

Estate tax avoidance and private benefit through charitable giving

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Abstract

I study how charitable contributions reported by nonprofit entities respond to variation in the federal and state estate tax rate. I focus on the asymmetric response by nonprofit vehicle type to changes in federal and state estate tax policy since 2000—distinguishing between private charities and public charities and between family foundations and non-familial private foundations. I find that private foundations respond between 7 and 10 times as strongly as public charities in response to variation in the top estate tax rate, exhibiting reported contributions elasticities of around 2 for changes in the federal estate tax and around 1 for same-state-level reforms. I also document a significant positive (negative) relationship between private foundation entry (exit) and estate tax rates. I document no significant difference in response between familial and non-familial foundations. Finally, I show that private foundations feature greater opacity in terms of their charitability objectives, demonstrate higher propensity to engage in self-benefiting transactions, and allocate greater shares of their expenses to administrative activities. This work demonstrates that the well-documented positive relationship between charitable bequests and estate taxation is largely driven by private foundations whose activity is associated with greater measures of private benefit.

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1 Introduction

How does the estate tax charitable deduction accrue differentially to different kinds of non-profit vehicles? Is the estate tax charitable deduction more important for private foundations or public charities, and how do these nonprofit vehicles differ in the public benefits they generate? These questions have broad implications both for how to most effectively design tax policy that balances equity and efficiency interests and for how policymakers think about the overall redistributive impacts and desirability of charitable giving.

Previous work has documented a substantial positive relationship between individual charitable bequests at death and the estate tax rate (D. Joulfaian 2000, J. M. Bakija, Gale, and J. B. Slemrod 2003). However, while individual bequesting behaviors as pertaining to the estate tax are better-understood, it is unclear quantitatively how important these responses are for are for charitable organizations themselves and how they vary differentially by nonprofit vehicle type. It is not known whether the funds absorbed through estate tax avoidance responses accrue disproportionately to private charitable entities, which may indicate the presence of quasi-privately benefiting or even tax-fraudulent charitable giving (Fack and Landais (2012)).

To address these questions, this paper estimates the magnitude of the estate tax-price responsiveness of reported charitable contributions of 501(c)(3) tax-exempt organizations in the US. I study how this response varies across charitable entity type—where namely, I investigate whether responses are stronger for more privately-held entities which may reflect more private interests in their operations (i.e. public charities versus private foundations). Furthermore, I study to what extent there exists a meaningful economic difference between family foundations and non-familial private foundations for estate tax avoidance purposes; this work is the first to incorporate data identifying family foundations and to study this distinction.

I view the contribution of this work as three-fold: First, I demonstrate that the large aggre-

gate response of charitable giving to variation in the estate tax rate is almost entirely driven by changes in contributions to private foundations (as opposed to public charities). This distinction cannot normally be made using US donor-side tax data for the income tax deduction because high-value monetary contributions are not feature any requirement to file substantiating documentation; similarly, individual-level bequest administrative data typically have not featured recipient information. Studying a large federal estate tax rate decrease, I find that aggregate contributions to private foundations responds with an elasticity with respect to the top marginal estate tax rate of around 2, and between zero and 0.285 public charities. Within-nonprofit contributions respond on average with an elasticity with respect to the top marginal estate rate of between 1.3 and 2; fixed individual public charities respond with an elasticity between zero and 0.15.

Second, I leverage new state-level variation in top estate tax rates since the 2001 replacement of the federal-state estate tax credit with a less generous deduction to provide the first evidence on the responses of private foundations contributions to changes in the estate tax rate. The reported contributions elasticity of private foundations with respect to the top *overall* marginal estate tax rate for changes in *state* estate tax policy is around 1, where as the within-nonprofit contributions elasticity for private foundations is between .25 and .5. The response for public charities is indistinguishable from zero in the aggregate, where the within-nonprofit response for public charities corresponds with an elasticity between 0.1 and 0.5. These results are surprising surprising result in light of the geographic disconnect between state estate tax liability (based on state-of-residence) and the full deductibility of charitable bequests regardless of state.

I also provide the first evidence that family foundations and non-familial private foundations do not operate in a meaningfully distinguishable manner for tax-avoidance purposes. While my results do not suggest a strong difference between the estate tax strategizing behavior of family and non-familial foundations, they are suggestive that if there is an asymmetry in their behavior, it is actually non-familial private foundations that respond more strongly to changes in the estate tax rate. My findings here suggest that there are mini-

mal benefits to legally distinguishing the two groups for tax enforcement purposes, and that there may be diminished scope for self-identified “family foundations” to operate as intergenerational transfer vehicles moreso than do non-familial private foundations. However, I do demonstrate that family foundations are associated with greater opacity in their stated charitability objectives and are more likely to hold substantial ownership interest in private businesses and make distributions to disqualified donor advised funds. On the other hand, I also document that family foundations engage in fewer disqualified transactions than do non-familial foundations.

After demonstrating the differential responses of charitable giving vehicle types to changes in the estate tax rate, I develop evidence on the extent of quasi-privately benefiting activity and charitability efficiency by nonprofit vehicle type. I demonstrate that private foundations, compared to public charities, private foundations are 1) substantially more opaque in terms of the exact subject matter of their charitable activity, 2) more prone using greater amounts of funds for administrative and non-charitable purposes, and 3) more likely to report business interests and activity pertaining to the financial interests of related and disqualified parties. I find less of an important distinction between familial and non-familial private foundations, but namely the family foundations 1) feature greater opacity in their charitability objectives and 2) greater likelihood of reporting substantial business ownership interests and distributions to related donor advised funds.

Estate and inheritance taxes in the US ostensibly serve to advance tax-progressivity interests over public revenue maximization moreso than do other kinds of taxes.¹ Only between 10,000-20,000 taxpayers face positive estate tax obligation in a given year, and by design—i.e. through the imposition of high exemption thresholds—these taxpayers generally come from the highest echelons of the wealth distribution. Moreover, federal estate tax collections

¹Several works focusing on optimal estate and inheritance taxation have adopted this perspective, replacing more standard public revenue maximization objectives that are typical in models of optimal taxation with equity-oriented and distributional objectives. For example, Piketty and Saez 2013 specify and calibrate their model of optimal inheritance taxation to maximize transfers to individuals that receive no bequests. Farhi and Werning 2010 study estate and inheritances taxes that facilitate intergenerational utility smoothing from the social planner’s perspective (as opposed to a purely dynastic generational perspective).

typically total to only around 1% of federal tax receipts every year.²

Considering the role of the estate tax in the social planner’s objective function, the relationship between charitable giving and inequality is ambiguous. Charitable activity is typically framed as fundamentally redistributive, but in settings where only the wealthiest taxpayers engage in charity or where charitable giving crowds out otherwise redistributive government public spending, inequality and charitable giving may covary in a positive manner. Indeed, accompanying increasing wealth and income inequality in the US, the volume of charitable giving has steadily increased as the number of unique donors has decreased (Collins, Flannery, and Hoxie 2018, Saez and Zucman 2016).

In this vein, several arguments pose the charitable giving regime in the US at odds to redistributive interests as specifically pertaining to the tax code. Namely, due to the limited settings in which the benefits of itemizing outweigh those of taking the standard income tax deduction³ or where disproportionately wealthy individuals engage in charitable giving or bequeathing as a means of reducing their tax obligation, the various permitted charitable deductions represent potentially distributionally regressive elements of the tax code.

There is also a substantial history of tax-fraudulent “charitable giving” in the US (Fack and Landais 2012) where “charitable” giving effectively served to facilitate self-dealt non-taxed consumption. Charity fraud persists to the present day, even decades following the legal overhaul of the private foundations giving regime through the Tax Reform Act of 1969. Moreover, even on the strictly legal tax *avoidance* end of the spectrum of tax strategy, within a familial private foundation (i.e. a “family foundation”), intra-generational assets may serve to facilitate the accrual of both pecuniary and non-pecuniary private benefits.⁴

²Calculated using annual tabulations from IRS Statistics of Income.

³Prior to the implementation of the Tax Cuts and Jobs Act (TCJA) beginning in 2017, less than a third of filers claimed an itemized deduction on their annual federal income taxes (Parisi 2018). This proportion has likely decreased since the TCJA due to the removal of select incentives to itemize.

⁴For example, individuals with familial connections to private foundation leadership roles may benefit from quasi-self dealing (i.e. not strict self-dealing, such as use of properties or consumption organizational work products or may benefit from increased social capital from expanded networks).

Critics in other disciplines have also called into question the desirability of public goods provided by private agents, as opposed to through governance and social planning. Early works in this area conceived of the (typically negatively-connoted) term *nonprofit industrial complex* to describe the relationship between the state and charitable giving entities (IN-CITE! 2007), Gereffi 2001). These scholars argue, issues of taxation notwithstanding, that the charitable giving/nonprofit regime ultimately operates *against* the redistributive goals they claim to espouse. A common critique in this space is that definitively solving a specific social problem poses an existential threat to the charitable entities organized against said issue, thus introducing a fundamental conflict of interest. Furthermore, by concentrating policy-making and decision-making capacities in private entities, the nonprofit industry dilutes government power and transfers power to the private leadership of nonprofit entities.

In this work, I combine data on the universe of nonprofit tax-exempt organizations with the underutilized legislative variation in the estate tax rate since the Economic Growth and Tax Relief Reconciliation Act of 2001 (EGTRRA) to more closely study charitable organizations and how their reported contributions respond to changes in tax incentives.

First I study the impact of the top marginal federal estate tax rate decrease from between 2001 and 2006 from 55% to 45% on reported charitable contributions by nonprofit 501(c) organizations, testing whether this response varies by organization vehicle type. I implement a difference-in-differences design using nonprofit organizations with non-tax-exempt contributions (i.e. 501(c) entities incorporated under sections excluding (3)) as the control group to estimate large elasticities of reported contributions with respect to the top marginal federal estate tax rate. I document that private foundations exhibit significantly greater responsiveness than do public charities. I find that private foundations exhibit a reported contributions elasticity of 2.4, whereas public charities see an elasticity of approximately unity. I also document that this estate tax rate decrease induced a slowdown in private foundation entry and an increase in exits compared to public charities.

Second, I focus on the contributions and entry/exit response of nonprofit entities to changes

in state-level estate tax policy. A priori, it is unclear how nonprofit activity might respond to state-level estate tax policy due to the geographic disconnect between state estate tax liability based on state-of-residence and the full deductibility of charitable bequests regardless of state of the recipient nonprofit. As two illustrative examples, 1) an individual with New Jersey state tax residence faces no direct or immediate incentive to engaging in tax strategy in response to elimination of the state estate tax in Tennessee, and 2) a New Jersey resident with positive New Jersey state estate tax liability faces equal tax incentive to make a charitable bequest out of their estate to a nonprofit recipient in New Jersey versus in Tennessee (which no longer features a state estate tax). To this end, I use a triple-differences design and a generalized event-study framework (Callaway and Sant’Anna 2020) to document an average private foundations response to changes in the same-state estate tax rate with an elasticity between .25 and .5 and an average public charity response corresponding to an elasticity between .05 and .1. In doing so, I also introduce improvements to extant data on state-level estate tax policy.

Throughout both of these exercises I make use of proprietary data on the near-universe of 501(c) entities to explore the distinction between familial and non-familial private foundations. This exercise sees some complication because identification as a “family foundation” is not a legal designation, but rather a colloquial one to indicate intra-familial ownership of and/or affiliation with a private foundation. This distinction, albeit carrying no legal implication, has implications for understanding private foundation management as an intergenerational asset or tax strategy vehicle. However, I find that there is no statistically significant difference between the responsiveness of familial and non-familial private foundations to variation in both top marginal federal and state estate tax rates.

Lastly, I develop evidence on the extent of quasi-privately benefiting activity and charitability efficiency by nonprofit vehicle type. I demonstrate that private foundations, compared to public charities, are 1) substantially more opaque in terms of the exact subject matter of their charitable activity, 2) more prone using greater amounts of funds for administrative and non-charitable purposes, and 3) more likely to report business interests and activity

pertaining to the financial interests of related and disqualified parties. These results substantiate the perspective that private foundation activity generate less public benefit than does public charity activity.

I find fewer large differences between familial and non-familial private foundations. Most importantly, I find among family foundations 1) greater opacity in terms of their stated charitability fields, 2) lower likelihood of engaging in and quantitatively lower importance of quasi-self dealing activities, such as compensation to officers and compensating disqualified persons, 3) greater likelihood of reporting substantial business ownership interests and distributions to related donor advised funds, and 4) similar levels of bunching on IRS-required minimum payout levels.

These findings come with several important implications. First, the results depict a charitable giving environment where private foundations exhibit strong responses to incentives, suggesting that these kinds of vehicles see disproportionate use for tax strategic purposes as compared to public charities. Taken with the evidence on the lower plausible public benefit generated by private foundations, this possibility may serve as impetus to re-evaluate the distributional impacts and characteristics of the charitable giving regime in the US. Second, the concentration among private foundations of the aggregate responsiveness of charitable contributions to variation in the estate tax rate may prompt us to re-frame earlier findings and discussions around charitable bequesting responses to the estate tax. Namely, the results imply that estate tax avoidance through charitable bequests is primarily a phenomenon for private foundations, as opposed to for public charities. Lastly, the large elasticities documented suggest the potential for large avoidance responses to alternative forms of wealth taxation through potentially semi-private charitable giving.

I proceed as follows: in Section 2, I discuss the literature related to charitability, wealth and income inequality, and taxation. Section 3 presents the data environment and establishes the relevant legislative background for estate tax avoidance via charitable giving. Section 4 presents and develops a simple model of intergenerational consumption and asset transfer

to illustrate the incentives and mechanisms underpinning tax avoidance through charitable and semi-private charitable giving. Section 5 estimates charitable contribution responses to changes in the federal estate tax environment, and Section 6 studies contributions responses of private foundations to variation in state estate taxes. In Section 7, I develop descriptive evidence on the extent of quasi-privately-benefiting activity and charity efficiency by nonprofit vehicle type. Section 8 provides a discussion of the results and concludes.

2 Related literature

In this section I discuss the relationship between this work and previous discussion on charity, taxation, and inequality. In brief, the intersection of these topics is relatively understudied. Most work in this area has focused on estimating the relationship between tax incentives and charitable giving. Additionally, a smaller literature has explored the potentially tax-fraudulent dimensions of charitable giving.

Within the body of work focusing on giving responses to taxation, much discussion has centered around taxpayers' charitable deductions response to income and estate taxes (and similar terminal wealth taxes) and whether the corresponding elasticity exceeds or is less than one in absolute value—i.e. whether the volume of charitable funds generated by the tax incentives exceed the tax expenditure. There exist several challenges in estimating the tax-price response of giving. For example, where the local charitable deduction reduces the per-unit cost of donating from 1 to $(1 - t)$,⁵ the precise marginal tax rate t faced by donors is a function of income. Additionally, in the US, there exist non-linearities in the deduction schedule through charitable deduction caps⁶ and deduction itemization requirements that introduce censoring issues for typically lower-to-middle-income individuals who do not item-

⁵Tax preferences extended to charitable giving may also induce broader impacts on the overall provision of both public and charitable goods and services based on whether public and charitable funds behave as complements or as substitutes.

⁶These deduction caps also vary by giving vehicle and type of tax. Individuals cannot deduct more than 50% of adjusted gross income (AGI) for giving to public charities, but cannot deduct more than 30% for private foundations. Other gifts see different deduction limits for the personal income tax.

ize their income tax deductions.⁷⁸

Much of the empirical work in this area has demonstrated disagreement over the magnitude of giving elasticities with respect to the net-of-tax rate—albeit moreso with respect to personal income taxation than for estate taxation. Bakija and Heim 2011 use tax return data to study a panel of taxpayers over the course of 25 years, documenting significant variance in the giving elasticity depending on the perceived persistence of the tax-price shock and taxpayer income group. Notably, they find elasticities with respect to the personal income tax induced price of giving statistically indistinguishable from negative one (albeit with preferred point estimates less than negative one) with responses mainly concentrated among taxpayers earning more than USD 1M in a given year. Auten, Sieg, and Clotfelter 2002 apply a structural estimation procedure to another panel of income tax filers in the US in order to more comprehensively separate transitory and persistent effects of tax-price changes. They document a large difference between short- and long-run responses, at -.4 and -1.26 (significantly lower than -1) respectively. Lastly, experimental evidence finds smaller responses to changes in the price of giving—approximately -.2 (Gandullia and Lezzi 2018); however, this work also finds elasticities slightly, but significantly in excess of one in absolute value when combined with a donation-matching scheme.

Another body of work focuses on these tax price responses of charitable giving within the estate, gift, and inheritance tax regime. A substantial body of evidence exists suggesting large responses to wealth taxation via savings decisions as well as avoidance and geographic mobility responses (e.g. David Joulfaian 2006 on savings decisions, J. Bakija and J. Slemrod 2004 and Moretti and Wilson 2019 on mobility, Kopczuk and J. Slemrod 2003 on estate and end-of-life planning); but within this area, other work has focused on how individuals anticipating paying the federal estate tax engage in charitable bequesting to mitigate their eventual tax obligations. Challenges in this area also tend to arise due to data censoring on

⁷While only one-third of taxpayers itemize their deductions—thus opening up the ability to make use of charitable deduction to the income tax—the 2017 Tax Cuts and Jobs Act (TCJA) introduced an above-the-line deduction of \$300 for non-itemizing taxpayers.

⁸See Andreoni 2006 for a more comprehensive discussion of the theoretical foundations of behavioral responses in incentives to engage in charitable giving.

part of the high estate tax filing exemption threshold as well as measurement error from the lightly progressive estate and inheritance tax schedules.

J. M. Bakija, Gale, and J. B. Slemrod 2003 use the universe of estate tax returns aggregated up to coarse wealth bins to study the change in bequesting behavior in response to variation in the marginal federal estate tax rate from throughout the 20th century. Under a wide variety of specifications, they recover elasticities between 1.6 and 2.1 in absolute value, soundly in excess of one including the error on their point estimates. Other works in this area typically make use of federal estate tax declaration samples or the universe of these declarations in select years, and report estimates of similar magnitude (e.g. D. Joulfaian 2000, D. Joulfaian 1991), and that responsiveness tends to increase as a function of wealth. Importantly, I seek to estimate the elasticity of contributions reported by nonprofits, not the taxpayer’s bequest response to end-of-life taxation.

Censoring of lower estate values issue plays an important role in this estimating bequest responses to the estate tax, but works relying on cross-sectional estate tax return samples and local probate records find similar results. Brunetti 2005 uses San Francisco probate records to study the responses of a wider range of taxpayers to changes in the federal estate tax and Californian inheritance tax, finding largely discrepant responses between federal estate tax filers and non-filers. In particular, federal estate tax filers exhibit tax-price elasticities of charitable bequest share of wealth between 1 and 2, with federal non-filers responding typically twice as strongly. Moreover, the authors also document a significant relationship between wealth and charitable bequests with an elasticity approximately equal to one.

Similarly relevant is the related literature focusing on the optimality of subsidizing charitable activity and optimal tax treatment of charitable activity. Model environments in this area tend to vary widely given the simultaneously behavioral and public-finance dimensions of charitable giving. Discussions on the optimal charity subsidy rate often begin with Feldstein 1980, which considers the cost and revenue raising efficiency of charitable giving subsidies versus direct government expenditure on a public “charitable” good: the primary

tradeoff in this setting considers the size of individual income and substitution responses to changes in the cost of the charitable good and the degree of substitutability between public funds and charitable funds. A simple result of the revenue maximization problem in this setting is that the subsidy is preferable to direct government spending when the subsidy induces some behavioral response in favor of the charitable activity/good. However, the optimality condition is augmented by the degree of substitutability between public and charitable goods/services, where the optimal subsidy decreases in the relative efficiency of government spending as compared to private charitable spending.

Hochman and Rodgers 1977 argues the possibility of that a decentralized giving equilibrium in the absence of price distortions may be non-pareto optimal due to discrepancies between individual marginal benefit and marginal cost in a free-rider setting. This model environment deals with the fundamental “publicness” and excludability of the charitable good, where non-donors can behave as free-riders. Kaplow 1995 argues that donors derive warm glow utility from donations through perceived benefit in the donee, but fail to consider fully internalize the social welfare impact of giving. I.e., donations have positive externalities that are underprovided in the absence of subsidies.

Other theoretical works consider charitable giving as a commodity in an Atkinson-Stiglitz tax expenditure setting, where revenue-raising objectives can support taxes on goods/services whose consumption is positively correlated with income and preferences Atkinson and Stiglitz 1976. Saez 2004 expands on this framework by focusing on a “contribution” good with positive externalities incorporating the crowd-out of charitability on government spending as well as the social welfare impact of both public spending sources.⁹

However, these optimal taxation/subsidization model environments do not typically engage with the tax evasive and tax avoiding dimensions of charitability. Although I do not advance

⁹Evidence on aggregate substitutability between government spending and charitable activity is scarce. However, empirical work on donor behaviors suggests the presence of crowd-out among different types of giving. For example Yildirim et al. 2020 and K. 2015 find evidence that donations to natural disaster relief decrease political donations; the former work also documents a decrease in charitable giving in response to political advertisement campaigns.

claims on explicitly tax evasive behavior through fraudulent use of charitable organizations, other works have studied tax evasion in the context of charitability and charitable giving.

A simple model conception of tax fraudulent giving assumes a constant fraudulent share of subsidized giving that dilutes the social benefit of giving that provides the initial impetus for subsidization. In this kind of setting, increasing subsidies to charitable activity is optimal if the ratio of the non-fraudulent giving and fraudulent giving tax-price elasticities exceeds one plus an increasing function of the local fraudulent contribution share (Fack and Landais 2012).

There exists a slightly greater volume of empirical work that substantiates the presence and behavioral characteristics of tax fraud through “charitability”. A central difficulty in thoroughly studying tax evasive behavior via charity fraud lies in the limited precision in 1) connecting individuals with their related foundations, and in 2) granularly documenting privately-accruing benefit either on the side of donation transactions or on the side of charitable activity. As a result, other works that study charity abuse tend to rely on aggregated data or highly stylized subsamples.

Fack and Landais 2012 demonstrate that up until the passage of anti-self-dealing laws, high-earning taxpayers could pass income through private foundations and engage in untaxed consumption. Following the ratification of the Tax Reform Act of 1969 (TRA69) that placed substantial scrutiny on the use of private foundations, prohibited self-dealing activities, and taxed income unrelated to private foundations’ central activities,¹⁰ the number of private foundations created dropped from 1250 to 200 entities per year, while the number of these foundations terminated increased from several dozen to around 600 entities per year. Moreover, aggregated charitable giving statistics demonstrate that while charitable giving continued to increase for lower income brackets, following TRA69 the total charitable giving of the top .01 percent of earners dropped by 25% relative to a 1968 baseline. The work

¹⁰Other methods of charity abuse are detailed in Fack and Landais 2012 as compiled from governmental committees and also include falsely claimed deductions, overvaluation of donated property to increase personal deductions from donated assets, and political bribery.

establishes the historical precedent for the abuse of private foundations for tax strategic purposes by high earners, but is less readily applicable for understanding charity abuse in today’s fiscal environment. Additionally, because TRA1969 affected so many aspects of the charitable giving regime in the US, it is difficult to interpret responses quantitatively in terms of a tax-price elasticity.

Other works studying charity abuse include Yermack 2009 which documents a trend of corporate CEOs systematically donating owned company stock to their own family foundations prior to a significant drop in stock price, and that these gifts are often fraudulently backdated. Tazhitdinova 2018 studies how reporting requirements limit evasion in the context of charitable deductions to income taxation. In line with evidence documented in other works on reporting requirements (e.g. Kleven et al. 2011), the removal of donation documentation requirements up to a small threshold of several hundred dollars induces a substantial volume of tax cheating. Tazhitdinova 2018 demonstrates substantial bunching in claimed deductions up to this small threshold that corresponds with a greater overall mass of deductions prior to the kinked schedule, finding that over half of new donations are fraudulent in nature.

3 Data and background

3.1 Data

I study the contributions response of charitable entities by combining data from three main sources: 1) annual financial statements from the universe of 501(c) organizations in the US as reported on mandatory tax filing declarations, 2) indicators for family foundation status from a charity research and statistical services provider, and 3) publicly available data on state and federal top federal estate tax rates. I describe and summarize these data including their scope and limitations here.

3.1.1 Annual nonprofit organization activity declarations

I compile annual tax declarations from the universe of US nonprofit entities from between 1989 and 2015.¹¹ The designation of nonprofit entity includes organizations with non-tax-exempt contributions for donors (organized under subsections of US Code § 501(c) other than (3)) as well as public charities and private foundations and private operating foundations (all organized under US Code § 501(c)(3)) whose contributions are tax-exempt. These organizations are required to file annual activity statements, from which publicly available excerpts are published.¹²¹³

These public data report nonprofit ID \times fiscal year levels of contributions from donors, various income and expense aggregations, and asset statements for the approximately 1.1 million unique nonprofits filing between 1989 and 2015.¹⁴ The data also include EIN-level metadata such as organization type (non-tax-exempt contributions for donors (i.e. 501(c) non-(3)), public charity, and private foundation (both 501(c)(3)), operating location, name, and industry of operation, *inter alia*.¹⁵

Each nonprofit organization is assigned an employment identification number (EIN). To construct my final sample, I drop 1) US organizations that ever report domicile in a US territory or protectorate or outside of the US, 2) organizations ever having organized under a *partially* tax-exempt subsection of US Code § 501(c), 3) organizations ever having changed

¹¹Data from 1989 to 2013 are maintained by the National Center for Charitability (NCCS) at Urban Institute; the Internal Revenue Service Statistics of Income (SOI) division publishes the universe of annual filings from 2012 to 2015 (with approximately two year’s delay; i.e. filings labeled for a specific year contain returns for the fiscal year typically two years prior. Data from 1993 only feature a sample of private foundations that over-samples larger organizations.

¹²I express all dollar values in terms of real USD 2015 except in the case of listing nominal tax bracket locations and exemption threshold.

¹³Of note, although donations to foreign nonprofits also generate estate tax deductions, the NCCS/SOI data only report the financial declarations of on US-based entities.

¹⁴Nonprofit organizations have varied fiscal year endings. Approximately 60% of EINs end their fiscal year and declare their annual activity to the IRS in December, and another 20% file in June. In my main specification, I truncate on the year-level: e.g. all months 1-12 of year 2015 are mapped to year 2015. Nonprofit entities typically do not change their fiscal year (with 95% of EINs only declaring on a single filing month throughout their span of activity), and such organizations tend to file every consecutive year during their activity as legally prescribed.

¹⁵The public releases of these data do not permit identifying organization leadership, although the NCCS data feature this information for fiscal year 2005.

tax-exempt status or private foundation status, 4) entities ever having organized under one of the 501(c) subsection codes outside of subsection (3) that do not solicit donations,¹⁶, Karol (2023), Goodman-Bacon (2020)), I also exclude nonprofits organized under subsection (4). Lastly, I exclude subsections 8, 10, and 13, due to their partial deductibility regimes that state that donations to such entities may be deducted from the estate tax base if the donations are used for similiar purposes as of 501(c)(3) entities. In total, I keep entities organized under subsections: 3, 6, 7, 19, and 23, as well as select sections organized outside of 501(c) including 501(d), 501(e), 501(f), 501(k), 527, and 4947(a)(1). and 5) organizations ever having been flagged to be removed from the sample of nonprofits by NCCS or SOI. I also assign values of zero for reported contribution for entity-years in which an entity is operating but has not filed. Table 1 displays select summary statistics of this final panel, stratified by each organization type.

3.1.2 Family foundation indicators

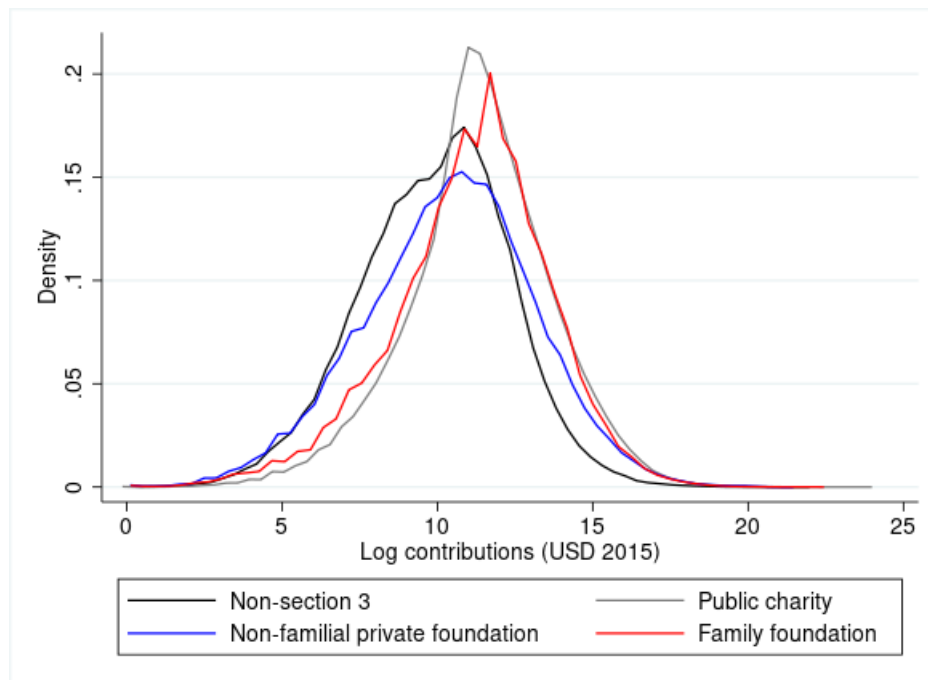
To distinguish between non-familial private foundations and family foundations, I scrape data from a prominent charitability statistics service provider for charities. The key difficulty for distinguishing these two groups within all private foundations is that the term *family foundation* does not confer a specific legal designation with separate taxation or legal implications, but rather serves as a colloquial distinction for an intra-generational private foundation asset.¹⁷ That is, both “non-familial private foundations” and “family foundations” have legal recognition as private foundations and file identical annual financial activity declarations as private foundations. Little is known about to what extent this colloquial distinction is economically meaningful.

¹⁶As an illustrative example, I drop subsection (14)—*state-chartered credit unions and mutual reserve funds offering loans to members*, which *does not* solicit donations—and keep subsection (07)—*social and recreational clubs which provide pleasure, recreation, and social activities*, which *does* solicit donations. Of note, I also drop subsections (02) and (71)—*title-holding corporations* (generally used by nonprofit entities as a means of pooling risk across legally separated entities and which do not solicit donations)—and subsection (90)—*split interest trusts* (whose purposes deal with optimizing charitable donations for income tax strategic purposes). In light of evidence of light substitution between political and charitable contributions (e.g. Yildirim et al. (2020))

¹⁷In this way, the self-identification of a private foundation as a family-foundation is likely a strategy-free decision. However, this may not be the case if there are differences in public perception, which may have implications organizations’ abilities to solicit contributions or external partnerships and loans.

This statistical service provider contains proprietary data on the near-universe of US-operating 501(c)(3) organizations, including (in addition to full tax declarations) indicators for family foundation status based on opt-in identification or the presence of individuals with the identical last names as the foundation namesake on declared organization leadership or major donor.¹⁸ I treat family-foundation status as time-invariant.

Figure 1: Histogram of log contributions by organization type



This figure displays a histogram of log contributions for years 1989-2015 stratified by organization type. Throughout the timeframe, approximately 60% of private foundations and non-section-3 organizations report zero contributions in a given year, whereas only 16% of public charities report zero contributions in a given year.

¹⁸I perform a fuzzy-match on foundation name between the service provider dataset and the NCCS/SOI data, complemented with a partial list of EINs jointly included between the data sources, yielding a 87% match rate of the list of family foundations to private foundations.

Table 1: Panel (a): Summary statistics by organization type (1989-2015)

	Non-section 3		Public charities	
	Mean	Median	Mean	Median
Age	30.60 (23.82)	26 [74.00]	19.23 (17.52)	14 [53.00]
Contributions	130000 (5.7e+06)	0 [2.1e+05]	1.100e+06 (2.3e+07)	55674 [2.9e+06]
Revenue	3.000e+06 (6.1e+07)	130000 [5.9e+06]	5.200e+06 (9.8e+07)	170000 [1.0e+07]
Expenses	2.700e+06 (4.3e+07)	120000 [5.4e+06]	4.800e+06 (9.2e+07)	150000 [9.5e+06]
Assets	7.400e+06 (2.9e+08)	150000 [1.1e+07]	9.500e+06 (2.5e+08)	180000 [1.6e+07]
Contributions / assets	1759 (9.2e+05)	0 [1.40]	388.5 (82943.63)	0.280 [8.19]
Revenue / assets	7913 (2.2e+06)	0.910 [9.83]	1182 (3.0e+05)	1.080 [14.48]
Expense / assets	7851 (2.1e+06)	0.860 [10.29]	1391 (4.0e+05)	0.980 [15.18]
Cont. / revenue	0.130 (0.28)	0 [0.94]	0.500 (0.40)	0.500 [1.00]
Revenue / expense	10.07 (4157.94)	1.030 [1.19]	9.810 (1317.62)	1.030 [2.18]
Distinct EINs	3.3e+05		6.0e+05	
Observations	3.5e+06		5.2e+06	

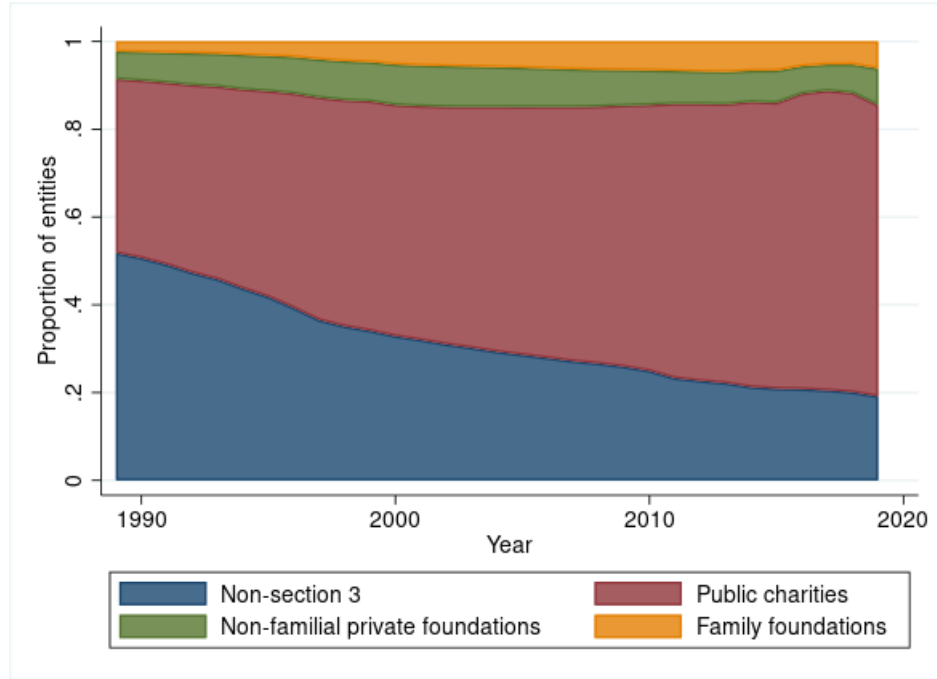
This table displays mean and median values of select summary stats for non-section 3 nonprofit organizations and public charities computed using a panel of annual financial declarations (as reported in IRS form 990) for between 1989 and 2015. Age corresponds with the maximum difference between most recent reporting year and founding year achieved by each EIN (with summary statistics computed from a separate cross-sectional dataset). Standard deviations are reported in parentheses; hard brackets indicate the difference between the 95th and 5th percentiles. Dollar values are expressed in terms of real USD 2015.

Table 1: Panel (b): Summary statistics by organization type (1989-2015)

	Non-familial private foundations		Family foundations	
	Mean	Median	Mean	Median
Age	17.87 (16.35)	13 [52.00]	21.33 (14.00)	19 [48.00]
Contributions	450000 (1.0e+07)	0 [6.6e+05]	630000 (2.3e+07)	0 [1.3e+06]
Revenue	1000000 (1.6e+07)	36000 [2.0e+06]	1.300e+06 (3.1e+07)	77946 [3.1e+06]
Expenses	680000	36923	730000	64939
	(1.0e+07)	[1.4e+06]	(2.5e+07)	[1.7e+06]
Assets	6.900e+06 (2.8e+08)	310000 [1.3e+07]	8.200e+06 (2.6e+08)	620000 [1.8e+07]
Cont. / assets	14600 (2.8e+06)	0 [4.09]	220.0 (22256.09)	0 [2.17]
Revenue / assets	15706 (2.8e+06)	0.0900 [6.90]	308.4 (27281.79)	0.110 [2.84]
Expense / assets	16610 (2.8e+06)	0.0800 [9.39]	505.6 (38062.98)	0.0800 [3.21]
Contributions / revenue	0.290 (0.41)	0 [1.00]	0.340 (0.42)	0 [1.00]
Revenue / expense	70.79 (10147.61)	1 [8.34]	98.55 (9283.43)	1.030 [14.05]
Distinct EINs	93976		46512	
Observations	1.0e+06		7.0e+05	

This table displays mean and median values of select summary stats for non-familial private foundations and family foundations computed using a panel of annual financial declarations (as reported in IRS form 990-PF) for between 1989 and 2015. Age corresponds with the maximum difference between most recent reporting year and founding year achieved by each EIN (with summary statistics computed from a separate cross-sectional dataset). Standard deviations are reported in parentheses; hard brackets indicate the difference between the 95th and 5th percentiles. Dollar values are expressed in terms of real USD 2015.

Figure 2: Share of broad organization types over time



This figure displays the evolution in relative shares of each of the four nonprofit organization types I identify. This time series is computed using a within-lifespan rectangularized panel of EINs so that an EIN-year is included if the year falls within the range of the EIN's founding year and its most recently reported year. Note that the group of all private foundations is comprised of the sum of non-familial and familial private foundations.

3.1.3 Estate tax variation

In spite of the public knowledge nature of state estate and inheritance tax variation over time, this information is not well-compiled in a publicly available format. I make use of modifications to state-year indicators for the presence of an estate tax or an inheritance tax that operates similarly to an estate tax as compiled by Moretti and Wilson 2019. These authors compile their indicators using prior legislative investigations by Conway and Rork 2014 and Michael 2015 for the presence of state estate and inheritance taxes and their year of repeal if applicable. I supplement the Moretti and Wilson indicators with information from state legislative texts and estate/inheritance tax schedules to 1) account for a wider range of years and include Washington D.C., 2) introduce greater precision for the top marginal

state tax rates,¹⁹ and 3) sharpen the timing of the exact repeal and introduction of state estate taxes.

Many state estate taxes involve a progressive gradation at lower estate valuations level, but reach their maximum rates at or below the federal estate tax threshold at a nearly uniform rate of 16% across the states that feature these taxes. For the reason that the average estate tax rate approaches the top marginal rate for estates high above the threshold, I focus on the binary presence of estate taxes for the state setting.

3.2 Legislative background

3.2.1 On end-of-life wealth taxation

Estate, generation-skipping, gift, and inheritance taxes²⁰ represent the primary forms of individual high-wealth taxation in the US. These taxes are typically levied upon the transferral of an asset from a decedent to an inheritor (or originating from a living individual in the case of inter vivos gifts). Depending on whether one's state-of-residence levies an end-of-life or gift tax separately from the federal level, individuals may face tax obligation on wealth transferrals from both the federal and state level. The legal regime for end-of-life taxation sees many complications, so I explain only the most relevant ones here.

Federal estate taxation: The federal estate tax uses a progressive rate gradation, with a top marginal rate that has seen substantial movement over time, mainly beginning with the Economic Growth and Tax Relief Reconciliation Act of 2001 (EGTRRA). The evolution of the top marginal rate is pictured in Panel (a) of Figure 3. The exemption threshold and gra-

¹⁹The modal top marginal tax rate across states with an estate tax is 16%. Because of the combined minimal deviations from this top rate across states and the typical complexity of the tax code when such deviations are present, Moretti and Wilson 2019 and similar works conceive of the presence of an estate tax as a binary variable (or as a uniform top rate of 16%)

²⁰The nominal distinction between these taxes typically lies in the identity of the taxpayer. Estate taxes are levied on the estate of a decedent, whereas inheritance taxes are levied upon receipt of an estate, with rates that often differ based on the relationship of the inheritance recipient and the decedent. Gift taxes apply to inter vivos transfers, and generation-skipping taxes apply to the transferral of assets from a decedent to a non-spousal party at least 37.5 years younger. I focus primarily on estate taxation, but aspects of the other end-of-life taxes behave similarly to the estate tax, and some state end-of-life taxes effectively operate as estate taxes, for which reason I include them as estate taxes.

dation have also seen change over time, but these changes are incremental and less relevant for high-valued estates.²¹ Namely, in the years leading up to EGTRRA, only estates valued at above approximately USD 650,000 (nominal) faced estate tax obligation. The exemption level rose gradually following EGTRRA until indexation to the inflation rate in 2011 (and doubling in 2018). The gradation of estate tax varies less and becomes substantially less important relative to the exemption threshold, starting at 18% and reaching the top marginal rate at USD 2.5 million until 2002 and at USD 1 million above the exemption threshold starting in 2013 (varying non monotonically between those two years, reaching a low of USD 500,000 between 2010 and 2012).

State estate taxation, simplified: The history of state-level end-of-life wealth taxation in the US is somewhat complicated. From most of the 20th century until 2001, a state estate tax credit allowed individuals to credit up to 16% of their federal estate tax obligations for state end-of-life taxes. Thus, all states and Washington D.C. made use of “pick-up” taxes that effectively diverted income from the federal government to state governments. These taxes are less formally referred to as pick-up or *sponge* taxes. States designed their estate taxes to fit the gradation of the tax credit, so that there was no geographic distortion in state end-of-life taxation obligation across the US.²²

While all states made use of state estate tax creditation against the federal estate tax, states varied in the legal implementation of their specific end-of-life taxes with respect to the credit; this detail is important for understanding the post-EGTRRA variation in state

²¹Figure 3 also highlights year 2010 as within federal estate taxation. EGTRRA originally provided for a repeal of federal estate and generation skipping taxes for 2010 specifically. However, in December 2010 US Congress retroactively reinstated the decided the estate tax for that year while allowing the estates of 2010 decedents to elect between facing a 35% versus paying no estate tax and applying EGTRRA’s modified carryover basis rules. In broad, the modified basis regime was interpreted to typically result in a “step-down” in the basis of inherited assets, which would result in greater income taxation upon inheritance (treated as gift income). The decision as to which estate tax regime to elect into relatively trivial except for large estates, with electing to pay the 35% estate tax as the dominant strategy for most smaller estates. See Ransome and Schafer 2011 and Nuckolls 2010 for more detailed discussions on the 2010 federal estate tax election from estate planning and accounting perspectives.

²²The state of New York is the sole exception to this rule, having installed a top marginal state estate tax rate of 21%, so that estates with tax basis far above the approximately USD 10 million top bracket location would face on average 5 percentage points additional estate tax obligation to New York as compared to decedents in other states.

estate taxation. Most states designed their estate taxes as explicitly tied to the existence of the credit, whereas others ratified their estate taxes as statutorily independent of the tax credit (albeit often designed to match the credit’s exact gradation). Regardless, under the pre-EGTRRA regime, state estate taxation generally effected no additional tax burden to decedents beyond the federal income tax rate.

With the passage of EGTRRA in 2001, the federal government phased out the state estate tax credit linearly between 2002 and 2005 (decreasing its generosity by 25 percentage points each consecutive year) and replacing it with a smaller deduction that resulted in additional net estate tax obligation from states that imposed estate taxes.²³

The removal of the state estate tax credit meant that all states effectively had to decide whether to impose a separate estate tax—referred to as *decoupling* from the state estate tax credit. By default, the states that designed their pick-up taxes as explicitly tied to the credit would have no estate tax unless they explicitly decided to decouple and pass a separate tax; those states that designed their estate taxes as separate from the state estate tax credit would decouple by default and have a separate estate tax unless they explicitly ratified legislation to *not* have a state estate tax.

This decision effectively created three mutually exclusive groups of states: 1) states that did not feature an estate tax following the repeal of the state estate tax credit, 2) states that had a separate estate tax *immediately* following the repeal of the estate tax credit, 3) states that installed a state estate tax only *after* the repeal of the state estate tax credit. Among the latter two groups, some of these states later repealed their state estate taxes. Among states featuring separate estate taxes, these state estate taxes saw a modal top marginal rate of 16%, with no states implementing a greater top marginal rate.

One can thus broadly understand the geographic heterogeneity of state estate taxation as

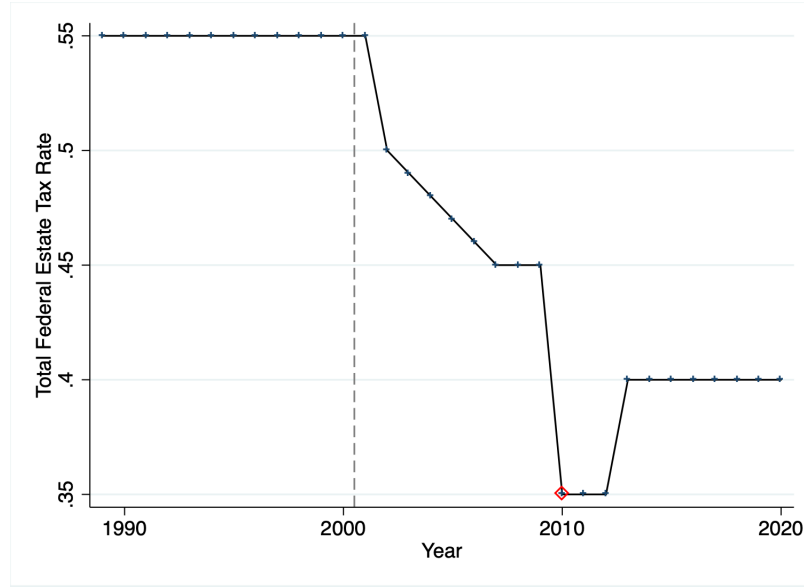
²³One can understand the change in estate tax rate from the replacement of the state estate tax credit with a deduction as an above-threshold rate change from $\tau_f + \tau_s - \tau_s = \tau_f$ under the credit regime to $\tau_f + \tau_s - \tau_f \tau_s$ under the deduction regime.

follows. 1) prior to EGTRRA, there was nearly no additional overall estate tax burden imposed by state estate taxation due to the state estate tax credit. 2a) With the passage of EGTRRA, state estate taxes induced additional estate tax burden to the federal estate tax. 2b) Based on the structure of the pre-existing sponge taxes, states had to decide whether to keep or install their estate taxes; but due to the limited revenue-raising capacity of end-of-life-taxes, this decision was largely contingent on state political environments and the ability of state legislatures to ratify legislation in a relatively small amount of time. 3) Some states later repealed or installed their estate taxes following the full-replacement of the state estate tax credit. Panel (b) illustrates the evolution in state estate taxation, distinguishing between *de jure* state estate taxes as separate from the pick-up taxes, and *de facto* estate taxes that effected additional tax burden in to the federal estate tax (pictured for a hypothetical estate of sufficiently high valuation).

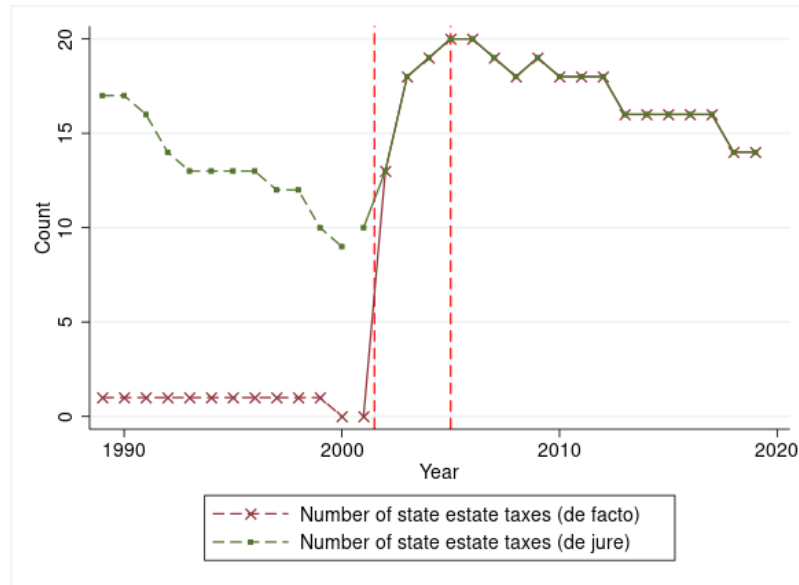
Unlike with income taxes, these end-of-life transfer taxes see no charitable deductions limits. That is, individuals and estates can entirely mitigate their estate tax obligations through engaging in bequests-at-death or carrying over near-end-of-life giving to nonprofit entities organized under US Code § 501(c)(3). Individuals can mitigate both their estate tax burden and a portion of their income tax obligations through during-life charitable estate donations, but the income tax deduction is generally trivial compared to the estate tax obligation.

Figure 3: Estate taxation in the US

(a) Top federal estate tax rate



(b) Number of state estate taxes



This figure illustrates the evolution of federal- and state-level estate taxation in the US. Panel (a) displays the top marginal federal estate tax rate over time. The dashed gray line signifies the ratification of the Economic Growth and Tax Relief Reconciliation Act of 2001 (EGTRRA). EGTRRA originally specified a repeal of the federal estate tax for 2010, and in December 2010, the US Congress decided to allow the estates of 2010 decedents to elect between facing a 35% estate tax rate versus paying no estate tax and applying EGTRRA's modified carryover basis rules. Panel (b) counts the number of states with separate estate taxes over time, distinguishing between *de jure* taxes per legislative statute (generally effecting no additional estate tax burden due to the state estate tax credit) and *de facto* taxes that induced geographic heterogeneity in overall estate tax obligation (pictured for a hypothetical estate of sufficiently high valuation). The dashed red lines signify the federal-state estate tax credit repeal period under EGTRRA.

3.2.2 On charitability and tax incentives

The US government has shaped its tax code considerably to incentivize nonprofit activity. Most nonprofit entities organize under one of the 29 subsections of Internal Revenue Code 501(c) which determine their eligibility for federal and state income tax exempt status.

While most 501(c) corporations do not pay income taxes,²⁴ generally only donations (deemed *contributions*) to entities organized under subsection (3) generate tax deductions for donees. The corporations under subsection (3) operate with primarily either religious, charitable, scientific, literary or educational purpose, whereas those organized under outside of subsection (3) tend to operate as social, professional, political, union, and insurance-pooling entities.

The US tax code distinguishes between two main kinds of 501(c)(3) organizations. The two groups, *public charities* and *private foundations* differ on a largely nominal basis, where the former are attributed public charity status by the IRS based on deriving at least 10% of their revenue from the general public and the government, whereas the latter status is granted based on deriving its funding mainly from individuals, families, and corporations.

The two groups see largely similar legal and tax treatment, albeit with some important distinctions. Many of the most important differences stem from the Tax Reform Act of 1969, which aimed to limit tax fraud through private foundations. Some of the reforms to private foundation operation include: 1) the limitation of the donor income tax deduction to 30% of adjusted gross income (AGI) (set at 50% for public charities),²⁵ 2) a 1.39% tax on investment and endowment income and corporate income tax treatment of unrelated business income, and 3) restrictions on *self-dealing*: direct transactions with foundation leadership and prominent donors and their families (deemed *disqualified* persons).

²⁴Certain kinds of activities do generate tax liability for nonprofit entities, such as generating investment income or making payments to disqualified parties.

²⁵The income tax charitable deduction also sees a five-year carry-forward basis; that is, for a charitable deduction in excess of the relevant AGI limit, the excess can be applied for up to five years after the initial donation.

There are a priori reasons to suspect that the declared contributions response to changes in estate taxation may differ between public charities and private foundations. As a first order, the private foundations are nominally defined by their more relatively concentrated contributor/donor base. Mechanically, bequests out of estates from wealthier individuals likely comprise a greater share of contributions for private foundations than do those for public charities that may receive a greater proportion of their contributions from government grants and smaller donors. Second, while anti-self-dealing laws prohibit most transactions that result in untaxed cash-flow to disqualified individuals, individuals may circumvent these restrictions via indirect, “round-tripping” transactions. Moreover, affiliation with a private foundation via relation to a prominent donor or manager may provide both non-pecuniary and pecuniary benefits to normally disqualified persons through entirely legal means. For example, association with a private foundation may afford related individuals additional social capital. In this manner, donations to private foundations can effectively serve as a less-liquid intra-generational asset similar to an estate.

4 Conceptual model

This section presents and develops a simple model environment that illustrates the incentives and tradeoffs of charitable tax expenditures out of within a wealth taxation framework, demonstrating justification for why private foundation giving might response more strongly to changes in the estate tax schedule than giving to other charity types. The purpose of the model is conceptual in foundation. I model the end-of-life estate planning and bequesting decision as an implicitly two-generation problem, in which a parent-decedent allocates her estate between taxed bequests and charitable giving between organizations of different benefit to her child-recipient. This taxpayer maximizes her utility, which considers the present-day warm-glow value of one of thee kinds of charitable giving and the vicarious, discounted utility of her child’s future consumption.²⁶

²⁶I refrain from modeling lifetime giving and its income-tax deduction implications for simplicity and because of the significantly greater magnitude of potential estate tax mitigation of charitable bequests compared to that for the income tax.

The taxpayer allocates wealth between four different kinds of end-of-life giving to activities that generate warm-glow utility or vicarious second-generation utility. Three kinds of charitable giving generate warm-glow utility: tax-dispreferred giving to a non-charitable entity and tax-preferred giving to a public charity or to a private foundation. The bequest motive considers both direct bequesting (subject to the estate tax) as well as private foundation giving, where the central implication is that private foundation giving may reflect interest in generating a form of consumption for future generations.

The conceptual results of this model are straightforward. The tax preference against direct non-charitable bequests and non-charitable giving induces substitution toward private foundation giving and unrelated charitable giving in response to an estate tax increase. However, negative income effects from additional taxation on direct bequests and non-charitable giving mitigate the positive substitution toward private foundation giving and unrelated charitable giving, so that the net effect of an estate tax increase on both of these latter activities depends on the relative magnitudes of income and substitution effects.

A parent has exogenous wealth $w \geq 0$ that she is allocating for end-of-life estate planning purposes. She derives utility based on the allocation of her wealth between four different sources that either benefit her child or that provide her warm glow utility: 1) she can bequest wealth b to her child that is subject to estate tax τ ; 2) she can donate g_c that is exempt from wealth taxation to an unrelated charitable cause; 3) she can donate g_n to a non-tax-deductible cause; 4) she can donate g_p exempt from estate taxation to a related charitable entity that generates some privately-accruing benefit to her child. This donation activity g_p serves as a stand-in for giving to a related private foundation. All three donation options provide the parent with some warm glow utility. The parent maximizes an objective function that considers directly the warm glow benefits of donating and vicariously the well-being of her child:

$$U(b, g_c, g_n, g_p) = \sum_{l \in \{c, n, p\}} u_l(g_l) + \beta v(b, g_p), \quad (1)$$

for a discount factor β of her child's utility in bequested wealth b and privately-benefiting charitable donation g_p . All of these value functions increase concavely in their arguments. Here, I heuristically consider a bequest motive $v(b, g_p)$ that is additively separable in direct bequests b and private foundation giving g_p , but Appendix subsection B.1 considers some of the complexities introduced by removing this specification.

The parent maximizes this objective subject to the end-of-life resource constraint:

$$w = \frac{b}{1 - \tau} + g_c + \frac{g_n}{1 - \tau} + g_p, \quad (2)$$

with $b, g_c, g_n, g_p \geq 0$.²⁷

An interior solution with strictly positive intergenerational bequesting and giving of all three described types satisfies the first order conditions:

$$v_b = \left(\frac{1}{\beta} u'_p + v_{g_p} \right) \frac{1}{1 - \tau} \quad (3)$$

$$= u'_c \cdot \frac{1}{\beta} \cdot \frac{1}{1 - \tau} \quad (4)$$

$$= u'_n \cdot \frac{1}{\beta} \quad (5)$$

and that at an interior optimum, the marginal value of alleviating the budget constraint can be expressed as $\lambda = u'_c|_{x^*}$ for optimal $x^* = (b^*, g_c^*, g_n^*, g_p^*) \in \mathbb{R}_+^4$.²⁸

²⁷Each argument $l \in \{b, g_c, g_n, g_p\}$ is associated with complementary slackness value multiplier λ_l .

²⁸One can also consider the case with binding non-negativity constraints on non-deductible donations and/or unrelated charitable donation (with other partial/full corner solutions generalizing accordingly): $g_c = g_n \equiv 0$. In these cases, the unconstrained optimum would attribute negative values to these consumption choices so as to free up additional budget to allocate to intergenerational bequests and related private foundation donations with marginal benefit $-\lambda_n, -\lambda_c > 0$ for a small decrease below zero in g_n or g_c respectively.

The first order conditions implicitly define an interior optimum with mapping $f : \mathbb{R}^8 \rightarrow \mathbb{R}^5$

$$f(x^*, \lambda, \beta, \tau, w) = \begin{bmatrix} \beta v_b - \frac{\lambda}{1-\tau} \\ \frac{\partial u_c}{\partial g_c} - \lambda \\ u'_n - \frac{\lambda}{1-\tau} \\ \beta v_{g_p} + u'_p - \lambda \\ w - \frac{b}{1-\tau} - \frac{g_n}{1-\tau} - g_c - g_p \end{bmatrix} = \vec{0} \in \mathbb{R}^5 \quad (6)$$

We can study the comparative statics associated with local perturbations of the interior optimum defined here by applying the implicit function theorem. The proof demonstrating this application and the full partial derivative matrix are presented in appendix section subsection B.1.

The simple case with additive separability between private foundation giving and direct transfers for the bequest-motive component of the utility function gives straightforward intuition for the incentive responses to a change in the tax rate. Income effects decrease each component of an optimum $(b^*, g_c^*, g_n^*, g_p^*)$ given a non-zero counterfactual $(b^* + g_n^*)$, and substitution effects draw funds from the tax-dispreferred bequesting and non-charitable giving toward tax-preferred private foundation giving and charitable giving. The sign of $\frac{\partial g_p}{\partial \tau} - \frac{\partial g_c}{\partial \tau}$ is given based on the specific curvatures of the value functions. But, assuming symmetric charitability motive for private foundation and public charity giving, the bequest motive channel of private foundation giving generates an asymmetric response:

$$\frac{\partial g_p}{\partial \tau} - \frac{\partial g_c}{\partial \tau} \geq 0.$$

The empirical section focuses primarily on estimating the declared contributions response of nonprofit entities to changes in the effective federal and state estate tax rate. We can understand this parameter as it relates to prior literature on the estate tax rate elasticity of charitable bequests as

$$\varepsilon_{T,\tau} = S_B \varepsilon_{B,\tau} + S_{NB} \varepsilon_{NB,\tau} = S_B (\varepsilon_{B,\tau} - \varepsilon_{NB,\tau}) + \varepsilon_{NB,\tau},$$

for bequest and non-bequest shares of declared contributions S_B and S_{NB} respectively and overall estate tax rate elasticity of declared contributions $\varepsilon_{T,\tau}$. Assuming that the estate tax rate has no bearing on non-estate-related donations, this net elasticity reduces to the standard bequesting elasticity (with respect to the estate tax rate) multiplied by the share of overall contributions resulting in an estate tax deduction.

This additional structure along with the above incentive responses also motivate the design of counterfactual giving estimation strategies in the empirical section. Namely, non-charitable entities can serve as a counterfactual group for studying the impact of estate tax changes on charitable entities and private foundations if, in addition to satisfying parallel trends assumptions, non-charitable donations demonstrate zero response to estate tax changes—i.e. estate tax changes do not also affect non-charitable donation behavior. This condition is satisfied either if the share of non-charitable contributions out of estates $S_{NB} = 0$ or if $\frac{\partial g_n^*}{\partial \tau} = 0$.

In addition to using non-501(c)(3) contributions to inform the counterfactual evolution of charitable and private foundation giving, I design counterfactuals using state-level changes that do not affect charitable entities in other states²⁹. I also allocate focus on quantifying the differential responses between vehicle types in response to federal reform.

5 Responses to federal estate tax reform

This section estimates the differential contributions response along 501(c) vehicle type to the 2001 federal estate tax rate decrease. EGTRRA, introduced in the US legislature in May 2001 and ratified the following month, reduced the top federal estate tax rate from 55% to 50% followed by an additional one percentage point reduction per year until 2007 (settling at a top rate of 45%).

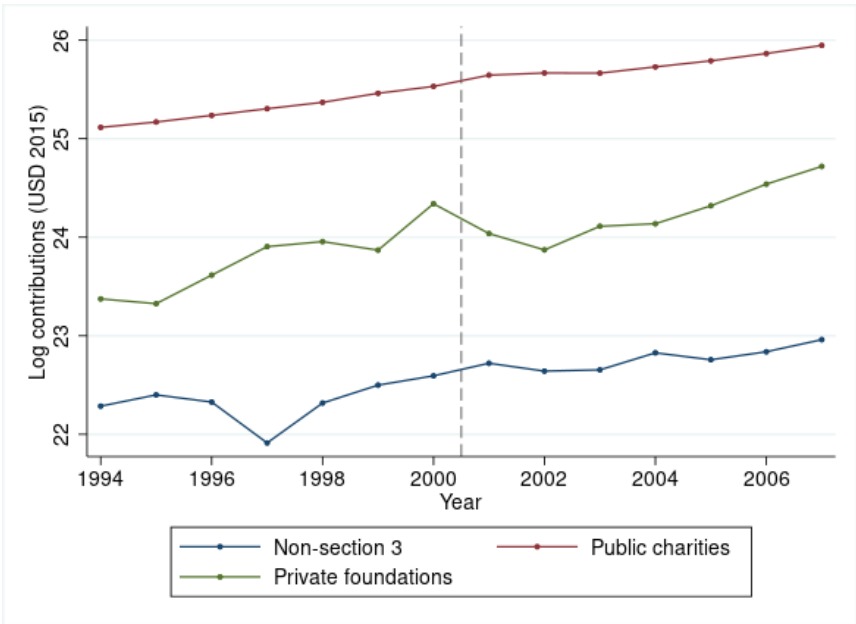
²⁹This approach relies on other assumptions that preclude the possibility of inter-state mobility responses of the domicile of charitable entities in response to state-level estate tax changes. I describe these restrictions in greater detail in Section 6.

Figure 4 plots the evolution over years in aggregate reported contributions by nonprofit vehicle type. Panel (a) illustrates parallel evolution in aggregate contributions, whereas following the reform, aggregate giving to private foundations visibly falls with respect to trends in public charity and non-section-3 reported contributions. Panel (b) focuses on private foundations, disaggregating between family-operated and non-familial entities; however, while pre-reform giving exhibits some fluctuation, there appears no significant break in trend contributions reported along a family-ownership margin.

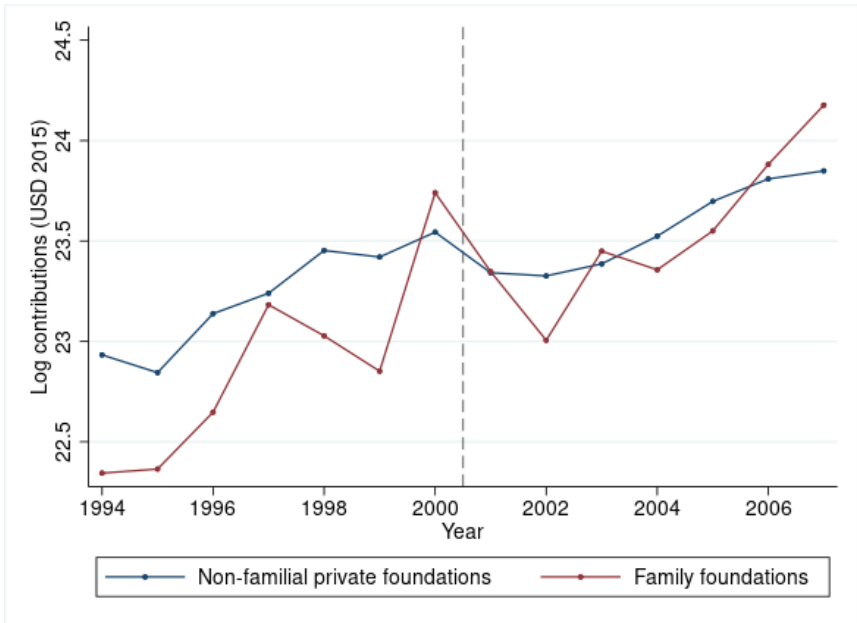
Figures Figure A.1 and Figure A.2 display these disaggregations for entry and exit rate, respectively. They illustrate that private foundation entry, while exhibiting substantial noise prior to EGTRRA, substantially decreased in the post-reform period, and that familial private foundations experienced an ostensibly larger decrease in entry rates than did non-familial private foundations. The plot of aggregate exits demonstrates there was no substantial movement in aggregate exit rates among any disaggregation by vehicle type following EGTRRA (and that public charities exhibited a substantial decrease in exit rates from the early to mid-1990s).

Figure 4: Log aggregate reported contributions by nonprofit vehicle type

(a) Public charities, private foundations, and 501(c)-non(3)'s



(b) Familial v. non-familial private foundations



These figures plot annual values of log aggregate reported contributions by nonprofit vehicle type between 1994 and 2007. Panel (a) disaggregates total annual contributions between private foundations, public charities, and nonprofit entities organized outside of subsection 501(c)(3). Panel (b) disaggregates total annual contributions between non-familial private foundations and familial private foundations.

The baseline empirical design estimates a difference-in-differences model in reported contributions between different tax-exempt vehicles in response to the federal estate tax changes introduced by EGTRRA:

$$y_{i,t} = \beta_0 + \sum_{l \in \{c,n,p\}} \gamma_l 1\{\theta_i = l\} + \sum_{k=1994}^{2007} \delta_k 1\{Year_t = k\} + \sum_{l \in \{c,n,p\}} \sum_{k=1994}^{2007} \beta_{lk} 1\{\theta_i = l\} 1\{Year_t = k\} + \varepsilon_{it}, \quad (7)$$

for organization i in year t . Each organization is of some time-invariant vehicle type $\theta_i \in \{c, n, p\}$, corresponding with 501(c) non-(3) type, public charities, and private foundations respectively. Outcome variables include various parameterizations of reported contributions: levels, logs, binary indicators for positive contributions, and binary indicators for whether contributions increased for a given entity between years (expressed as $1\{contributions_{i,t} > contributions_{i,t-1}\}$). Other outcome variables focus on the operating, entry, and exit decisions of nonprofit organizations.³⁰

In my main specifications for contributions response, I include two-way fixed effects as well as covariates that vary on the time-id level.³¹ The data only include entities during their years of operation (e.g. the contributions for entity i in year t prior to market entry or subsequent to exit is missing rather than zero).

I use 501(c) non-(3) organizations and the year 2000 as baselines for comparison. Tax strategic estate planning is a key component of estate planning. Because death is typically an unforeseen event, changes to estate planning occur in responses to expected future estate taxation parameters (Bakija and Heim 2011). For the purposes of studying the estate

³⁰I define the variable $entry_{it} = 1\{Year_t \geq founding\ year_i\}$, with the founding year of entity i defined as the minimum of the self-reported founding year of entity i and the minimum year observed for i in the data after 1991 (two years after the earliest year observed in the data). I define $exit_{it} = 1\{Year_t > last - year_i\}$, where the last year of entity i is defined as the maximum year observed for i prior to 2013 (two years before the latest year observed in the data). I define $operating_{i,t} := entry_{i,t} - exit_{i,t}$.

³¹In my main specification, I include only the following covariates: assets, liabilities, state- and federal-level corporate income tax rates, state-level unemployment insurance (payroll) tax rates, and state- and federal-level top personal income tax rates. I exclude other financial accounting covariates on the id-year level, such as expenses and non-contribution-sourced revenue, out of endogeneity concerns.

planning behavior, although federal estate tax rate changes only began in 2002, taxpayers likely began to alter their post-death estate allocation plans upon the passage of EGTRRA in 2001. In the respect that I therefore expect *a priori* a contributions response beginning in 2001, I use the year 2000 as the baseline year in my preferred specifications. I end the federal-level time frame just prior to the onset of the 2008 Financial Crisis.

The results of this estimation demonstrate a significant, largely asymmetric response of private foundation activity relative to public charity activity. Figure 5 illustrates a sharp post-reform decline in reported contributions by private foundation by around 40%. While public charity giving is characterized by an sizeable increasing pre-trend relative to non-section-3 giving, accounting for this pre-reform movement depicts a modest decline of around 10% in line with a decrease in giving incentives. The results of the reform present no evidence of an asymmetric response between familial and non-familial private foundations.

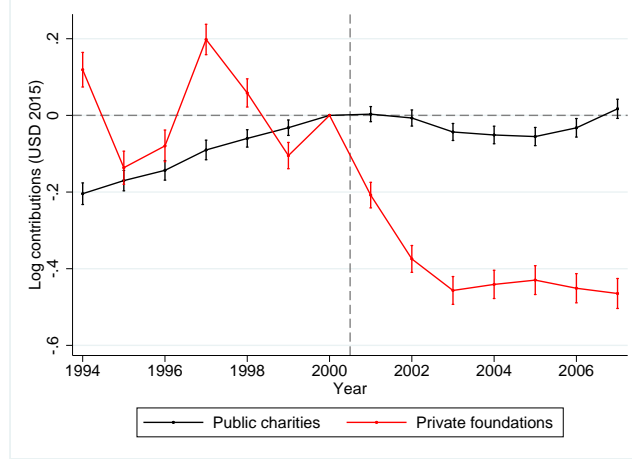
Table 2 displays the post-reform difference-in-differences estimates for various parameterizations of nonprofit activity, controlling for vehicle-specific linear time trends.³² The asymmetric response between private foundations and public charities appears in all parameterizations of contributions and is robust to the inclusion/exclusion of nonprofit fixed effects. Columns (1) and (2) illustrate that the response of contributions reported by charities to variation in the estate tax rate is entirely driven by the response of private foundations, as opposed to public charities. Following EGTRRA, contributions reported by private foundations decreased by USD 237k per year relative to non-tax-exempt nonprofits (a 43% decline relative to a baseline of USD 540k per year). This finding implies that the long-standing documented positive relationship between the estate tax rate and charitable giving is largely driven by giving to private foundations.

Columns (3) - (6) illustrate similar responses on the purely intensive and extensive margins separately. Proportionately, private foundation contributions decreased by 33% on average,

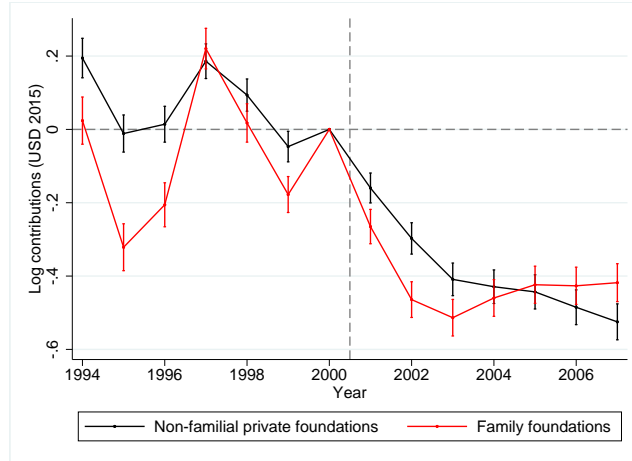
³²Because there is no significant time trend for private foundations, Table 2 Panel (b) does not include linear time trends.

Figure 5: Federal reform difference-in-differences: log contributions

(a) Private foundations and public charities relative to non-section-3 entities



(b) Familial v. non-familial private foundations



These figures plots the annual difference-in-differences coefficients for the two-way fixed effect specification: $y_{i,t} = \alpha_i + \sum_{k=1994}^{2007} 1\{Year_t = k\} + \sum_{l \in \{c,n,p\}} \sum_{k=1994}^{2007} \beta_{lk} \{\theta_i = l\} 1\{Year_t = k\} + \varepsilon_{it}$. Panel (a) displays the difference-in-differences coefficients for private foundations relative to public charities, and panel (b) compares family foundations and non-familial private foundations against 501(c)-non(3) entities. The 95% confidence bands use standard errors clustered on the EIN-level.

and within-nonprofit contributions declined by 24%; public charity contributions decreased by 5% on average, corresponding with a within-nonprofit average decline of 3%. Taking into account the approximately 18.2% decline in the net estate tax rate post-reform (55% to 45%), private foundations exhibit an aggregate contributions elasticity of between 1.8 and 2.2, whereas public charities see an elasticity of approximately .285. However, this lat-

ter elasticity for public charities corresponds with a purely intensive-margin response. The within-nonprofit response for private foundations implies an elasticity of 1.3.

The reform also induced differential extensive margin responses by organization type. Private foundations demonstrated a 6.5 percentage point (15%) decline in the probability of reporting non-zero contributions, whereas this probability declined by 0.5-1 percentage points (1.5-3%) for public charities. Additionally, private foundations entry slowed by 5 percentage points versus a 1.7 percentage point decline in public charity entry. However, private foundation exit demonstrated no change, while public charity exit increased by 0.23 percentage points, in line with the incentives at play.

Table 2 Panel (b) displays the difference-in-difference results for family foundations expressed relative to non-familial private foundations. Columns (1) and (2) illustrate no significant difference in the overall contributions response of the two vehicle types to the estate tax rate. The intensive- and extensive-margin parameterizations suggest a slightly outsized response of family foundations relative to non-familial private foundations.

Table 2: Federal reform difference-in-differences

Panel (a): Private foundation and public charities

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Contributions	Contributions	Log cont.	Log cont.	Cont. bin.	Cont. bin.	Entry	Exit
Private foundation \times Post	-236.8*** (55.8)	-202.8*** (49.2)	-0.40*** (0.02)	-0.27*** (0.015)	-0.066*** (0.0019)	-0.065*** (0.0019)	-0.048*** (0.0018)	-0.0012 (0.00074)
Public charity \times Post	5.9 (10.7)	-3.3 (12.6)	-0.054*** (0.014)	-0.029*** (0.0096)	-0.0045*** (0.0013)	-0.0097*** (0.0012)	-0.017*** (0.0014)	0.0023*** (0.00056)
Private foundation	478.6*** (48.2)		1.39*** (0.018)		0.18*** (0.0018)		0.031*** (0.0011)	-0.016*** (0.00047)
Public charity	409.2*** (18.5)		1.99*** (0.014)		0.11*** (0.0013)		-0.012*** (0.00085)	-0.024*** (0.00036)
Post	4.0 (6.5)		0.038*** (0.013)		0.017*** (0.0011)		0.019*** (0.0013)	-0.0024*** (0.00050)
Constant	59.1*** (6.5)	381.0*** (6.0)	9.58*** (0.012)	11.1*** -0.0045	0.23*** (0.0011)	0.34*** (0.0005)	0.061*** (0.00082)	0.038*** (0.00032)
Observations	6,254,220	6,206,490	2045649	1,969,142	6,254,220	6,206,490	5793780	6,389,919
Adjusted R^2	0.000	0.591	0.089	0.792	0.02	0.638	0.008	0.012
ID		X		X		X		X
Year		X		X		X		X
Vehicle \times Linear time trend	X	X	X	X	X	X	X	X

EIN-clustered standard errors in parentheses

* $p < .10$, ** $p < .05$, *** $p < .01$

This table displays select coefficients estimated from the difference-in-differences model:

$$y_{it} = \beta_0 + \delta \cdot 1\{Year_t \geq 2001\} + \sum_{l \in \{n, c, p\}} \gamma_l \cdot 1\{\theta_i = l\} + \sum_{l \in \{n, c, p\}} \pi_l \cdot Year_t + \sum_{l \in \{n, c, p\}} \beta_l \cdot 1\{\theta_i = l\} 1\{Year_t \geq 2001\} + \varepsilon_{it}$$

with non-section (3) charities in the year 2000 as the baseline. “Cont” abbreviates “contributions”. Levels contributions are expressed in 1000s USD 2015. The dependent variable in columns (5) and (6) is defined as $1\{Contributions_{i,t} > 0\}$. The variable “entry” is populated only for observations including and prior to entry; the variable “exit” is populated only for observations during a nonprofit’s operating lifetime.

Table 2: Panel (b): Family foundations versus non-familial private foundations

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Contributions	Contributions	Log cont.	Log cont.	Cont. bin.	Cont. bin.	Entry	Exit
Family foundation \times Post	4.4 (43.5)	64.7 (43.0)	-0.13*** (0.022)	0.063*** (0.019)	-0.017*** (0.0027)	-0.033*** (0.0025)	0.030*** (0.0012)	-0.0073*** (0.00046)
Family foundation	195.4*** (58.6)		0.89*** (0.023)		0.16*** (0.0030)		0.016*** (0.00063)	-0.022*** (0.00033)
Post	39.0* (23.5)		-0.044*** (0.015)		-0.00041 (0.0015)		0.020*** (0.00064)	0.0076*** (0.00041)
Constant	317.2*** (20.8)	394.2*** (9.8)	10.4*** (0.017)	10.7*** (0.0054)	0.33*** (0.0017)	0.39*** (0.00058)	0.052*** (0.00035)	0.025*** (0.00029)
Observations	976,708	970,819	377,793	359,981	976,708	970,819	906,119	996,472
Adjusted R^2	0.000	0.203	0.023	0.611	0.023	0.469	0.006	0.008
ID		X		X		X		
Year		X		X		X		

EIN-clustered standard errors in parentheses

* $p < .10$, ** $p < .05$, *** $p < .01$

This table displays select coefficients from the difference-in-differences model: $y_{it} = \alpha + \delta \cdot 1\{Year_t \geq 2001\} + \gamma \cdot 1\{\theta_i = family\ foundation\} + \beta \cdot 1\{\theta_i = family\ foundation\}1\{Year_t \geq 2001\} + \varepsilon_{it}$ estimated on the sample of all private foundations with non-familial private foundations in the year 2000 as the baseline. “Cont” abbreviates “contributions”. Levels contributions are expressed in 1000s USD 2015. The dependent variable in columns (5) and (6) is defined as $1\{Contributions_{i,t} > 0\}$. The variable “entry” is populated only for observations including and prior to entry; the variable “exit” is populated only for observations during a nonprofit’s operating lifetime.

6 Responses to state-level estate tax reform

This section studies the differential responses of charitable giving vehicles to state-level variation in the estate tax schedule. Prior to the replacement of the state estate tax credit with a less generous deduction as part of EGTRRA, there existed nearly no geographic heterogeneity in the total top marginal estate tax rate. This replacement occurred at a constant annual rate between 2002 and 2005. I use the new state-level estate tax variation induced by EGTRRA to demonstrate an additional asymmetric margin of response between different kinds of charitable giving vehicles. I show that in spite of the geographic disconnect between state estate tax liability based on state-of-residence and the full deductibility of charitable bequests regardless of state, private foundations contributions respond to a change in the same-state estate tax rate with an within-nonprofit elasticity between .25 and .5, and an overall elasticity of around one. Public charities respond with an elasticity between .05 and .1.

By the limited geographic scope of the new state-level legislative variation, the responses elicited in this section do not perfectly map onto the contributions responses and broader changes in charitable activity documented in response to federal-level reform. Instead, taxpayers generally only incur estate, inheritance, gift, and generation-skipping tax obligation on the state-level based on state-of-residence at death. I.e., ex-ante, a change in state-level end-of-life wealth taxation may not necessarily result in a commensurate change in contributions received reported by nonprofit entities in that state, as reflecting optimal tax strategy. For example, a high-worth decedent from a state with a state estate tax, say New York, can receive equal tax benefit from making an end-of-life donation to a nonprofit entity domiciled in New York as in California (which features no end-of-life taxation). Ultimately, while an increase in end-of-life wealth taxation for a single state *will* incentivize additional bequests originating from that state, those incentives will not necessarily generate additional contributions accruing to nonprofit entities in that state relative to those domiciled in other states.

I ask: does there exist a measurable state-level charitable contributions response to changes

in end-of-life wealth taxation? While there is no preferential tax treatment based on the *location* of donation reciprocity, contributions may change disproportionately within the state of tax change if either: 1) individuals exhibit substantial same-state preferences for donating behavior, 2) if private benefits to donating accrue based on location (e.g. the incentives charities give to donors, say a benefit dinner) are not fungible across geography, or 3) in-line with the result that individuals practice greater tax strategy in dealing with private foundations (which may host considerable related-giving or facilitate quasi-self-dealing), individuals incorporate nonprofit entities (namely private foundations) in proximity to their legal residence and engage in tax strategic charitable donating to their own nonprofits.

I study whether reforms to state-level estate taxation following the ratification of EGTRRA and the replacement of the state estate tax federal credit with a less-generous deduction resulted in a significant change in charitable activity on the state-level and whether there exists a disproportionate response between private foundations versus public charities as well as between family foundations and non-familial private foundations.

The ratification of EGTRRA effectuated considerable estate tax variation within and across states. Section 3.2 details this variation, which can be described simply as follows. Prior to EGTRRA, there existed nearly no geographic variation in estate taxation due to the presence of a federal-level tax credit generated from state-level estate tax payment. EGTRRA replaced this tax credit with a significantly less generous deduction. In the presence of the tax credit, total estate tax obligation can be understood, for an estate of sufficiently high-valuation P , approximately as $T_0 = \tau_s \cdot P + (\tau_f \cdot P - \tau_s \cdot P) = \tau_f \cdot P$ for federal- and state-level tax rates τ_f and τ_s respectively. Replacing this creditation with a deduction results in the following approximation of overall estate tax obligation: $T_1 = P(\tau_s + \tau_f - \tau_f \tau_s)$, an additional estate obligation of $\tau_s(1 - \tau_f)$ relative to the credit regime for a estate domiciled in a state with a separate state estate tax.

This repeal represented an unanticipated shock to state-level estate tax policy, and resulted in four mutually exclusive groups of states in terms of their tax-policy responses: 1) states

that had no legislation providing for an independent state-level estate tax in the absence of the federal credit (and never installing an estate tax since EGTRRA) saw no additional state-level estate taxation following EGTRRA and are referred to as “*dormant*” or “*non-decouplers*” (29 states), 2) states that installed legislation either prior to or at the beginning of the phase-out of the federal credit repeal imposed commensurately higher total estate tax rates, but with a gradual increase aligning with the federal credit phaseout and are referred to as “*decouplers*”,³³ (12 states plus Washington DC) 3) states that installed an estate tax following the full phase-out of the federal credit by 2005 generated a sharp increase in their overall estate tax obligation and are referred to as “*post-EGTRRA decouplers*” (3 states), further split between those decoupling in 2005 (1 state) and those decoupling after 2005 (2 states), and 4) states that installed a separate estate tax at the beginning of, during, or following the federal credit phase-out that later repealed their state-level estate tax are referred to as “*repealers*” (6 states, all initially installing their estate taxes in 2002).^{34,35} States generally define their estate tax base using residence-based criteria, typically including all intangible assets and in-state tangible assets of taxpayers (sometimes exempting out-of-state physical assets included in the estate).

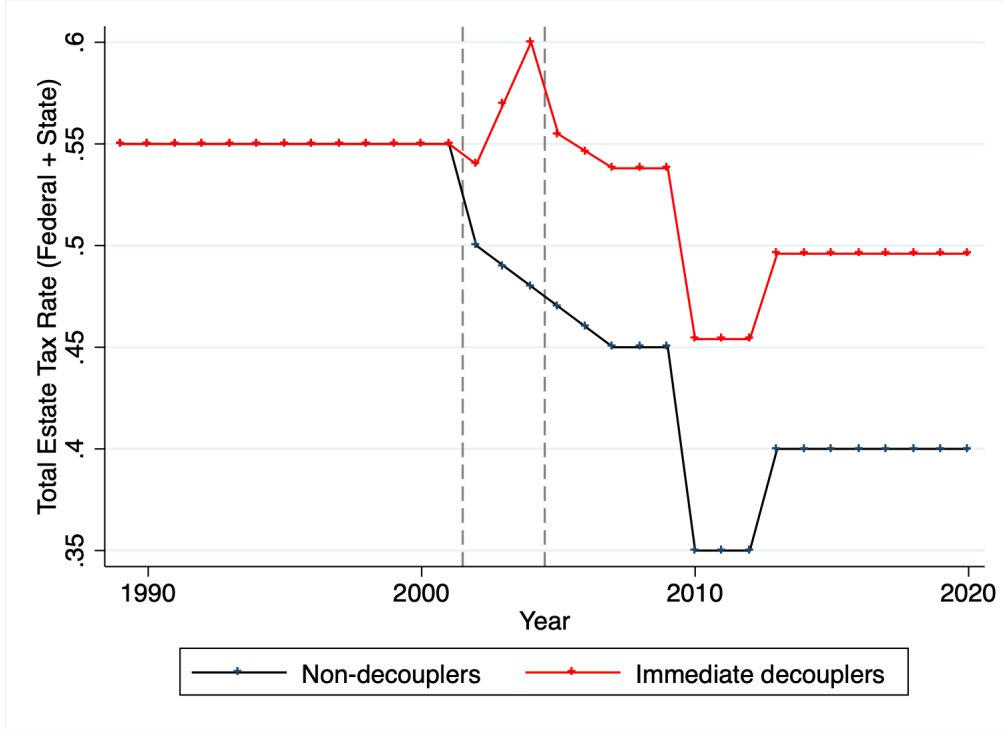
State-level estate taxes generally graduate progressively at identical thresholds as does the federal-estate tax, maxxing out at a top marginal rate of 16%, although mild variation exists in this top rate. Figure 6 displays the hypothetical evolution in the top marginal total estate tax rates for estates of sufficiently high valuation domiciled in dormant states (e.g. Arkansas) and immediate-decoupling states (e.g. Washington D.C.). With the full replacement of the credit with a deduction, states with a separate estate tax effectively impose an additional

³³Those decoupling in 2002 (7 states) are referred to as “*immediate decouplers*”, whereas those states decoupling after 2002 but prior to the full replacement of the federal credit by 2005 are referred to as “*late decouplers*” (6 states).

³⁴While New Jersey and Delaware repealed their estate taxes in 2018, the sample timeframe ends in 2015 so that I categorize these states based on the timing of the state-estate tax installation.

³⁵These groups are (presently, as of 2022) mutually exclusive insofar as no states have either repealed or installed a state-level estate tax at least twice in the post-EGTRRA era. Other states, such as Delaware, North Carolina, and Wisconsin have featured estate taxes with intermittent periods of repeal when considering *de jure* state-level estate taxation (absorbed by the federal credit pre-EGTRRA), but are not considered as such on a *de facto* basis, having initial periods of estate taxation occurring during the pre-EGTRRA era in the presence of the federal credit.

Figure 6: Illustration of evolution in top total estate tax rate



This figure illustrates the evolution of the top total (state + federal) marginal estate tax rate for two hypothetical estates of sufficiently high valuation: one domiciled in a state never featuring a separate estate tax (non-decoupler, e.g. Arkansas) and another domiciled in a state with an separate estate tax in operation starting in 2002 (immediate decoupler, e.g. Washington D.C.). The first vertical dashed gray line marks the passage of EGTRRA and the beginning of the federal-state estate tax credit phase-out. The second vertical dashed gray line demarcates the end of the federal-state estate tax credit phase-out, after which state estate tax payments generate a less generous deduction against federal estate tax obligations.

(approximately) 10 percentage points on estates of sufficiently high valuation.

The replacement of the federal-state estate tax credit with the deduction in the post-EGTRRA era lends itself to several distinct quasi-experimental designs in studying the different kinds of responses of charitable giving to state-level estate taxation. Due the new possibility to make counterfactual comparisons of identical charitable giving vehicle types of across states with different tax policies, I now constrain my sample to the universe of public charities and private foundations.

6.1 Difference-in-differences surrounding the repeal of the federal-state estate tax credit

I first turn my attention to the differential contributions and activity responses of nonprofits between states that installed a separate state-level estate tax and those that did not along the federal-state estate tax credit phased-out on part of EGTRRA.

Because of the important role of forward-looking optimization and forecasting future estate taxation in estate planning, I exclude states that either install an estate tax subsequent to the full phase-out of the federal-state estate tax credit (and thereby could in principle serve as initially “dormant” states) or those that initially decoupled from the federal estate tax, but later repealed their state estate taxes (and thereby could in principle serve as initially “decoupling” states). These states may feature substantial anticipation responses to expected future changes to state estate tax regimes. For example, while Wisconsin decoupled from the federal estate tax immediately in 2002, the specific state political environment might have signalled clearly to taxpayers that the state estate tax would be repealed as soon as possible (which occurred in 2007). Wisconsin taxpayers likely planned out their estates with dynamic consideration of this possibility, so that the behavior of these taxpayers would differ considerably from those in an immediately decoupling state that did not later repeal their estate tax.

For this analysis I focus on nonprofits in two groups of states. I view nonprofits in immediate- and late-decoupling-states as treated and those domiciled in permanently dormant states as control.³⁶ The component of EGTRRA repealing the state estate tax credit represents an quasi-randomly assigned shock to state estate tax policy. Whereas the primary concern in this setting may lie in potential endogeneity of state-level estate tax policy to the evolution of future within-state economic outcomes, states typically committed to the dependency of their state estate taxes on the federal-state estate tax credit in prior political regimes. Moreover, while some states quickly made an immediate post-EGTRRA effort to reverse their

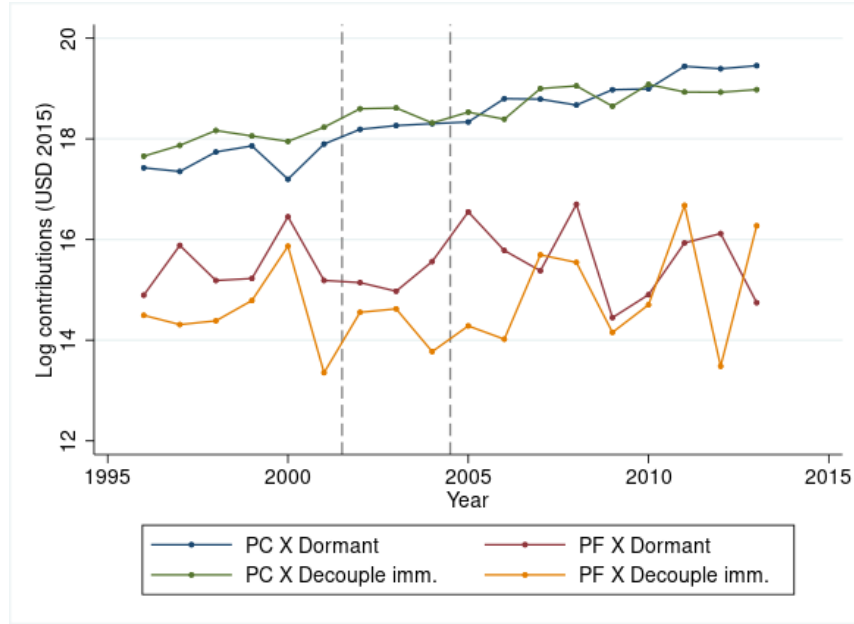
³⁶I exclude from this analysis any nonprofit entities changing their state of domicile.

preset state-level estate tax, because the estate tax generates a tiny portion of state tax collections, this decision fell on largely partisan lines in a manner unrelated to the operation of nonprofits.

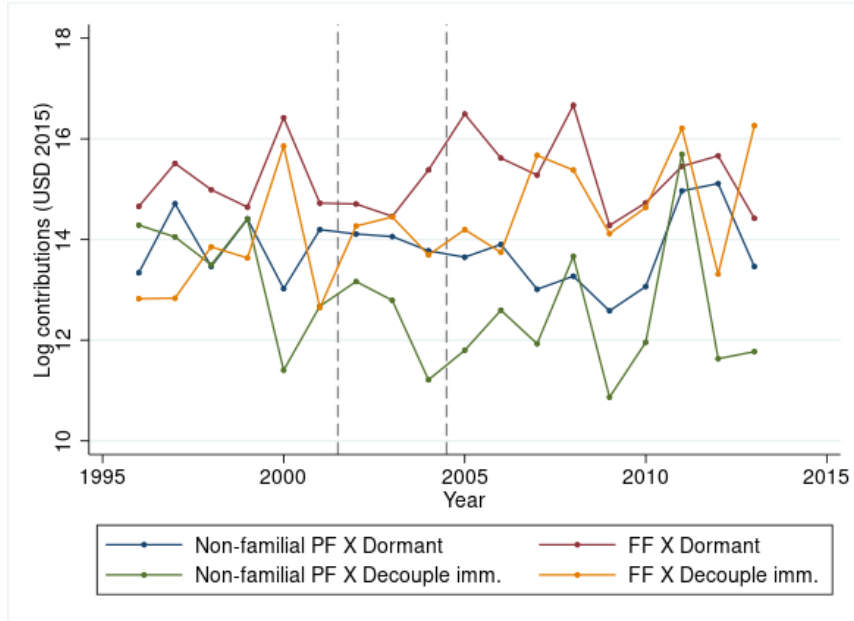
Figure 7 displays the evolution in aggregate reported contributions by nonprofits along the margins of vehicle type and state type. Panel (a) illustrates a modest increase in aggregate private foundation giving in immediately decoupling states—compared both to public charities in dormant and decoupling states as well as to private foundations in non-decoupling states. The aggregates in Panel (b) are more erratic, but suggest that more of the increase documented in Panel (a) is more driven by giving to family foundations in decoupling states. Reported contributions by both familial- and non-familial private foundations in dormant states remains relatively constant. Figure A.4 illustrates a similar aggregate trend for the number of nonprofits in operation, however also showing a proportional increase in private foundations operating in dormant states relative to those in treated states.

Figure 7: Log aggregate reported contributions by nonprofit vehicle type

(a) Public charities and private foundations



(b) Familial v. non-familial private foundations



These figures plot annual values of log aggregate reported contributions by nonprofit vehicle type between 1996 and 2013. Panel (a) disaggregates total annual contributions between private foundations and public charities. Panel (b) disaggregates total annual contributions between non-familial private foundations and familial private foundations. The years between the dashed gray lines indicate the phase-out period of the federal-state estate tax credit.

To more finely parse these aggregates, I estimate the response in reported contributions and other measures of activity for nonprofits based on the de facto state estate tax policy of their state of domicile. While I am interested in estimating the responses for all nonprofits, I also estimate the differential responses along the public charity v. private foundation and non-familial private foundation v. family foundation margins using a triple difference (DDD) specification:

$$y_{i,t} = \alpha_i + \sum_{k=1996}^{2013} \delta_k 1\{Year_t = k\} + \sum_{s \in S} \sum_{k=1996}^{2013} \gamma_{s,k} 1\{Year_t = k\} \cdot 1\{State_i = s\} + \sum_{\theta \in \Theta} \sum_{k=1996}^{2013} \xi_{\theta,k} 1\{Year_t = k\} \cdot 1\{\theta_i = \theta\} + \sum_{\theta \in \Theta} \sum_{s \in S} \sum_{k=1996}^{2013} \beta_{\theta,k,s} 1\{Year_t = k\} \cdot 1\{State_i = s\} \cdot 1\{\theta_i = \theta\} + \varepsilon_{i,t}.$$

Here, subscript s represents the state-type as pertaining to federal-state estate tax credit decoupling policy, and dormant states serve as the baseline. Because nonprofits changing states are dropped from the sample, EIN-level fixed effects are perfectly collinear with the state-level and nonprofit type θ -level fixed effects. I also estimate a similar specification that excludes EIN-level fixed effects to correspond with more aggregated averages, as opposed to within-entity responses. Under the assumption of parallel trends³⁷ $\beta_{\theta,k,s}$ represents the triple difference estimator: e.g. the average treatment effect on the treated in year t for private foundations located in states immediately decoupling from the federal-state estate tax credit and instituting its own separate state-level state tax relative to public charities located in dormant states in the year 2000.

I estimate regressions of these forms to demonstrate the asymmetric response of public charities and private foundation to changes in state-level estate tax policy along the same outcome variables as in previous sections. I also isolate the two by-charitable-giving-vehicle-type difference-in-difference estimators implicit in the above specification (e.g. the difference-in-difference estimator comparing private foundations in decoupling and dormant states pre-and post- reform, and the same analogous estimator for the other non-profit vehicle types).

³⁷Olden and Møen 2022 demonstrate that an alternate parallel trends assumption—identical bias between both corresponding component difference-in-differences estimators—satisfies the identifying assumptions of the triple difference estimator.

Figure 8 displays these coefficients, largely illustrating an asymmetric giving response between private foundations and public charities and an indistinguishable difference between familial- and non-familial private foundations. When controlling for EIN fixed effects, compared to contributions reported by year 2000 public charities in dormant states, private foundation giving in treated states increases by between 7- and 8%, rising following the full phase-out of the estate tax credit.

Figure 9 disaggregates this triple difference between its two component difference-in-difference estimates, finding that this effect is mainly driven by an increase in giving to private foundations in treated states relative to those in dormant states. Public charities in treated states do exhibit some average increase in giving relative to the pre-period, but their evolution is noisy and of a significantly smaller scale than for private foundations. Importantly, this emerges when including firm-level fixed effects or controlling for firm size, as indicated by Figure A.5. Lastly, Figure 10 illustrates an analogous response along nonprofit entry: private foundation entry in decoupling states by 1 percent, relative to public charity entry in dormant states. This specification also illustrates a decrease in familial foundation entry on the order of half of one percentage point, albeit only jointly significant across years.³⁸

The results affirm the view that private foundation activity exhibits much greater sensitivity to the tax environment than do public charities. Similarly as with the federal reform, there is little statistically distinguishable difference in observed behavior between familial and non-familial private foundations, albeit a stronger entry response of non-familial private foundations relative to family foundations.

Table 3 summarizes these results. Column (1) illustrates that state-level estate taxation induces an increase in state-level giving that accrues entirely to private foundations, as opposed to to public charities. Namely, private foundation contributions increased by USD 130k per year (a 23% increase against a baseline counterfactual of USD 560k per year) for

³⁸Figure A.6 finds commensurate results while using repealing states as the state-level treatment group.

nonprofits domiciled in states with a separate state estate tax relative to those domiciled in states without an estate tax. While I cannot sharply distinguish the precise mechanism that generates the asymmetry between the two vehicle types, this difference likely suggests either that private foundations see a greater concentration of non-related donors within their state of domicile, or that private foundations see greater donations from their owners, who are domiciled in the same state.

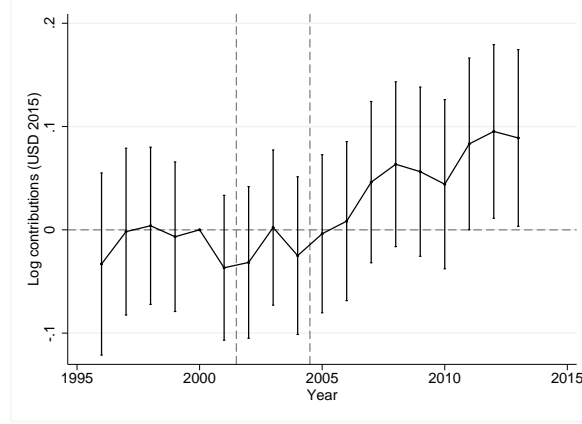
However, column (2) shows that this overall contributions response loses significance on the within-nonprofit level. Columns (3)-(6) illustrate the pure intensive- and extensive-margin responses separately. The attenuation of the overall contributions response on the within-nonprofit level appears to be driven by conflicting responses on these margins, where on the intensive margin, charitable contributions reported by private foundations within states with an estate tax increased by 5% but also saw a 1 percentage point decline in probability of any positive contribution. The population-average intensive margin response, illustrated in column (3), also shows that while giving did not strictly increase among private foundations along the intensive margin, private foundations on average saw 7 percent greater contributions than did public charities (driven entirely by a decrease in public charity contributions).

Given the proportion change in the top marginal estate tax rate for the post-credit repeal period,³⁹ the intensive margin response corresponds with a reported contributions elasticity with respect to the state-level top estate tax rate of approximately .25, albeit nearly double when considering solely the post-repeal response. The overall contributions elasticity for private foundations with respect to the overall estate tax rate is approximately unity. Contributions to public charities respond with an aggregate elasticity indistinguishable from zero but with a within-nonprofit elasticity between 0.1 and 0.5.

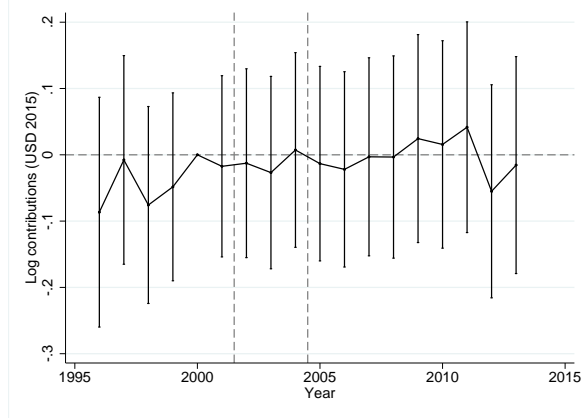
³⁹ $\frac{\Delta \tau_{2007}}{\tau_{2007}} = \frac{.16 \cdot 0.6}{.45} \approx 0.213$.

Figure 8: Triple differences in state \times vehicle type: log contributions

(a) Public charities and private foundations



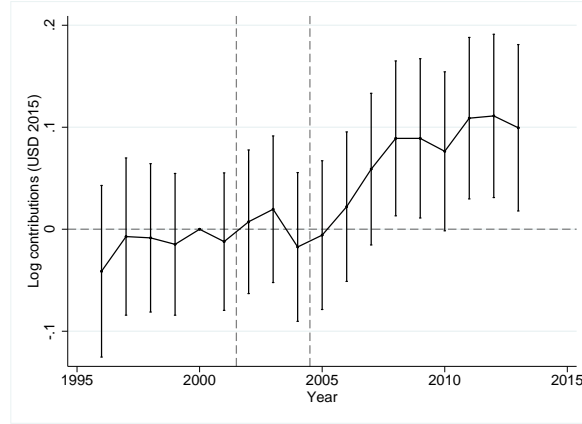
(b) Familial v. non-familial private foundations



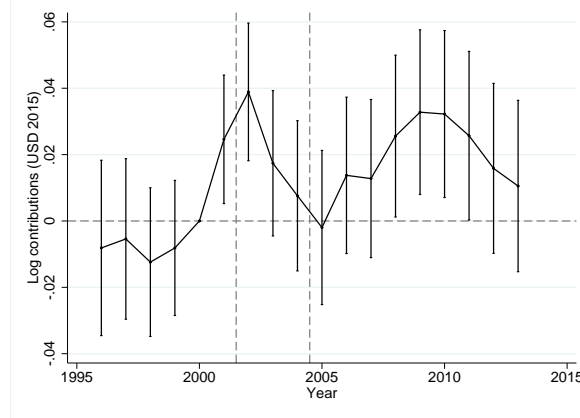
These figures plot annual values of the triple difference coefficients for log aggregate reported contributions comparing between vehicle type and state estate tax treatment status, using the year 2000 as a baseline. The specifications includes two-way fixed effects on the EIN-year-level. Panel (a) compares private foundations with public charities. Panel (b) isolates private foundations and compares familial foundations against non-familial foundations. The years between the dashed gray lines indicate the phase-out period of the federal-state estate tax credit. Error bars represent 95% confidence intervals with standard errors clustered on the EIN-level.

Figure 9: Difference-in-differences by state-type: log contributions

(a) Private foundations



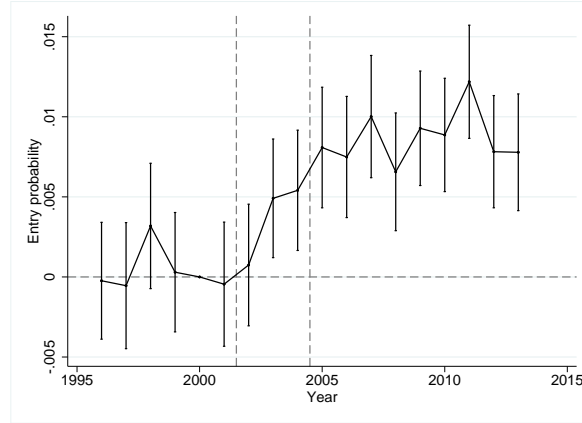
(b) Public charities



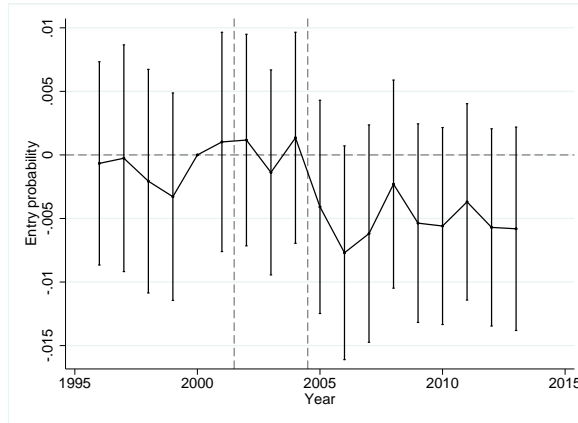
These figures display the difference-in-differences coefficients estimated from reduced forms stratified by charity vehicle type compare log aggregate reported contributions based on state-level tax policy, using the year 2000 as a baseline. The specifications includes two-way fixed effects on the EIN-year-level. Panel (a) compares private foundations across state types, and panel (b) compares public charities. Panel (b) isolates private foundations and compares familial foundations against non-familial foundations. The years between the dashed gray lines indicate the phase-out period of the federal-state estate tax credit. Error bars represent 95% confidence intervals with standard errors clustered on the EIN-level.

Figure 10: Triple differences in state \times vehicle type: entry

(a) Private foundations v. public charities



(b) Familial v. non-familial private foundations



These figures display the difference-in-differences coefficients estimated from reduced forms stratified by charity vehicle type compare log aggregate reported contributions based on state-level tax policy, using the year 2000 as a baseline. Panel (a) compares private foundations across state types, and panel (b) compares public charities. Panel (b) isolates private foundations and compares familial foundations against non-familial foundations. The years between the dashed gray lines indicate the phase-out period of the federal-state estate tax credit. Error bars represent 95% confidence intervals with standard errors clustered on the EIN-level.

Table 3: State-level reform triple differences

Panel (a): Private foundation versus public charities

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Contributions	Contributions	Log cont.	Log cont.	Cont. bin.	Cont. bin.	Entry	Exit
PF \times Decouplers \times Post	131.2** (60.3)	80.8 (62.3)	0.0025 (0.024)	0.051*** (0.019)	-0.016*** (0.0029)	-0.0092*** (0.0027)	0.00059 (0.0016)	-0.0031*** (0.00070)
PC \times Decouplers \times Post	-5.85 (28.2)	105.0*** (36.2)	-0.068*** (0.011)	0.0100 (0.0071)	-0.10*** (0.0012)	-0.044*** (0.0010)	-0.0099*** (0.00061)	-0.0051*** (0.00027)
Constant	223.9*** (14.0)	548.6*** (7.81)	11.4*** (0.012)	11.3*** (0.0030)	0.21*** (0.0010)	0.45*** (0.00029)	0.041*** (0.00018)	0.0091*** (0.00010)
Difference	137.01 [2.06]	-24.14 [-0.34]	0.07 [2.74]	0.04 [2.01]	0.09 [27.41]	0.03 [11.94]	0.01 [6.22]	0.00 [2.66]
Year		X		X		X		
ID		X		X		X		
Adj. R-squared	0.00	0.61	0.02	0.78	0.07	0.60	0.01	0.00
N	5554613	5523273	2357161	2268512	5554613	5523273	4259788	5670925

Ein-clustered standard errors in parentheses

* $p < .10$, ** $p < .05$, *** $p < .01$

This table displays select coefficients estimated from the triple-differences model along 1) state estate tax treatment status, 2) charitable giving vehicle type, and 3) pre/post status. The first two rows correspond to the difference-in-differences coefficients by state estate tax treatment status and pre/post status, stratifying by charitable giving vehicle type. The “Difference” row displays the triple difference estimator, and the number immediately below in hard brackets represents the associated t-statistic. Levels contributions is measured in 1000s USD (2015). The dependent variable in columns (5) and (6) is defined as $1\{Contributions_{i,t} > 0\}$. The variable “entry” is populated only for observations including and prior to entry; the variable “exit” is populated only for observations during a nonprofit’s operating lifetime. The specification uses observations from between 1998 and 2012. The state estate tax policy treatment group includes states decoupling from the federal-state estate tax credit prior to 2005 as treated, and the control group includes dormant states. The specification treats states decoupling from the federal-state estate tax credit prior to 2005 as treated. The post period begins in 2001.

6.2 Event studies of post-credit phase-out estate tax repeals

Over one-fifth of states either added on or repealed state-level estate taxes in the post-EGTRRA period. Because they did so in a decentralized and uncoordinated manner, the tax change policy events stagger and lend to estimating the effects of state-level estate tax policy in an event study setting.

However, a central difficulty with eliciting the response of nonprofit activity in this set-

Table 3: Panel (b): Family foundations versus non-familial private foundations

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Contributions	Contributions	Log cont.	Log cont.	Cont. bin.	Cont. bin.	Entry	Exit
FF \times Decouplers \times Post	83.8 (95.5)	81.0 (117.1)	0.029 (0.032)	0.067** (0.028)	-0.015*** (0.0045)	-0.00076 (0.0044)	-0.00054 (0.0037)	-0.000024 (0.00052)
Non-familial PF \times Decouplers \times Post	186.3** (82.0)	86.1 (65.0)	-0.029 (0.034)	0.046* (0.027)	-0.020*** (0.0036)	-0.012*** (0.0034)	0.0026 (0.0016)	-0.0055*** (0.0011)
Constant	322.1*** (38.4)	464.2*** (26.0)	10.3*** (0.025)	10.6*** (0.010)	0.33*** (0.0027)	0.42*** (0.0012)	0.059*** (0.00064)	0.033*** (0.00051)
Difference	-102.54 [-0.81]	-5.04 [-0.04]	0.06 [1.26]	0.02 [0.56]	0.01 [0.94]	0.01 [2.09]	-0.00 [-0.79]	0.01 [4.51]
Year		X		X		X		
ID		X		X		X		
Adj. R-squared	0.00	0.48	0.02	0.62	0.02	0.48	0.02	0.01
N	973344	969130	395324	380735	973344	969130	641574	1001245

Ein-clustered standard errors in parentheses

* $p < .10$, ** $p < .05$, *** $p < .01$

This table displays select coefficients estimated from the triple-differences model along 1) state estate tax treatment status, 2) charitable giving vehicle type, and 3) pre/post status. The regressions are estimated on the sample of private foundations from between 1998 and 2012. The specification treats states decoupling from the federal-state estate tax credit prior to 2005 as treated. The post period begins in 2001. The first two rows correspond to the difference-in-differences coefficients by state estate tax treatment status and pre/post status, stratifying by charitable giving vehicle type. The “Difference” row displays the triple difference estimator, and the number immediately below in hard brackets represents the associated t-statistic. “Cont.” abbreviates reported contributions, and is measured in 1000s USD (2015). The dependent variable in columns (5) and (6) is defined as $1\{\text{Contributions}_{i,t} > 0\}$. The variable “entry” is populated only for observations including and prior to entry; the variable “exit” is populated only for observations during a nonprofit’s operating lifetime. The state estate tax policy treatment group includes states decoupling from the federal-state estate tax credit prior to 2005 as treated, and the control group includes dormant states.

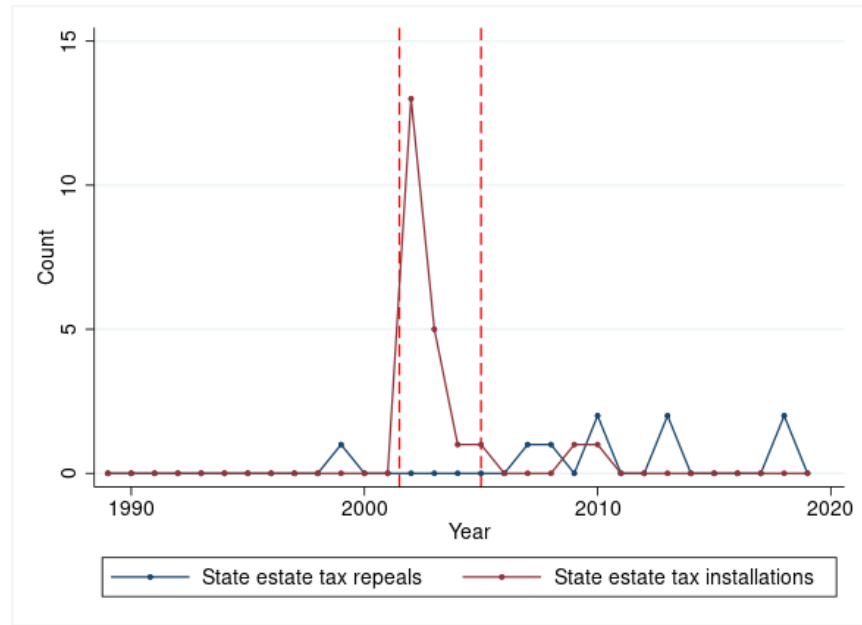
ting deals with the potential anticipation responses by taxpayers in states having reversed their state estate tax policy. Because estate planning involves dynamic optimizing over the expected path of future state-level estate tax rates, if states’ initial estate tax policies are not perceived as credible, taxpayers will neither respond to the initial estate tax policy stance nor the subsequent reversal in anticipation of an expected future estate tax level. As an example, Kansas immediately decoupled from the federal state estate tax credit upon the first year EGTRRA took effect—having a fully decoupled estate tax from 2002 until the state decided to repeal the tax in 2009. If Kansan taxpayers anticipated a repeal of the estate tax, they would neither increase estate tax deductible donations upon the installation of the Kansas state estate tax nor relatively decrease donations upon the subsequent repeal of the estate tax. Analogous limitations hold for states that only installed separate state-

level estate taxes well after the full replacement of the federal state estate tax credit with a deduction in 2005.

Figure 11 illustrates the timing of the repeals and installations of state-level estate taxes. There are 8 states that ratified their own state-level estate taxes in the post-EGTRRA era, and 3 states that had imposed separate state-level estate taxes that subsequently repealed their estate taxes following the full replacement of the federal-state estate tax credit with the deduction.

Figures Figure 12 and Figure 13 display the aggregate responses of charitable contributions by nonprofit vehicle type surrounding these events. In all cases, overall contributions evolves according to the tax incentives posed by each respective state estate tax event. In all four specifications, all differential aggregate changes between charitable giving vehicle types are accompanied by substantial violations to parallel pre-trends, suggesting the role for differential anticipation responses. In the aggregate, private foundation giving decreases more than public charity giving following repeal events; however, the response appears reversed for installation events (albeit with substantial aggregate movement in the pre-period). Distinguishing between familial and non-familial private foundations, the gaps between these vehicle types close prior to each state tax event, with giving to familial foundations responding respectively less and more than giving to non-familial private foundations following estate tax repeal and installation events.

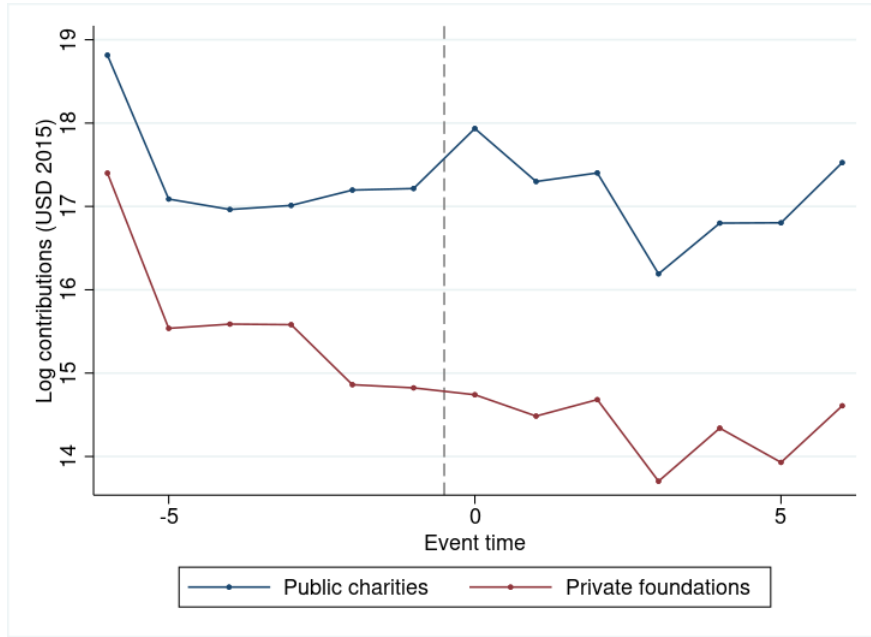
Figure 11: De facto state estate tax repeals and installations



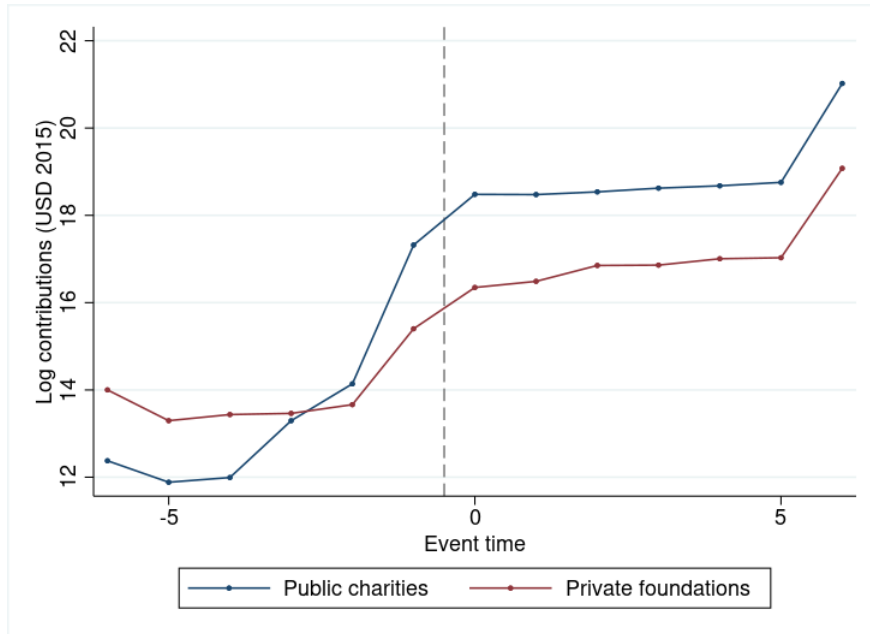
This figure illustrates the number of repeals and installations of state-level estate taxes over time. Only de facto state-estate taxes are considered here, as prior to the 2002 passage of EGTRRA, all state-level estate taxes with top marginal rates under 16% were fully creditable against the federal estate tax, rendering no additional estate tax obligation. The dashed red lines indicates the beginning and end of the replacement period of the federal-state estate tax credit with a less generous deduction that generates additional estate tax obligation on top of the federal estate tax.

Figure 12: Event study aggregates (Private foundations v. public charities)

(a) Repeal events



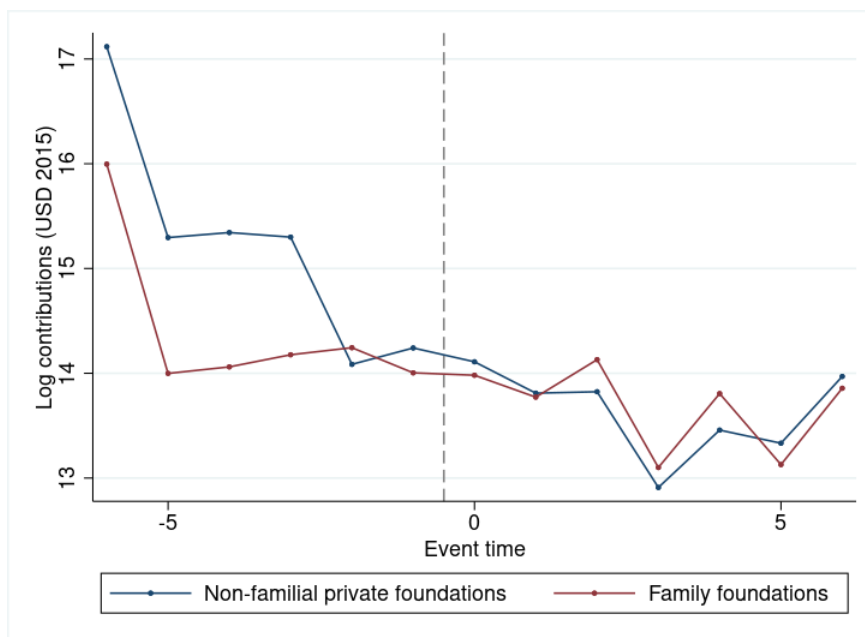
(b) Installation events



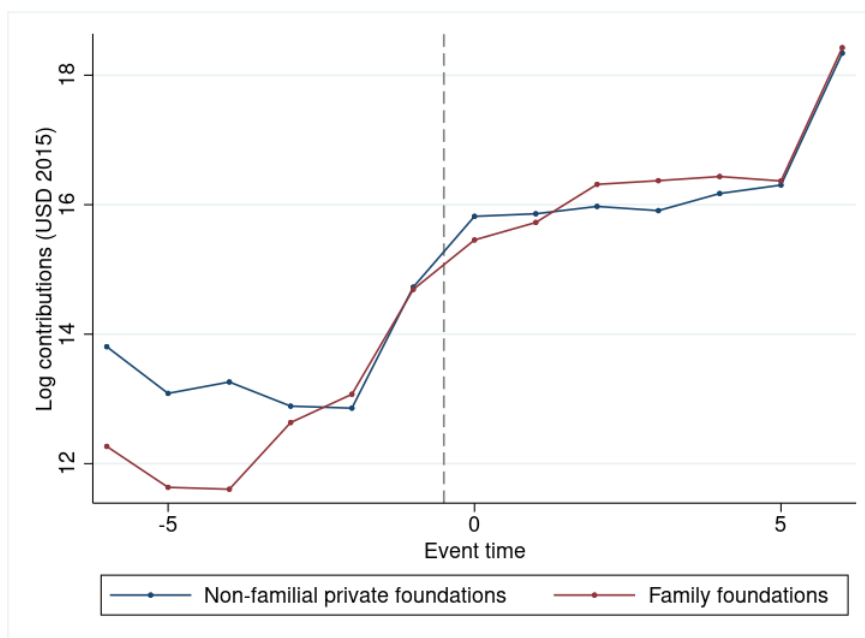
These figures display the aggregate responses of reported contributions disaggregated by nonprofit vehicle type surrounding a de facto state estate tax repeal or installation event after 2005. Panel (a) displays the aggregate evolution of contributions within states repealing their estate tax. Panel (b) focuses on states installing a new state estate tax. All contributions are aggregated over all states and nonprofits for each specification.

Figure 13: Event study aggregates (Family foundations v. non-familial private foundations)

(a) Repeal events



(b) Installation events



These figures display the aggregate responses of reported contributions disaggregated by nonprofit vehicle type surrounding a de facto state estate tax repeal or installation event after 2005. Both of these figures focus only on private foundations, distinguishing between familial and non-familial private foundations. Panel (a) displays the aggregate evolution of contributions within states repealing their estate tax. Panel (b) focuses on states installing a new state estate tax. All contributions are aggregated over all states and nonprofits for each specification.

To quantify the response in nonprofit activity in response to these policy changes activity I estimate event studies with two-way fixed effects on the nonprofit-year level:

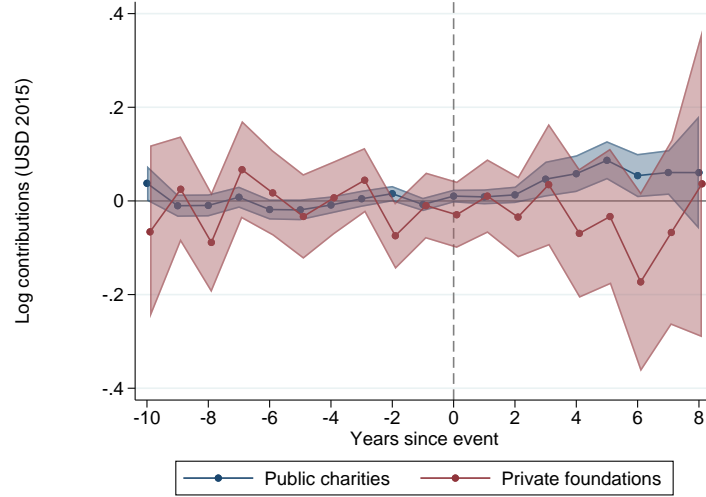
$$y_{it} = \alpha_i + \sum_{k=2002}^{2015} \delta_k 1\{Year_t = k\} + \sum_{j=-8}^8 \beta_j 1\{EventTime_{s(i),t} = j\} + \varepsilon_{it}.$$

I compute event study coefficients $\{\beta_j\}$ using the estimation procedure developed by Callaway and Sant’Anna 2020 in order to account for dynamic and heterogeneous treatment effects in this setting.⁴⁰ I estimate this specification separately by each charitable giving vehicle type. Causal identification of coefficients $\{\beta_j\}$ in this setting arises from the quasi-random variation event timing.

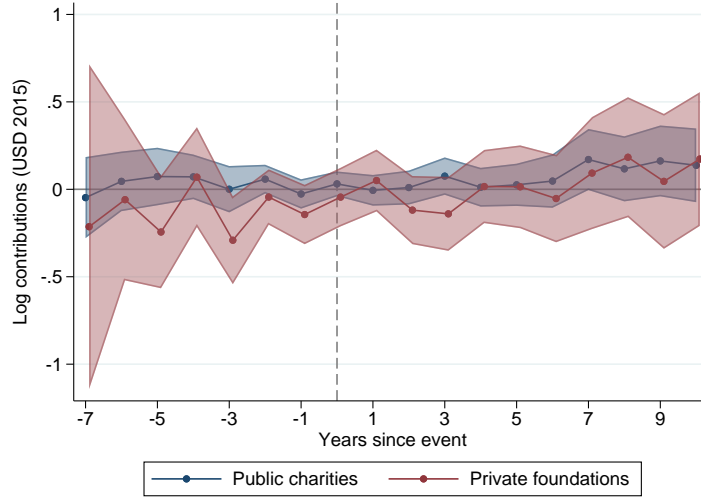
⁴⁰Figures Figure A.8-Figure A.11 display the Goodman-Bacon decompositions associated with the standard event studies with two-way fixed effects of this same specification.

Figure 14: Event studies (Private foundations v. public charities)

(a) Repeal events



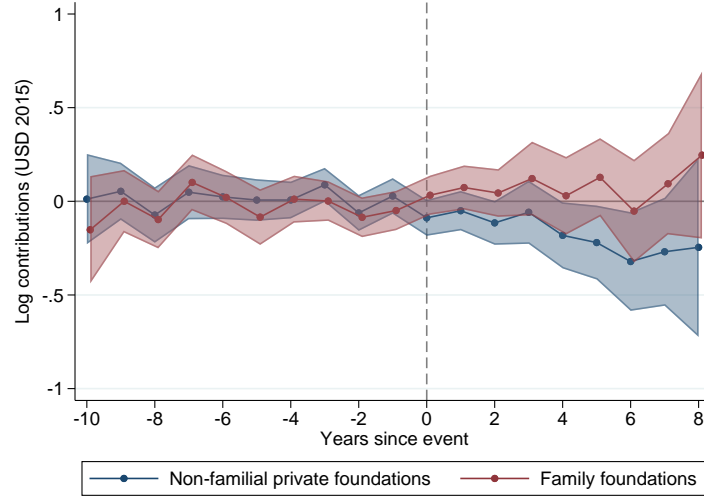
(b) Installation events



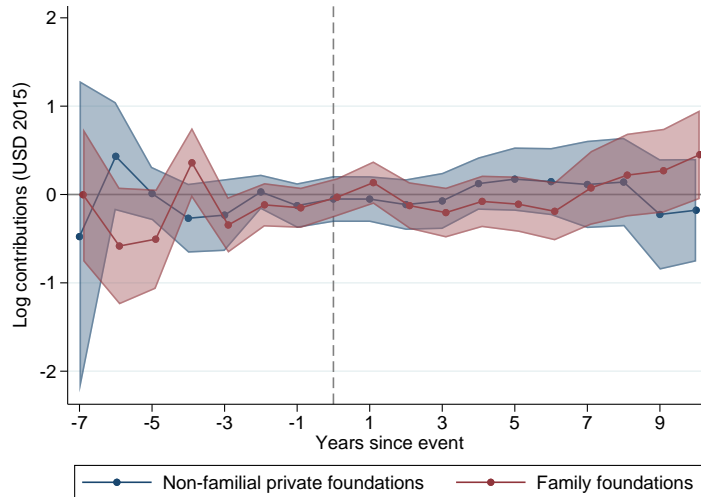
This figure estimates the two-way fixed effect event study $y_{it} = \alpha_i + \sum_{k=2002}^{2015} \delta_k 1\{Year_t = k\} + \sum_{j=t_0}^{t'} \beta_j 1\{EventTime_{s(i),t} = j\} + \varepsilon_{it}$ around de facto state estate tax installation and repeal events. The event study coefficients $\{\beta_j\}$ are estimated using the procedure from Callaway and Sant'Anna 2020 to account for heterogeneous and dynamic treatment effects. Panel (a) studies the responses of nonprofits domiciled in states repealing their state estate taxes starting 2005. Panel (b) focuses on nonprofits domiciled in states installing separate estate taxes starting 2005. For each panel, each series of coefficients are computed on the universe of public charities and private foundations excluding nonprofits domiciled in “always-treated” states (i.e. for repeal events the states never having a separate estate tax and for installation events the states always having an estate tax during the sample period) and stratified by charitable giving vehicle type on nonprofits between 2002 and 2015.

Figure 15: Event studies (Family foundations v. non-familial private foundations)

(a) Repeal events



(b) Installation events



These figures estimate the two-way fixed effect event study $y_{it} = \alpha_i + \sum_{k=2002}^{2015} \delta_k 1\{Year_t = k\} + \sum_{j=t_0}^{t'} \beta_j 1\{EventTime_{s(i),t} = j\} + \varepsilon_{it}$ around de facto state estate tax installation and repeal events. The event study coefficients $\{\beta_j\}$ are estimated using the procedure from Callaway and Sant'Anna 2020 to account for heterogeneous and dynamic treatment effects. Panel (a) studies the responses of nonprofits domiciled in states repealing their state estate taxes starting 2005. Panel (b) focuses on nonprofits domiciled in states installing separate estate taxes starting 2005. For each panel, each series of coefficients are computed on the universe of non-familial private foundations and family foundations excluding nonprofits domiciled in “always-treated” states (i.e. for repeal events the states never having a separate estate tax and for installation events the states always having an estate tax during the sample period) and stratified by charitable giving vehicle type on nonprofits between 2002 and 2015.

Figures Figure 14 and Figure 15 display the results of these event studies. The response for both nonprofit entity comparisons and both event types (state estate tax repeals and installations) are largely muted compared to as observed for the previous designs. For all specifications, repeal and installation events induce no significant differential response by charitable giving in the years immediately following each event.

However, starting four years following repeal events, private foundations appear to report marginally less in contributions than do public charities on the order of 5-10% relative to the pre-period baseline—although no single year coefficients attain individual significance. Figure 15(b) demonstrates a decrease in giving to non-familial private foundations relative to family foundations, corroborating results from the main state-level specifications that non-familial private foundations may exhibit more tax strategic behavior than do family foundations. The individual year coefficients here exhibit substantial noise and do not demonstrate individual statistical significance, but gap in reported contributions between the two groups expands to nearly 40 percentage points.⁴¹

State estate tax installation events appear to only elicit at-most muted differential responses in charitable activity by nonprofit vehicle type. However, both aggregate and two-way fixed effect event studies demonstrate a stronger decrease in giving to private foundations than to public charities following state estate tax repeal events. This muted response is likely attributable to the role of taxpayers anticipating state-level policy reversals. The observation that estate tax repeal events elicit stronger responses than installation events suggests that post-EGTRRA installation events saw greater anticipation.

7 Evidence on quasi-private benefit and charity efficiency by vehicle type

I now briefly elaborate on the differences in potentially privately benefiting activities and charity expenses between nonprofit vehicle types. I focus on the domains of charitable

⁴¹Figures Figure A.7 illustrate similar results for event studies surrounding repeals using levels.

activity, select measures of private benefit, penalized activity, non-charitable expenses, and the presence of tax-optimizing charitable activity. I compare private foundations with public charities as well as familial foundations with non-familial private foundations.

Overall, this section demonstrates that, compared to public charities, private foundations are 1) substantially more opaque in terms of the exact subject matter of their charitable activity, 2) more prone using greater amounts of funds for administrative and non-charitable purposes, and 3) more likely to report business interests and activity pertaining to the financial interests of related and disqualified parties.

I find fewer large differences between familial and non-familial private foundations. Most importantly, I find among family foundations 1) greater opacity in terms of their stated charitability fields, 2) lower likelihood of engaging in and lower importance of quasi-self dealing activities, such as compensation to officers and compensating disqualified persons, 3) greater likelihood of reporting substantial business ownership interests and distributions to related donor advised funds, and 4) similar levels of bunching on IRS-required minimum payout levels.

A first step in studying the potential private-benefiting nature of nonprofit activity is studying their stated charitability subject matter. Charitable organizations have an NTEE (National Taxonomy of Exempt Entities) code corresponding with their stated charitability goal. This code, analogous to a NAICS code for for-profit entities, features increasing granularity with each letter/digit. The coarsest version of this code features just the first letter of the full code (e.g. “B” corresponds with education), of which there are 26. Full NTEE codes can feature two to four additional numeric digits (e.g. “B70” corresponds with “libraries and library science”).

Table 4 tabulates the five most common broad NTEE groups by charitable giving vehicle type in 2019. A key takeaway in comparing public charities and private foundations, is that nearly all private foundations are concentrated in the “T” subgroup of the broad NTEE

categories. This category is opaque insofar as it, instead of specifying exact charitability goals or subject matter, describes the aims of a nonprofit entity as funding other nonprofit entities—with no specificity as to subject matter or goals. There are no other means of using the systematized tax administrative data to ascertain more precise charitability subject matter.⁴²⁴³ Private foundations are heavily concentrated in this space—hosting nearly three-quarters of private nonprofits. This concentration contrasts with the reported goals of public charities; the top five broad NTEE codes of public charities account for about 55% of public charities’ stated subject matters.

Familial and non-familial private foundations are somewhat similar with respect to reported subject matter. The same categories occupy their top five broad NTEE codes with some re-ordering, but the most striking takeaway is that nearly 90% of family foundations report a broad NTEE code in the more opaque category “T”, compared with 62% of non-familial private foundations. This result suggests a key characteristic of family foundations—greater desired flexibility or perhaps opacity in operation.

The IRS forms feature information on various kinds of activities undertaken by nonprofits each year. Here I focus on administrative, disqualified, and quasi-self-dealing activities that are reported in both the 990 and 990-PF forms of can be reconciled between them.⁴⁴

Table 5 displays the results of regressing various measures of administrative, disqualified, and quasi-self-dealing activities on an indicator of nonprofit vehicle type in a simple bivariate cross-sectional setting. The differences between private foundations and public charities are stark. Private foundations are more than 10 times as likely to pay compensation to

⁴²The subgroups of NTEE base code “T” describe the legal designation of the types of recipient nonprofit entities, rather than any specific subject matter (e.g. education, health, religion, etc.).

⁴³There exist alternative means of inferring charitability subject matter. The full 990 and 990-PF declarations feature verbal mission statements. However, these short-response entries are not systematized (and often unavailable for earlier years). Yet another alternative would use proprietary data from charitability aggregators on which to which individuals and entities nonprofits make grants.

⁴⁴Unfortunately, there exist many fields indicating quasi-self benefit and specific charitable and non-charitable activities that do not exist mutually between both the 990 and 990-PF. I make use of NCCS and SOI data from 2019 here due to improvements to conformability of fields between forms 990 and 990-PF.

disqualified persons than are public charities—with over one in six private foundations doing so in 2019.⁴⁵ However, they are substantially less likely to engage in lending with legally disqualified persons, albeit only between one and three percent of nonprofits engage in such activity every year.

Important differences also extend to how private foundations and public charities use their funds and wealth. Private foundations use a 20% greater proportion of their expense for officer compensation. They also allocated 120 and 130 percent greater shares of their overall expenses than did public charities on legal fees and accounting fees respectively. Private foundations allocate a substantially greater share of their asset portfolios in securities—over 60% of their assets compared to 13% for public charities.

Private foundations are nearly 10 times more likely than public charities to hold at least a 2% ownership interest in a business and 40% more likely to have management with a donor advised fund.⁴⁶ Overall, these results portray private foundations as substantially more susceptible to engaging in quasi-private-benefiting transactions and substantially greater use as an investment vehicle.

Panel (b) displays the results of these regressions among the subsample of private foundations, distinguishing between familial and non-familial foundation status. Family foundations are less than half as likely as are non-familial private foundations to compensate disqualified persons and spend half the proportion of overall expenses on legal fees. They also allocate only one-third the proportion of overall expenses on officer compensation as do non-familial private foundations. However, family foundations are 60% and 100% more likely to claim a greater than 2% interest in an external business and distribute to a related donor advised fund respectively. They are also around 10% more likely to engage in disqualified

⁴⁵This difference may also reflect differences in reporting standards for the two vehicle types. Private foundations are asked about compensation and reimbursements of disqualified persons, whereas public charities are only asked about compensation of disqualified persons.

⁴⁶There exists a reporting standard discrepancy between forms 990 and 990-PF for studying the usage of donor advised funds. Form 990 asks if the organization maintains donor advised funds over which donors can provide advice on distributions and investments; Form 990-PF asks if the foundation made a distribution to a donor advised fund over which the foundation or a disqualified person has advisory privileges.

lending.

Lastly, I demonstrate that familial and non-familial private foundations engage in tax strategic spending in similar magnitudes. Private foundations are required to distribute a proportion of their total asset value (per market valuation) in charitable expenses every year. Nonprofits not in compliance with this rule by the end of their fiscal year are allotted 90 days to pay the remainder of their determined “minimum payout” plus a 30% fee, and those further delinquent are required to pay the entirety of the remaining deemed minimum payout as an excise tax. Additionally, the 30% fee continues to compound each year the minimum payout remains unfulfilled.

This incentive generates a kinked incentive in charitable payout (and a notched incentive in payout delinquency) for private foundations, where for a minimum required payout X , a payout deficiency by amount ϵ results in a net loss of 0.3ϵ (assuming the required amount is paid out within 90 days). Each private foundation has a kink point based on its total assets, and studying the bunching mass at this point and how the bunching may differ on average between nonprofit type may reveal differences in propensity to engage in tax strategy.

Based on the IRS guidelines, I calculate the prescribed minimum payout requirement as

$$\textit{Minimum Payout}_{it} = (0.05 \cdot 0.985 \cdot \textit{Assets}_{it}) - 0.0139 \cdot \textit{Investment Revenue}_{it}.^{47}$$

With every nonprofit-year associated with a specific kink point, I generate the ratio of realized payout to the calculated minimum payout for each foundation-year observation (the “compliance ratio”). Figure 16 plots the distribution of nonprofit-year compliance ratios for every nonprofit-year observation in my sample between 1989 and 2015, stratifying by family foundation status. In the figure, observations to the left of a compliance ratio of one are

⁴⁷Specifically, a 5% minimum expense applies to the amount of assets owned by the foundation less a 1.5% deduction from the stock of assets. Against this amount, most private foundations are allowed to credit the entire amount paid on taxes on investment revenues. I observe in the data whether a given nonprofit is exempt from the investment tax revenues tax, and therefore whether the credit from investment revenue taxes is applicable.

non-compliant. The figure depicts a local mass located precisely at the minimum compliance ratio to avoid delinquency, confirming the salience of this incentive. Interestingly, the shape of the distribution around this value appears perfectly continuous, unlike with other distributions around kinked incentive schedules (e.g. Saez 2010).

However, there appears no discernible difference in the “bunching” behavior between family foundations and non-familial private foundations. The only visible difference between the two distributions perhaps is the relatively greater volume of low-payout non-familial private foundations. While the local extremum located at the minimum payout level to attain compliance confirms the presence of tax strategic spending among private foundation, there appears no significant difference in the extent to which private foundations engage in this kind of tax strategic expense planning.

These results reveal basic differences in the extent of quasi-privately benefiting and tax strategic behavior by nonprofit vehicle type. Namely, private foundations compared to public charities are associated with significantly more opacity in terms of the exact subject matter of their operations. They also allocate 1) significantly greater shares of their expenses to officer compensation and administrative activities 2) demonstrate a higher likelihood of engaging in compensation of disqualified individuals or maintaining relations with disqualified donor advised funds, and 3) exhibit greater substantial ownership interest in private businesses and investment securities. These result demonstrate evidence of both greater propensity for private benefit of private foundations and differences in charitability efficiency as measured by expenses on non-charitable activities.

Differences between familial and non-familial private foundations are less pronounced, but reveal that family foundations feature greater opacity in terms of their charitability goals. They are less likely to engage in activities with disqualified persons, but are more likely to demonstrate substantial ownership in private businesses and make distributions to donor advised funds of disqualified persons.

Table 4: Top five NTEE codes by nonprofit vehicle type

	Public charities			Private foundations		
	NTEE	Description	%	NTEE	Description	%
1.	B	Education	17.33	T	Philanthropy, Voluntarism & Grantmaking Foundations	73.35
2.	P	Human Services	12.21	B	Education	8.09
3.	A	Arts, Culture & Humanities	10.48	A	Arts, Culture & Humanities	3.01
4.	N	Recreation & Sports	8.28	X	Religion-Related	2.36
5.	X	Religion-Related	6.38	P	Human Services	2.29
	Non-familial private foundations			Family foundations		
	NTEE	Description	%	NTEE	Description	%
1.	T	Philanthropy, Voluntarism & Grantmaking Foundations	62.39	T	Philanthropy, Voluntarism & Grantmaking Foundation	89.99
2.	B	Education	11.06	B	Education	3.55
3.	A	Arts, Culture & Humanities	4.34	P	Human Services	1.00
4.	X	Religion-Related	3.28	A	Arts, Culture & Humanities	1.00
5.	P	Human Services	3.15	X	Religion-Related	0.96

This table tabulates the top five most common NTEE first letter codes (also referred to as “NTEE Major Group” by charitable giving vehicle type as reported by nonprofits in their 990 and 990-PF declarations for fiscal year 2019. The second panel divides private foundations between non-familial private foundations and family foundations. All nonprofit entities are assigned equal weight in this specification.

Table 5: Cost-measures and quasi-private benefit

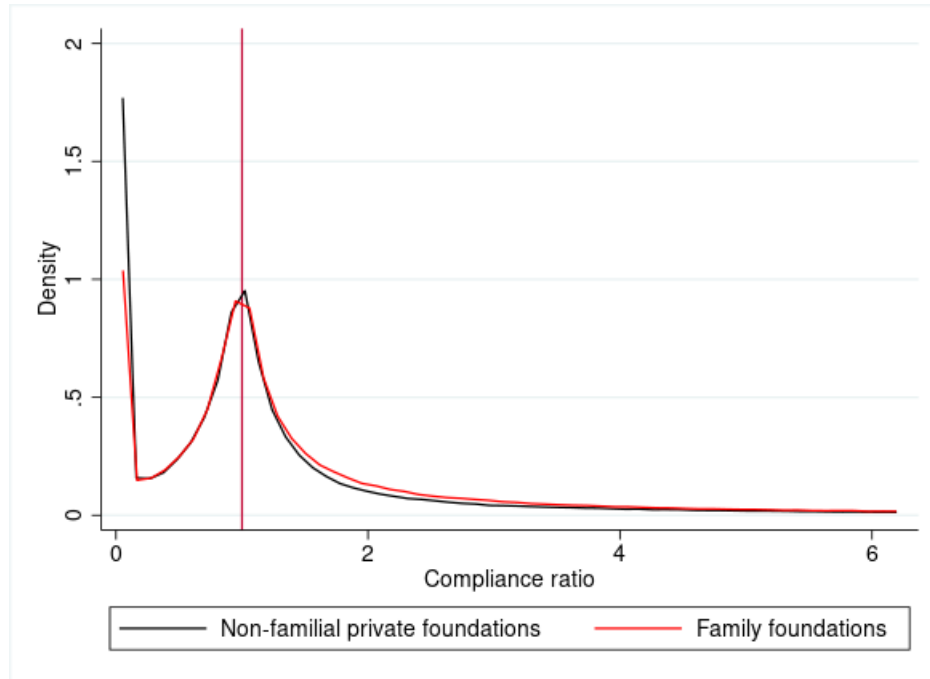
	Business interest ($>2\%$)	Disqual. lending	Disqual. comp.	Officer comp (expense share)	Legal fees (ex- pense share)	Account. fees (ex- pense share)	Related DAF	Securities (asset share)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel (a): Private foundations v. public charities								
Private foundation	0.010*** (0.000)	-0.027*** (0.001)	0.161*** (0.001)	0.008*** (0.001)	0.006*** (0.000)	0.037*** (0.001)	0.003*** (0.000)	0.493** (0.245)
Constant	0.00015* (0.000)	0.034*** (0.000)	0.015*** (0.000)	0.039*** (0.000)	0.005*** (0.000)	0.016*** (0.000)	0.007*** (0.000)	0.132*** (0.001)
Observations	274487	274487	402952	389391	270189	270189	402952	290407
R^2	0.007	0.005	0.091	0.000	0.002	0.033	0.000	0.000
Panel (b): Family foundations v. non-familial private foundations								
Family foundation	0.005*** (0.001)	0.001** (0.001)	-0.133*** (0.003)	-0.047*** (0.001)	-0.008*** (0.000)	-0.001 (0.001)	0.007*** (0.001)	-0.252 (0.403)
Constant	0.008*** (0.000)	0.007*** (0.000)	0.229*** (0.002)	0.066*** (0.001)	0.015*** (0.000)	0.054*** (0.001)	0.007*** (0.000)	0.724* (0.403)
Observations	75344	75344	75344	72026	72026	72026	75344	75321
R^2	0.001	0.000	0.029	0.046	0.003	0.000	0.001	0.000

Heteroskedasticity-robust standard errors in parentheses

* $p < .10$, ** $p < .05$, *** $p < .01$

This table displays the results of cross-sectional bivariate regressions of the form: $y_i = \beta_0 + \beta\theta_i + \varepsilon_i$. In panel (a), θ_i is an indicator for whether nonprofit i is a private foundation. Panel (b) isolates the sample of private foundations and regresses the outcome variable on an indicator for whether the private foundation is a family foundation. All observations come from 990 and 990-PF returns from fiscal year 2019.

Figure 16: Private foundation compliance ratio



This figure displays the distribution of the compliance ratio for the universe of familial and non-familial private foundations from 1989 to 2015. I define the compliance ratio as the ratio of charitable expenses (typically contributions paid out less administrative expenses) to the minimum IRS-required payout (95% of nonprofit assets per market value less 1.5% for cash reserves and taxes paid on investment revenues). Private foundations are fined for making fewer charitable expenses than their required payout. The red vertical line marks the minimum compliance ratio for a foundation to be compliance with minimum payout requirements.

8 Conclusion

This work has documented the systematic differences in charitable giving responses to changes in the estate tax schedule by nonprofit vehicle type. I study the distinction between private foundations and public charities, leverage new variation in federal and state estate taxation in the post-EGTRRA era, and make use of novel data distinguishing familial and non-familial private foundations. In brief, I find that individual private foundations respond much more strongly to the estate tax rate than do public charities. I also find that the colloquial distinction between family foundations and non-familial private foundations reflects no significantly differential response in reported contributions to changes in the estate tax rate.

First, I have demonstrated that much of the positive relationship between the estate tax rate and charitable giving is driven by additional giving to private foundations over public charities. This result holds for changes in the estate tax schedule both on the federal and state levels. I find that aggregate giving responds in an asymmetric manner for private foundations in the case of both federal and state estate tax reform, reflecting that the estate tax charitable deduction induces a reallocation in charitable giving in net toward private foundations. For federal-level reform, aggregate contributions to private foundations responds with an elasticity with respect to the top marginal estate tax rate of around 2, and between zero and 0.285 public charities. Within-nonprofit contributions respond on average with an elasticity with respect to the top marginal estate rate of between 1.3 and 2; fixed individual public charities respond with an elasticity between zero and 0.15.

Second, I show that in spite of the disconnect between state estate tax base and full deductibility of charitable contributions regardless of recipient location, private foundation giving responds significantly more than does public charity giving in response to state estate tax changes. The reported contributions elasticity of private foundations with respect to the top *overall* marginal estate tax rate for changes in *state* estate tax policy is around 1, where as the within-nonprofit contributions elasticity for private foundations is between .25 and .5.

The response for public charities is indistinguishable from zero in the aggregate, where the within-nonprofit response for public charities corresponds with an elasticity between 0.1 and 0.5.

I also make use of a novel dataset that allows me to distinguish between family and non-familial private foundations. Although a purely colloquial distinction entailing no legal implications, little is known about whether these two groups behave differently. I provide the first evidence that these two groups behave similarly. Overall, evidence here suggests that non-familial private foundations respond perhaps slightly more to incentives posed by the estate tax charitable deduction. This result may appear counterintuitive, as ex-ante one might associate family foundations as facilitating estate planning for intragenerational asset management purposes. However, descriptive evidence on the distinction between familial and non-familial private foundation suggests that family foundations are associated with greater opacity in terms of their charity subject matter and demonstrate greater ownership interest in private businesses and are more likely to make distributions to the donor advised funds of disqualified persons.

These results have important implications for how we understand estate tax avoidance via charitable giving. Much work has demonstrated the positive relationship between estate taxation and charitable donations out of bequests. However, by demonstrating the outsized role of private foundations in driving the overall positive causal relationship between the estate tax rate and charitable giving, this work calls into question the net optimality of the charitable giving estate tax deduction and to what extent the deduction facilitates tax avoidance while subsidizing potentially privately benefiting “charitable” activity. I also demonstrate that, compared to public charities, private foundations are associated with significantly greater subject matter opacity. I show that they 1) allocate significantly greater shares of their expenses to officer compensation and administrative activities 2) demonstrate a higher likelihood of engaging in compensation of disqualified individuals or maintaining relations with disqualified donor advised funds, and 3) exhibit greater substantial ownership interest in private businesses and investment securities. To the extent that the activity

of private foundations demonstrates less public benefit, private foundations undermine the social optimality of the charitable bequest estate tax deduction.

References

- Andreoni, James (2006). “Chapter 18 Philanthropy”. In: *Applications*. Ed. by Serge-Christophe Kolm and Jean Mercier Ythier. Vol. 2. Handbook of the Economics of Giving, Altruism and Reciprocity. Elsevier, pp. 1201–1269. DOI: [https://doi.org/10.1016/S1574-0714\(06\)02018-5](https://doi.org/10.1016/S1574-0714(06)02018-5). URL: <https://www.sciencedirect.com/science/article/pii/S1574071406020185>.
- Atkinson, A.B. and J.E. Stiglitz (1976). “The design of tax structure: Direct versus indirect taxation”. In: *Journal of Public Economics* 6.1, pp. 55–75.
- Auten, Gerald E., Holger Sieg, and Charles T. Clotfelter (Mar. 2002). “Charitable Giving, Income, and Taxes: An Analysis of Panel Data”. In: *American Economic Review* 92.1, pp. 371–382. DOI: 10.1257/000282802760015793. URL: <https://www.aeaweb.org/articles?id=10.1257/000282802760015793>.
- Bakija and Heim (2011). “Hows Does Charitable Giving Respond to Incentives and Income? New Estimates from Panel Data”. In: *National Tax Journal* 64.2.2, pp. 615–650. DOI: 10.17310/ntj.2011.2S.08. eprint: <https://doi.org/10.17310/ntj.2011.2S.08>. URL: <https://doi.org/10.17310/ntj.2011.2S.08>.
- Bakija, Jon and Joel Slemrod (July 2004). *Do the Rich Flee from High State Taxes? Evidence from Federal Estate Tax Returns*. Working Paper 10645. National Bureau of Economic Research. DOI: 10.3386/w10645. URL: <http://www.nber.org/papers/w10645>.
- Bakija, Jon M., William G. Gale, and Joel B. Slemrod (May 2003). “Charitable Bequests and Taxes on Inheritances and Estates: Aggregate Evidence from across States and Time”. In: *American Economic Association Papers and Proceedings* 93.2, pp. 366–370. DOI: 10.1257/000282803321947362. URL: <https://www.aeaweb.org/articles?id=10.1257/000282803321947362>.
- Brunetti, Michael J. (2005). “The Estate Tax and Charitable Bequests: Elasticity Estimates Using Probate Records”. In: *National Tax Journal* 58.2, pp. 165–188. DOI: 10.17310/ntj.2005.2.01. eprint: <https://doi.org/10.17310/ntj.2005.2.01>. URL: <https://doi.org/10.17310/ntj.2005.2.01>.
- Callaway, Frantly and Pedro H.C. Sant’Anna (2020). “Difference-in-Differences with Multiple Time Periods”. In: URL: https://pedrohcg.github.io/files/Callaway_SantAnna_2020.pdf.
- Collins, Chuck, Helen Flannery, and Josh Hoxie (Nov. 2018). *Gilded Giving 2018: Top-Heavy Philanthropy and Its Risks to the Independent Sector*. Tech. rep. Institute for Policy Studies.

- Conway, Karen Smith and Jonathan C. Rork (2014). “Diagnosis Murder: The Death of State Death Taxes”. In: *Economic Inquiry* 42.4, pp. 537–559.
- Fack, Gabrielle and Camille Landaïs (2012). “Philanthropy, Tax Policy and Tax Cheating: A Long Run Perspective”. In: *CEPR Conference*.
- Farhi, Emmanuel and Iván Werning (May 2010). “Progressive Estate Taxation”. In: *The Quarterly Journal of Economics* 125.2, pp. 635–673. ISSN: 0033-5533. DOI: 10.1162/qjec.2010.125.2.635. eprint: <https://academic.oup.com/qje/article-pdf/125/2/635/5319704/125-2-635.pdf>. URL: <https://doi.org/10.1162/qjec.2010.125.2.635>.
- Feldstein, Martin (1980). “A Contribution to the Theory of Tax Expenditures: The Case of Charitable Giving”. In: *The Economics of Taxation*. Ed. by H. Aaron and M. Boskin. Brookings.
- Gandullia, Luca and Emanuela Lezzi (2018). “The price elasticity of charitable giving: New experimental evidence”. In: *Economics Letters* 173, pp. 88–91. ISSN: 0165-1765. DOI: <https://doi.org/10.1016/j.econlet.2018.09.012>. URL: <https://www.sciencedirect.com/science/article/pii/S0165176518303902>.
- Gereffi, Gary (Jan. 2001). “The NGO-Industrial Complex”. In: *Foreign policy*.
- Goodman-Bacon, Andrew (2020). “Difference-in-Differences with Variation in Treatment Timing”. In: URL: <http://goodman-bacon.com/pdfs/ddtiming.pdf>.
- Hochman, Harold M. and James D. Rodgers (1977). “The Optimal Tax Treatment of Charitable Contributions”. In: *National Tax Journal* 30.1, pp. 1–18. ISSN: 00280283, 19447477. URL: <http://www.jstor.org/stable/41862109>.
- INCITE! (2007). *The Revolution Will Not be Funded*. Duke University Press.
- Joulfaian, D. (1991). “Charitable Bequests and Estate Taxes”. In: *National Tax Journal* 44.2, pp. 169–180.
- (2000). *Estate taxes and charitable bequests by the wealthy*. Working Paper 7663. National Bureau of Economic Research.
- Joulfaian, David (2006). “The Behavioral Response of Wealth Accumulation to Estate Taxation: Time Series Evidence”. In: *National Tax Journal* 59.2, pp. 253–68. URL: <https://EconPapers.repec.org/RePEc:ntj:journl:v:59:y:2006:i:2:p:253-68>.
- K., Yörük Barış (Jan. 2015). “Do Charitable Subsidies Crowd Out Political Giving? The Missing Link between Charitable and Political Contributions”. In: *The B.E. Journal of Economic Analysis & Policy* 15.1, pp. 1–29. DOI: 10.1515/bejeap-2012-0026. URL: <https://ideas.repec.org/a/bpj/bejeap/v15y2015i1p29n1.html>.

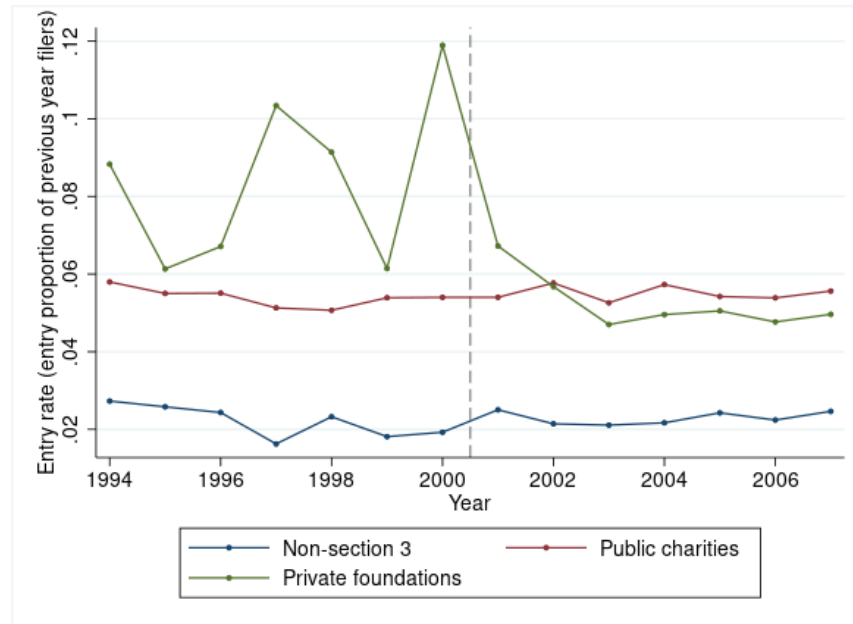
- Kaplow, Louis (1995). "A note on subsidizing gifts". In: *Journal of Public Economics* 58.3, pp. 469–477. ISSN: 0047-2727. DOI: [https://doi.org/10.1016/0047-2727\(95\)01482-H](https://doi.org/10.1016/0047-2727(95)01482-H). URL: <https://www.sciencedirect.com/science/article/pii/004727279501482H>.
- Karol, Stephanie (Mar. 2023). "Taking from Charity? Political Contributions and the Market for Charitable Funds". In: *Working Paper*. URL: <https://static1.squarespace.com/static/62e4846f8d11f573a2a6db19/t/641f4b3969296f14fed99cff/1679772474566/KarolTakingFromCharity.pdf>.
- Kleven, Henrik Jacobsen et al. (2011). "Unwilling or Unable to Cheat? Evidence From a Tax Audit Experiment in Denmark". In: *Econometrica* 79.3, pp. 651–692. DOI: <https://doi.org/10.3982/ECTA9113>. eprint: <https://onlinelibrary.wiley.com/doi/pdf/10.3982/ECTA9113>. URL: <https://onlinelibrary.wiley.com/doi/abs/10.3982/ECTA9113>.
- Kopczuk, Wojciech and Joel Slemrod (2003). "Tax Impacts on Wealth Accumulation and Transfers of the Rich". In: ed. by A. Munnell and A. Sunden. *Death and Dollars: The Role of Gifts and Bequests in America*. Brookings Institution Press, pp. 213–249.
- Michael, Joel (Dec. 2015). *Survey of State Estate, Inheritance, and Gift Taxes*. Tech. rep. Minnesota House of Representatives, Research Department.
- Moretti, Enrico and Daniel J Wilson (Oct. 2019). *Taxing Billionaires: Estate Taxes and the Geographical Location of the Ultra-Wealthy*. Working Paper 26387. National Bureau of Economic Research. DOI: 10.3386/w26387. URL: <http://www.nber.org/papers/w26387>.
- Nuckolls, John (Apr. 2010). *Carryover Basis for Property Acquired from a Decedent Dying During 2010*. Web.
- Olden, Andreas and Jarle Møen (Mar. 2022). "The triple difference estimator". In: *The Econometrics Journal*. utac010. ISSN: 1368-4221. DOI: 10.1093/ectj/utac010. eprint: <https://academic.oup.com/ectj/advance-article-pdf/doi/10.1093/ectj/utac010/43051905/utac010.pdf>. URL: <https://doi.org/10.1093/ectj/utac010>.
- Parisi, Michael (Spring 2018). "Individual Income Tax Returns, Preliminary Data, 2016". In: *Statistics of Income Bulletin*. URL: <https://www.irs.gov/pub/irs-soi/soi-a-inpd-id1802.pdf>.
- Piketty, Thomas and Emmanuel Saez (2013). "A Theory of Optimal Inheritance Taxation". In: *Econometrica* 81.5, pp. 1851–1886. DOI: <https://doi.org/10.3982/ECTA10712>. eprint: <https://onlinelibrary.wiley.com/doi/pdf/10.3982/ECTA10712>. URL: <https://onlinelibrary.wiley.com/doi/abs/10.3982/ECTA10712>.
- Ransome, Justin and Frances Schafer (June 2011). *Estate Tax or Carryover Basis?* Web.

- Saez, Emmanuel (2004). “The optimal treatment of tax expenditures”. In: *Journal of Public Economics* 88.12, pp. 2657–2684. ISSN: 0047-2727. DOI: <https://doi.org/10.1016/j.jpubeco.2003.09.004>. URL: <https://www.sciencedirect.com/science/article/pii/S0047272703001397>.
- (Aug. 2010). “Do Taxpayers Bunch at Kink Points?” In: *American Economic Journal: Economic Policy* 2.3, pp. 180–212. DOI: 10.1257/pol.2.3.180. URL: <https://www.aeaweb.org/articles?id=10.1257/pol.2.3.180>.
- Saez, Emmanuel and Gabriel Zucman (2016). “Wealth Inequality in the United States since 1913: Evidence from Capitalized Income Tax Data”. In: *The Quarterly Journal of Economics* 131.2, pp. 519–578.
- Tazhitdinova, Alisa (2018). “Reducing evasion through self-reporting: Evidence from charitable contributions”. In: *Journal of Public Economics* 165, pp. 31–47. ISSN: 0047-2727. DOI: <https://doi.org/10.1016/j.jpubeco.2018.06.001>. URL: <https://www.sciencedirect.com/science/article/pii/S0047272718301105>.
- Yermack, David (2009). “Deductio’ ad absurdum: CEOs donating their own stock to their own family foundations”. In: *Journal of Financial Economics* 94.1, pp. 107–123. ISSN: 0304-405X. DOI: <https://doi.org/10.1016/j.jfineco.2008.12.002>. URL: <https://www.sciencedirect.com/science/article/pii/S0304405X09001202>.
- Yildirim, Pinar et al. (Jan. 2020). *Are Political and Charitable Giving Substitutes? Evidence from the United States*. Working Paper 26616. National Bureau of Economic Research. DOI: 10.3386/w26616. URL: <http://www.nber.org/papers/w26616>.

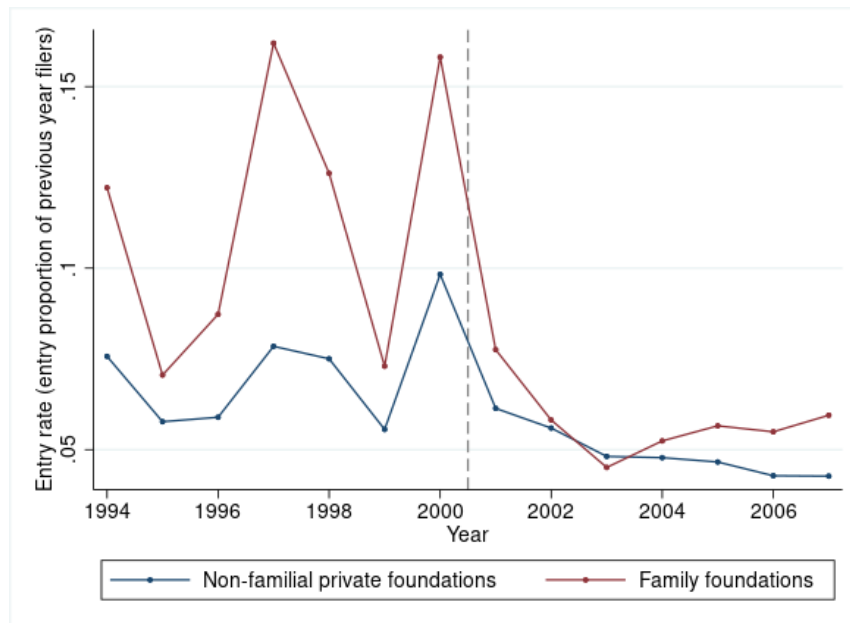
Appendix A Additional figures and tables

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Figure A.1: Aggregate entry rates by nonprofit vehicle type
(a) Public charities, private foundations, and 501(c)-non(3)'s

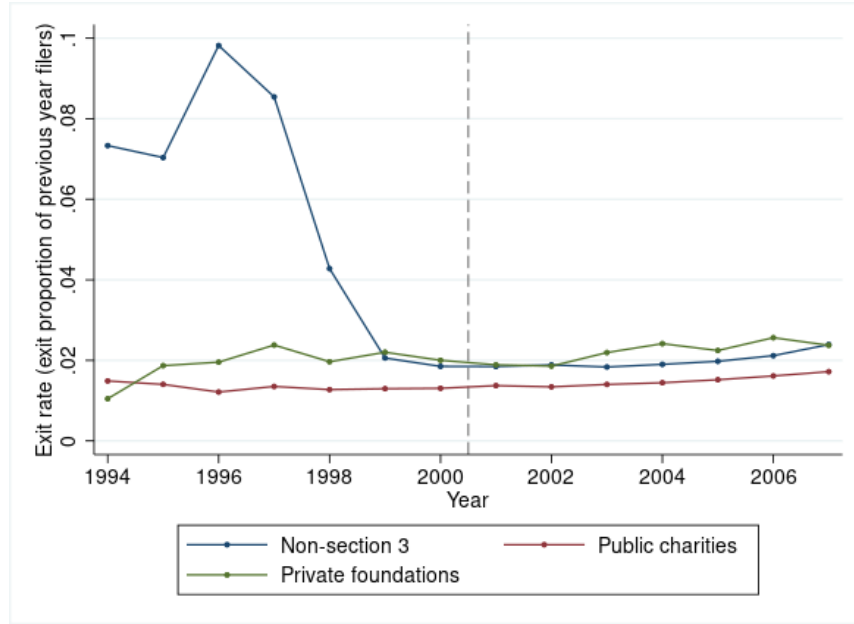


(b) Familial v. non-familial private foundations

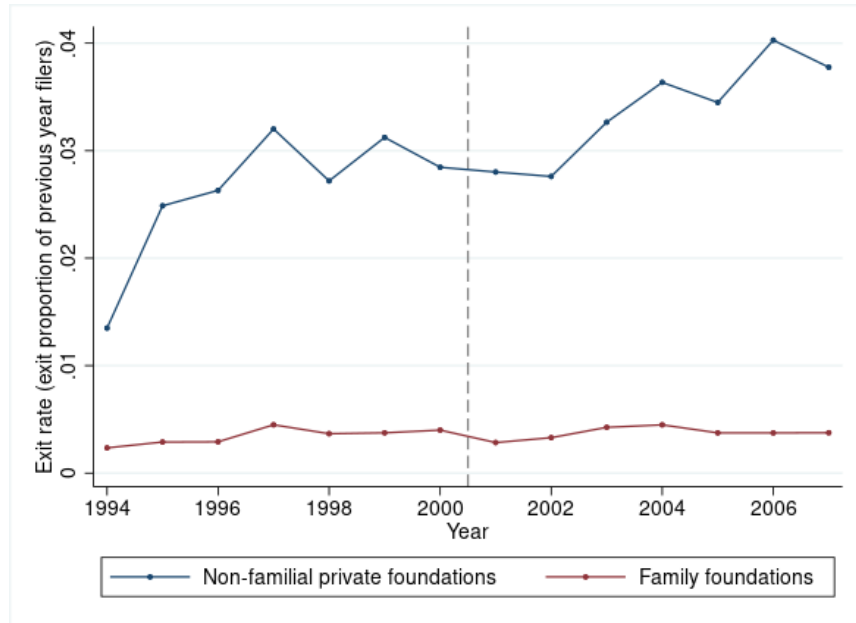


These figures plot annual values of nonprofit entry rate by nonprofit vehicle type between 1994 and 2007. Entry rate in year t is defined as the number of nonprofits filing a 990 or 990-PF declaration for the first time in year t divided by the number of nonprofits operating in year $t - 1$. Panel (a) plots the evolution in entry rate for private foundations, public charities, and nonprofit entities organized outside of subsection 501(c)(3). Panel (b) disaggregates entry rates between non-familial private foundations and familial private foundations.

Figure A.2: Aggregate exit rates by nonprofit vehicle type
(a) Public charities, private foundations, and 501(c)-non(3)'s

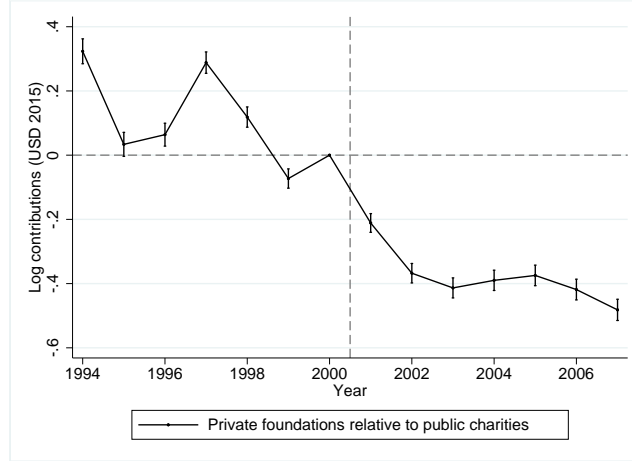


(b) Familial v. non-familial private foundations



These figures plot annual values of nonprofit exit rate by nonprofit vehicle type between 1994 and 2007. Exit rate in year t is defined as the number of nonprofits filing a 990 or 990-PF declaration for the last time in year t divided by the number of nonprofits operating in year $t - 1$. Panel (a) plots the evolution in exit rate for private foundations, public charities, and nonprofit entities organized outside of subsection 501(c)(3). Panel (b) disaggregates exit rates between non-familial private foundations and familial private foundations.

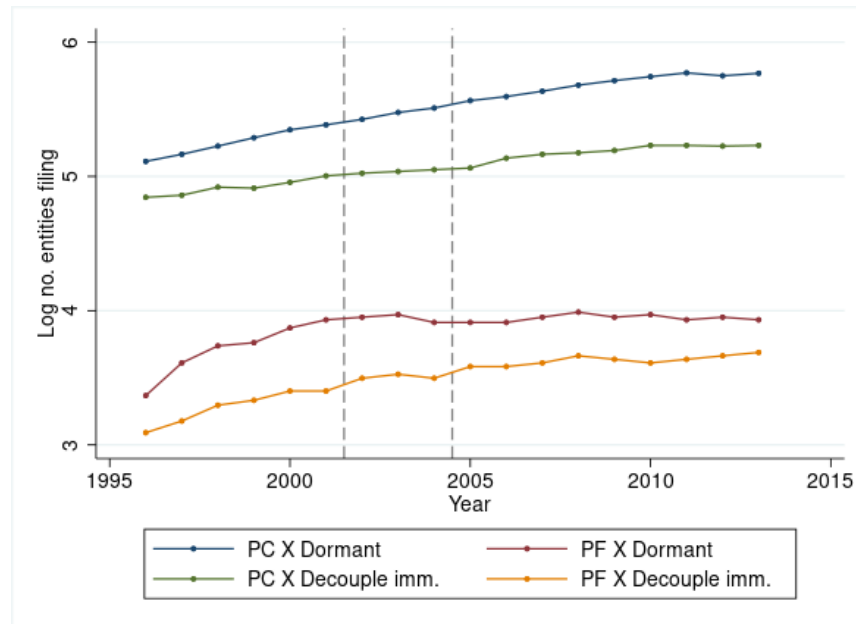
Figure A.3: Federal reform: Log contributions
Private foundations and public charities relative to non-section-3 organizations



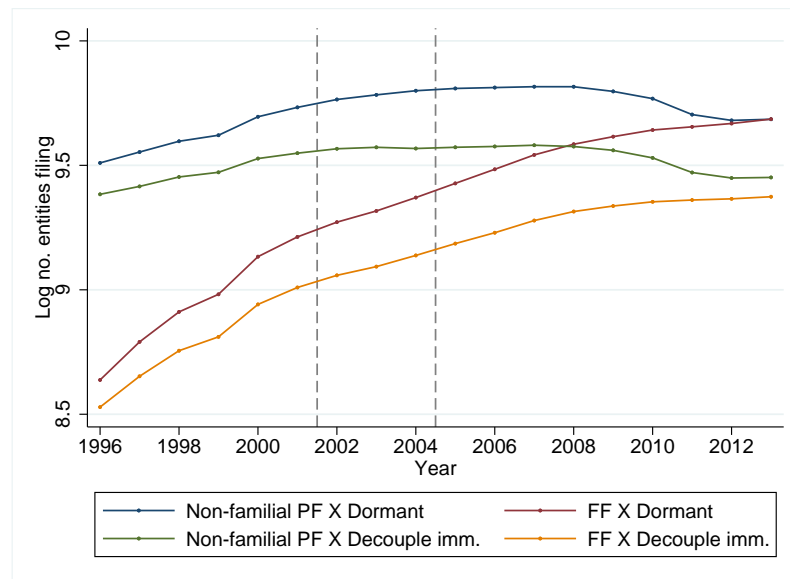
This figure plots the annual difference-in-differences coefficients for the two-way fixed effect specification: $y_{i,t} = \alpha_i + \sum_{k=1994}^{2007} 1\{Year_t = k\} + \sum_{l \in \{c,n,p\}} \sum_{k=1994}^{2007} \beta_{lk} \{\theta_i = l\} 1\{Year_t = k\} + \varepsilon_{it}$. Public charities and the year 2000 serve as the baseline for estimation. The 95% confidence bands use standard errors clustered on the EIN-level.

Figure A.4: Log aggregate reported contributions by nonprofit vehicle type

(a) Public charities and private foundations



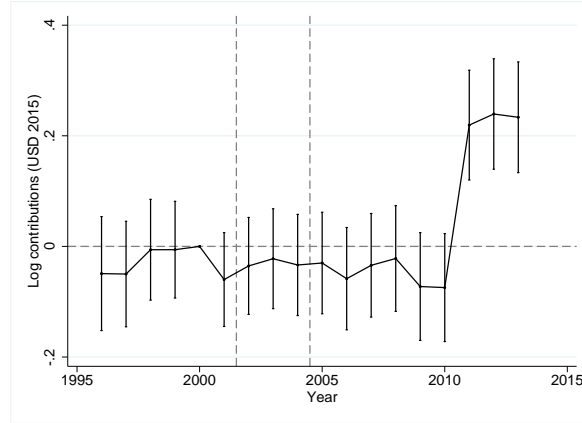
(b) Familial v. non-familial private foundations



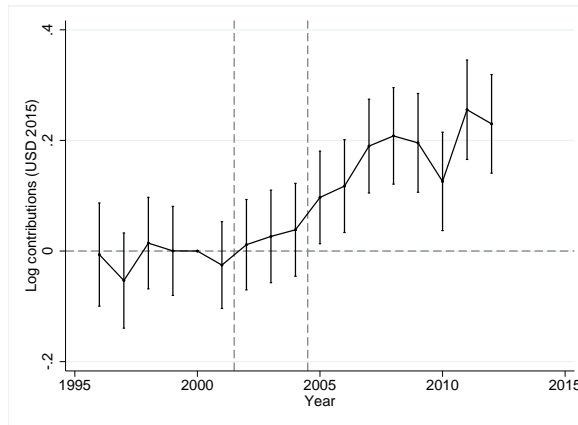
These figures plot annual values of the log number of operating nonprofit entities by nonprofit vehicle type between 1996 and 2013. Panel (a) disaggregates total annual contributions between private foundations and public charities. Panel (b) disaggregates total annual contributions between non-familial private foundations and familial private foundations.

Figure A.5: Triple differences in state \times vehicle type: log contributions, no fixed effects

(a) Private foundations v. public charities, no controls



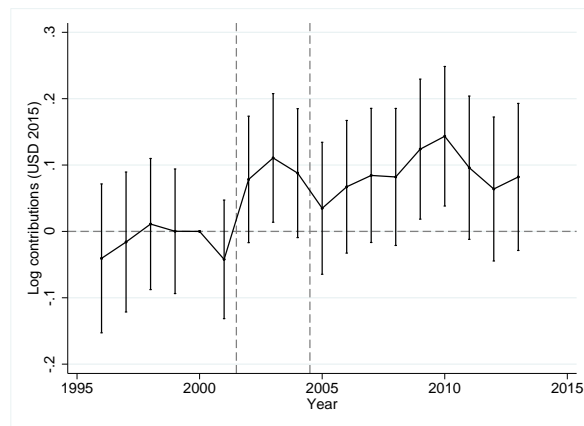
(b) Private foundations v. public charities, controlling for size and state-year taxes



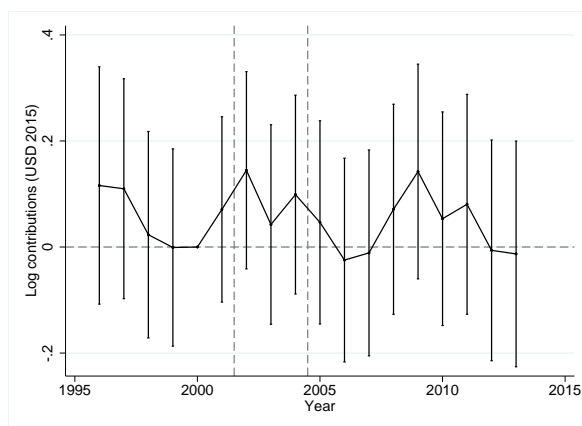
These figures plot annual values of the triple difference coefficients for log aggregate reported contributions comparing private foundations against public charities by state estate tax treatment status, using the year 2000 as a baseline. Panel (a) excludes all controls. Panel (b) controls for nonprofit size measured in assets as well as state-year level income, unemployment, and corporate income tax rates. The years between the dashed gray lines indicate the phase-out period of the federal-state estate tax credit. Error bars represent 95% confidence intervals with standard errors clustered on the EIN-level.

Figure A.6: Triple differences in state \times vehicle type (later repealers as treated): log cont.

(a) Public charities and private foundations



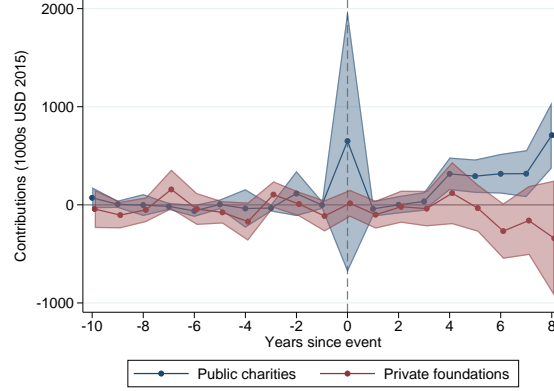
(b) Familial v. non-familial private foundations



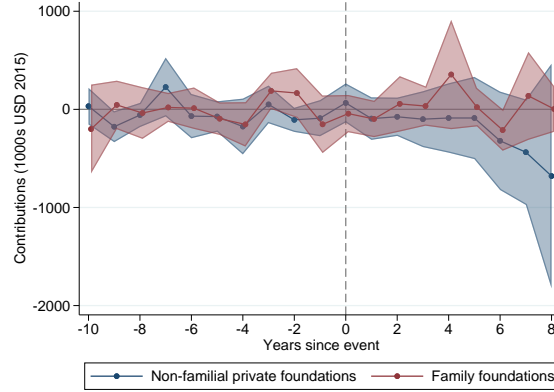
These figures plot annual values of the triple difference coefficients for log aggregate reported contributions comparing between vehicle type and state estate tax treatment status, using the year 2000 as a baseline. This specification uses states initially decoupling from the federal-state estate tax credit but later repealing as “treated”, and uses dormant states as the control group. The specifications includes two-way fixed effects on the EIN-year-level. Panel (a) compares private foundations with public charities. Panel (b) isolates private foundations and compares familial foundations against non-familial foundations. The years between the dashed gray lines indicate the phase-out period of the federal-state estate tax credit. Error bars represent 95% confidence intervals with standard errors clustered on the EIN-level.

Figure A.7: Event study estimates with two-way fixed effects
Repeal events

(a) Private foundations v. public charities



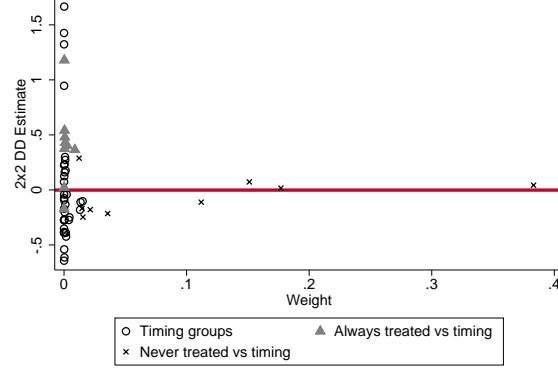
(b) Family foundations v. non-familial private foundations



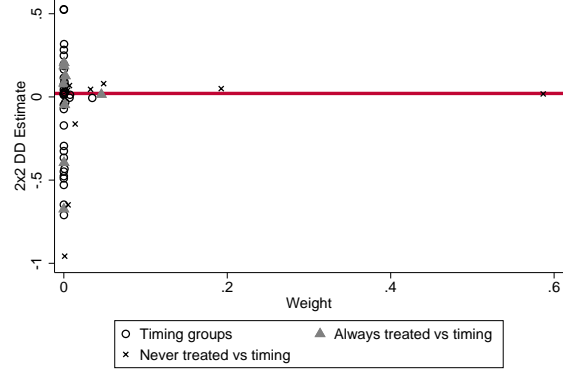
These figures estimate the two-way fixed effect event study $y_{it} = \alpha_i + \sum_{k=2002}^{2015} \delta_k 1\{Year_t = k\} + \sum_{j=t_0}^{t'} \beta_j 1\{EventTime_{s(i),t} = j\} + \varepsilon_{it}$ around de facto state estate tax repeal events. The event study coefficients $\{\beta_j\}$ are estimated using the procedure from Callaway and Sant'Anna 2020 to account for heterogeneous and dynamic treatment effects. Panel (a) studies the responses of public charities and private foundations domiciled in states repealing their state estate taxes. Panel (b) focuses on family foundations and non-familial private foundations. For each panel, the two series of coefficients are computed on samples excluding nonprofits domiciled in “always-treated” states (i.e. the states never having a separate estate tax and during the sample period) and stratified by charitable giving vehicle type on nonprofits between 2002 and 2015.

Figure A.8: Goodman-Bacon decomposition
Event study estimates with two-way fixed effects (repeat events)

(a) Private foundations



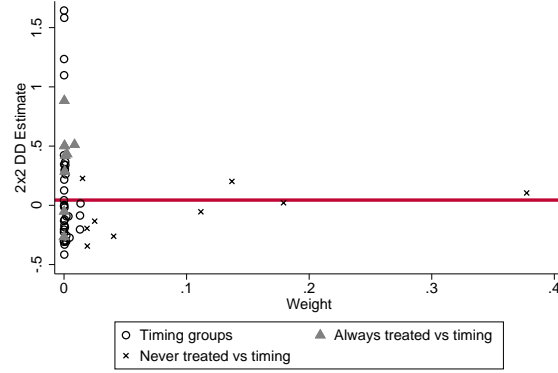
(b) Public charities



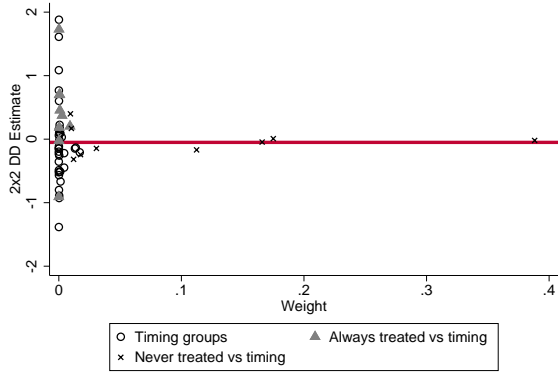
These figures plot the Bacon Decomposition (see Goodman-Bacon 2020) for the two-way fixed effect event studies for the staggered repeal of state-level estate taxes. The decomposition corresponds with the reduced form: $y_{it} = \alpha_i + \sum_{k=2002}^{2015} \delta_k 1\{Year_t = k\} + \sum_{j=-8}^8 \beta_j 1\{EventTime_{s(i),t} = j\} + \varepsilon_{it}$, estimated on the sample of nonprofits remaining in a single state between 2002 and 2015 and excludes nonprofits domiciled in states never imposing an estate tax in this time period (always-treated units). Panel (a) estimates this specification on the subsample of private foundations. Panel (b) estimates this specification on the subsample of public charities.

Figure A.9: Goodman-Bacon decomposition
Event study estimates with two-way fixed effects (repeal events)

(a) Family foundations



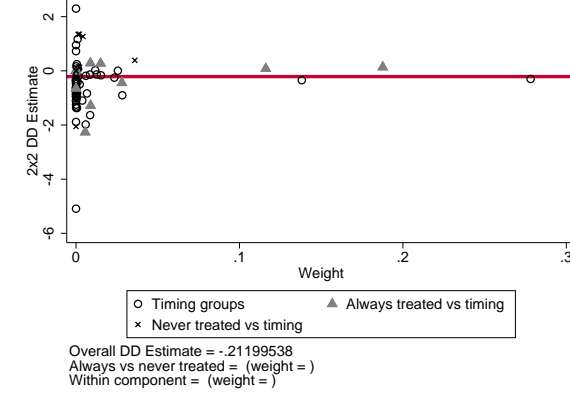
(b) Non-familial private foundations



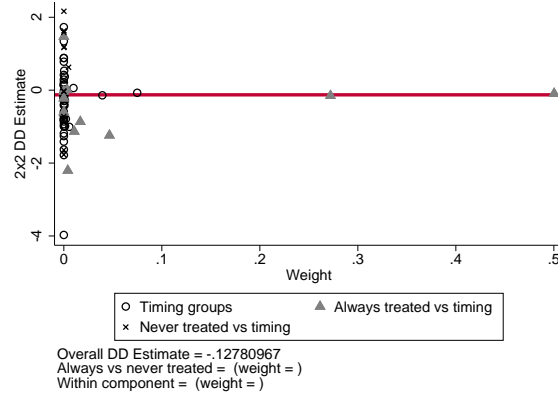
These figures plot the Bacon Decomposition (see Goodman-Bacon 2020) for the two-way fixed effect event studies for the staggered repeal of state-level estate taxes. The decomposition corresponds with the reduced form: $y_{it} = \alpha_i + \sum_{k=2002}^{2015} \delta_k 1\{Year_t = k\} + \sum_{j=-8}^8 \beta_j 1\{EventTime_{s(i),t} = j\} + \varepsilon_{it}$, estimated on the sample of nonprofits remaining in a single state between 2002 and 2015 and excludes nonprofits domiciled in states never imposing an estate tax in this time period (always-treated units). Panel (a) estimates this specification on the subsample of family foundations. Panel (b) estimates this specification on the subsample of non-familial private foundations.

Figure A.10: Goodman-Bacon decomposition
Event study estimates with two-way fixed effects (installation events)

(a) Private foundations



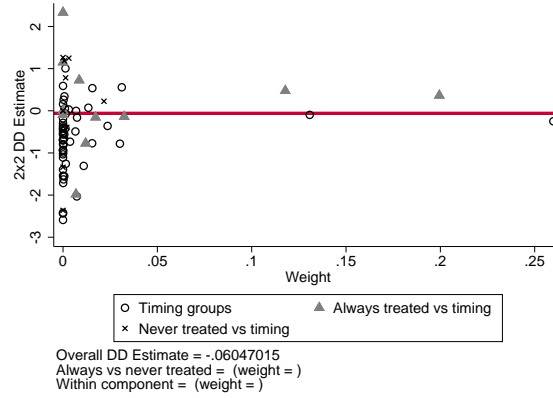
(b) Public charities



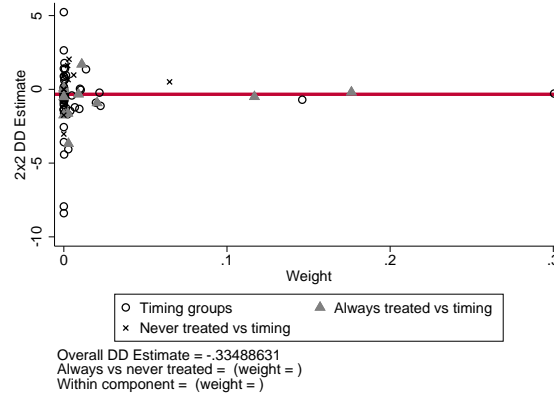
These figures plot the Bacon Decomposition (see Goodman-Bacon 2020) for the two-way fixed effect event studies for the staggered installation of state-level estate taxes. The decomposition corresponds with the reduced form: $y_{it} = \alpha_i + \sum_{k=2002}^{2015} \delta_k 1\{Year_t = k\} + \sum_{j=-8}^8 \beta_j 1\{EventTime_{s(i),t} = j\} + \varepsilon_{it}$, estimated on the sample of nonprofits remaining in a single state between 2002 and 2015 and excludes nonprofits domiciled in states never imposing an estate tax in this time period (always-treated units). Panel (a) estimates this specification on the subsample of private foundations. Panel (b) estimates this specification on the subsample of public charities.

Figure A.11: Goodman-Bacon decomposition
Event study estimates with two-way fixed effects (installation events)

(a) Family foundations



(b) Non-familial private foundations



These figures plot the Bacon Decomposition (see Goodman-Bacon 2020) for the two-way fixed effect event studies for the staggered installation of state-level estate taxes. The decomposition corresponds with the reduced form: $y_{it} = \alpha_i + \sum_{k=2002}^{2015} \delta_k 1\{Year_t = k\} + \sum_{j=-8}^8 \beta_j 1\{EventTime_{s(i),t} = j\} + \varepsilon_{it}$, estimated on the sample of nonprofits remaining in a single state between 2002 and 2015 and excludes nonprofits domiciled in states never imposing an estate tax in this time period (always-treated units). Panel (a) estimates this specification on the subsample of family foundations. Panel (b) estimates this specification on the subsample of non-familial private foundations.

Table A.1: Panel (a): Revenue summary statistics by organization type

	Non-section 3		Public charities	
	Mean	Median	Mean	Median
Revenue total	3.000e+06 (6.1e+07)	130000 [5.9e+06]	5.200e+06 (9.8e+07)	170000 [1.0e+07]
Contributions / revenue	0.130 (0.28)	0 [0.94]	0.500 (0.40)	0.500 [1.00]
Revenue / expense	10.07 (4157.94)	1.030 [1.19]	9.810 (1317.62)	1.030 [2.18]
Contributions > 0	0.310 (0.46)	0 [1.00]	0.840 (0.36)	1 [1.00]
Investment revenue	110000 (4.1e+06)	720.6 [1.5e+05]	140000 (1.1e+07)	169.9 [1.6e+05]
Gross receipts	4.800e+06 (3.0e+08)	170000 [7.0e+06]	7.300e+06 (2.3e+08)	230000 [1.3e+07]
Dividend revenue	32658 (1.4e+05)	7006 [1.2e+05]	30619 (4.2e+05)	0 [46198.00]
Interest revenue	2031 (24315.09)	0 [4560.00]	6091 (1.7e+05)	24 [13488.00]
Net income	160000 (3.9e+07)	2069 [4.4e+05]	260000 (2.0e+07)	3371 [6.3e+05]
Inventory profit	38062 (9.7e+05)	0 [63276.89]	23242 (1.0e+06)	0 [12221.77]
Disqualified amounts	8.560 (2182)	0 [0]	48368 (1.3e+06)	0 [0]

This table displays mean and median values of select revenue summary stats for non-section (3) nonprofit organizations and public charities computed using a panel of annual financial declarations (as reported in IRS form 990) for between 1989 and 2015. Disqualified amounts corresponds with contributions from individuals legally designated as “disqualified members” due to proximity to organization leadership. Disqualified amounts are only reported starting 2011. Standard deviations are reported in parentheses; hard brackets indicate the difference between the 95th and 5th percentiles. Dollar values are expressed in terms of real USD 2015.

Table A.1: Panel (b): Revenue summary statistics by organization type

	Non-familial private foundations		Family foundations	
	Mean	Median	Mean	Median
Revenue total	1000000 (1.6e+07)	36000 [2.0e+06]	1.300e+06 (3.1e+07)	77946 [3.1e+06]
Contributions / revenue	0.290 (0.41)	0 [1.00]	0.340 (0.42)	0 [1.00]
Revenue / expense	70.79 (10147.61)	1 [8.34]	98.55 (9283.43)	1.030 [14.05]
Contributions > 0	0.390 (0.49)	0 [1.00]	0.490 (0.50)	0 [1.00]
Investment revenue	520000 (1.2e+07)	9582 [8.6e+05]	630000 (2.0e+07)	23802 [1.4e+06]
Gross receipts	4.300e+06 (1.2e+08)	130000 [2.2e+06]	3.100e+06 (8.4e+06)	240000 [2.2e+07]
Dividend revenue	120000 (2.2e+06)	3247 [2.7e+05]	130000 (2.4e+06)	8104 [3.7e+05]
Interest revenue	16526 (3.2e+05)	31 [33362.00]	33984 (3.5e+06)	41 [50713.00]
Net income	290000 (1.1e+07)	0 [9.6e+05]	450000 (1.6e+07)	1.100 [1.9e+06]
Inventory profit	2170 (1.9e+05)	0 [0.00]	244 (28713.72)	0 [0.00]
Disqualified amounts			520000 (1.4e+06)	0 [3.9e+06]

This table displays mean and median values of select revenue summary stats for non-familial private foundations and family foundations computed using a panel of annual financial declarations (as reported in IRS form 990-PF) for between 1989 and 2015. Disqualified amounts corresponds with contributions from individuals legally designated as “disqualified members” due to proximity to organization leadership. Disqualified amounts are only reported starting 2011. Standard deviations are reported in parentheses; hard brackets indicate the difference between the 95th and 5th percentiles. Dollar values are expressed in terms of real USD 2015.

Table A.2: Panel (a): Expense summary statistics by organization type

	Non-section 3		Public charities	
	Mean	Median	Mean	Median
Expenses total	1.400e+06 (3.4e+07)	100000 [2.6e+06]	4.800e+06 (9.2e+07)	150000 [9.6e+06]
Disqualified comp.	5600 (2.0e+05)	0 [0.00]	22864 (1.0e+06)	0 [0.00]
Contributions paid	78784 (9.2e+05)	4584 [2.1e+05]	160000 (1.9e+06)	2176 [3.8e+05]
Administrative expense	6258 (28585.31)	1184 [25030.00]	15815 (2.9e+05)	0 [18199.00]
Admin. expense share	0.250 (0.27)	0.170 [0.87]	0.100 (0.25)	0 [0.82]
Exp. / assets	3110 (1.2e+06)	0.930 [10.01]	1372 (4.0e+05)	0.980 [15.10]
Rev. / exp.	2.600 (285.99)	1.030 [1.09]	9.840 (1314.60)	1.030 [2.18]
Contributions received / paid	106.6 (940.46)	0.760 [163.26]	39.59 (680.51)	0.270 [40.43]
Contributions / expense	0.710 (0.22)	0.760 [0.84]	0.560 (0.43)	0.780 [1.00]

This table displays mean and median values of select expense summary stats for non-section (3) nonprofit organizations and public charities computed using a panel of annual financial declarations (as reported in IRS form 990) for between 1989 and 2015. Standard deviations are reported in parentheses; hard brackets indicate the difference between the 95th and 5th percentiles. Dollar values are expressed in terms of real USD 2015.

Table A.2: Panel (b): Expense summary statistics by organization type

	Non-familial private foundations		Family foundations	
	Mean	Median	Mean	Median
Expenses total	680000 (1.0e+07)	36924 [1.4e+06]	730000 (2.5e+07)	65000 [1.7e+06]
Disqualified comp.	14524 (1.9e+05)	0 [57342.82]	8850 (1.7e+05)	0 [31323.83]
Contributions paid	490000 (8.0e+06)	19421 [9.8e+05]	580000 (2.0e+07)	51147 [1.4e+06]
Administrative expense	110000 (2.4e+06)	1741 [2.1e+05]	70581 (2.2e+06)	2658 [1.6e+05]
Admin. expense share	0.220 (0.29)	0.100 [0.91]	0.150 (0.22)	0.0700 [0.75]
Expense / assets	16610 (2.8e+06)	0.0800 [9.39]	505.6 (38062.98)	0.0800 [3.21]
Revenue / expense	70.79 (10147.61)	1 [8.34]	98.55 (9283.43)	1.030 [14.05]
Contributions received / paid	269.8 (28561.65)	0.620 [50.00]	216.4 (21430.52)	0.780 [57.22]
Contributions / expense	0.660 (0.35)	0.810 [1.00]	0.800 (0.27)	0.890 [1.00]

This table displays mean and median values of select summary stats for non-familial private foundations and family foundations computed using a panel of annual financial declarations (as reported in IRS form 990-PF) for between 1989 and 2015. Standard deviations are reported in parentheses; hard brackets indicate the difference between the 95th and 5th percentiles. Dollar values are expressed in terms of real USD 2015.

Table A.3: Panel (a): Metadata by organization type

	w			
	Non-section 3		Public charities	
	Mean	Median	Mean	Median
Age	17.88	11	6.700	2
	(19.11)	[54.00]	(11.70)	[32.00]
Reporting age (max 31)	12.64	8	9.970	8
	(11.23)	[30.00]	(8.60)	[29.00]
Reporting prop.	0.870	0.970	0.910	0.950
	(0.20)	[0.60]	(0.14)	[0.38]
Distinct EINs	3.3e+05		6.0e+05	

This table displays mean and median values of select metadata for non-section 3 nonprofit organizations and public charities computed using a panel of annual financial declarations (as reported in IRS form 990) for between 1989 and 2015. Age corresponds with the maximum difference between most recent reporting year and founding year achieved by each EIN (with summary statistics computed from a separate cross-sectional dataset). Reporting age corresponds with the maximum within-panel age achieved by each EIN computed as the difference between the latest and earliest reporting years. Reporting proportion refers to the fraction of years out of an entity's within-panel age in which it filed a 990 or 990-PF declaration. Standard deviations are reported in parentheses; hard brackets indicate the difference between the 95th and 5th percentiles. Dollar values are expressed in terms of real USD 2015.

Table A.3: Panel (b): Metadata by organization type

	Non-familial private foundations		Family foundations	
	Mean	Median	Mean	Median
Age	3.050 (3.84)	2 [8.00]	2.620 (5.14)	1 [8.00]
Reporting age (max 31)	12.55 (9.59)	11 [30.00]	17.87 (8.10)	18 [26.00]
Reporting prop.	0.870 (0.15)	0.910 [0.50]	0.840 (0.13)	0.850 [0.43]
Distinct EINs	93976		46512	

This table displays mean and median values of select summary stats for non-familial private foundations and family foundations computed using a panel of annual financial declarations (as reported in IRS form 990-PF) for between 1989 and 2015. Age corresponds with the maximum difference between most recent reporting year and founding year achieved by each EIN (with summary statistics computed from a separate cross-sectional dataset). Reporting age corresponds with the maximum within-panel age achieved by each EIN computed as the difference between the latest and earliest reporting years. Reporting proportion refers to the fraction of years out of an entity's within-panel age in which it filed a 990 or 990-PF declaration. Standard deviations are reported in parentheses; hard brackets indicate the difference between the 95th and 5th percentiles. Dollar values are expressed in terms of real USD 2015.

Appendix B Mathematical proofs

B.1 Proof of comparative statics results with non-additively separable bequest motive

I apply the implicit function theorem to the interior optimum defined implicitly by the mapping

$$f(x^*, \lambda, \beta, \tau, w) = \begin{bmatrix} \beta v_b - \frac{\lambda}{1-\tau} \\ u'_c - \lambda \\ u'_n - \frac{\lambda}{1-\tau} \\ \beta v_{g_p} + u'_p - \lambda \\ w - \frac{b}{1-\tau} - g_c - \frac{g_n}{1-\tau} - g_p \end{bmatrix} = \vec{0} \in \mathbb{R}^5 \quad (8)$$

so as to express partial derivatives of $x^* = (b^*, g_c^*, g_n^*, g_p^*, \lambda)$ with respect to τ .

$$\begin{bmatrix} \frac{\partial b^*}{\partial \tau} \\ \frac{\partial g_c^*}{\partial \tau} \\ \frac{\partial g_n^*}{\partial \tau} \\ \frac{\partial g_p^*}{\partial \tau} \\ \frac{\partial \lambda}{\partial \tau} \end{bmatrix} = -1 \cdot \begin{bmatrix} \beta v_{bb} & 0 & 0 & \beta v_{bg_p} & \frac{-1}{1-\tau} \\ 0 & u''_c & 0 & 0 & -1 \\ 0 & 0 & u''_n & 0 & \frac{-1}{1-\tau} \\ \beta v_{g_p b} & 0 & 0 & \beta v_{g_p g_p} + u''_p & -1 \\ \frac{-1}{1-\tau} & -1 & \frac{-1}{1-\tau} & -1 & 0 \end{bmatrix}^{-1} \cdot \begin{bmatrix} -\lambda(1-\tau)^{-2} \\ 0 \\ -\lambda(1-\tau)^{-2} \\ 0 \\ -(b+g_n)(1-\tau)^{-2} \end{bmatrix}$$

We can express the implicitly defined partial derivatives at an interior optimum as:

$$\begin{bmatrix} \frac{\partial b^*}{\partial \tau} \\ \frac{\partial g_c^*}{\partial \tau} \\ \frac{\partial g_n^*}{\partial \tau} \\ \frac{\partial g_p^*}{\partial \tau} \\ \frac{\partial \lambda}{\partial \tau} \end{bmatrix} = \frac{1}{\Lambda(1-\tau)^2} \begin{bmatrix} \lambda(\beta \frac{v_{bg_p} u''_c}{1-\tau} + u''_c u''_n + u''_n U_{g_p g_p}) + (b+g_n) u''_c u''_n (\beta v_{bg_p} - \frac{U_{g_p g_p}}{1-\tau}) \\ \lambda(\frac{\beta^2 v_{bg_p}^2 - \beta v_{bb} U_{g_p g_p} - u''_n U_{g_p g_p}}{1-\tau} + \beta v_{bg_p} u''_n) + (b+g_n) u''_n (\beta^2 v_{bg_p}^2 - \beta v_{bb} U_{g_p g_p}) \\ \lambda(\beta v_{bb} (u''_c + U_{g_p g_p}) - \beta^2 v_{bg_p}^2 - \beta v_{bg_p} \frac{u''_c}{1-\tau}) + (b+g_n) \frac{u''_c}{1-\tau} (\beta^2 v_{bg_p}^2 - \beta v_{bb} U_{g_p g_p}) \\ -\lambda(\beta v_{bg_p} u''_n + \frac{u''_c}{1-\tau} (\beta v_{bb} + u''_n)) + (b+g_n) u''_c u''_n (\frac{\beta v_{bg_p}}{1-\tau} - \beta v_{bb}) \\ \lambda u''_c (\frac{\beta^2 v_{bg_p}^2 - U_{g_p g_p} (\beta v_{bb} + u''_n)}{1-\tau} + \beta v_{bg_p} u''_n) + (b+g_n) u''_c u''_n (\beta^2 v_{bg_p}^2 - \beta v_{bb} U_{g_p g_p}) \end{bmatrix}$$

for $U_{g_p g_p} = \beta v_{g_p g_p} + u''_p$ and

$$\Lambda = U_{g_p g_p} \left(\frac{u''_c}{(1-\tau)^2} (\beta v_{bb} + u''_n) + \beta v_{bb} u''_n \right) + \beta u''_c u''_n (v_{bb} - 2 \frac{v_{bg_p}}{1-\tau}) - \beta^2 v_{bg_p}^2 (u''_n + \frac{u''_c}{(1-\tau)^2}).$$

Imposing additive separability between bequests b and private foundation giving g_p trivially establishes a critical value as a local maximum and produces standard substitution effects and normal income effects.

However, allowing for a more general form of v_{bg_p} may introduce non-trivialities that require additional assumptions on the shape of $v(b, g_p)$ and its relationship with the other value functions in order to preserve the critical points of the Lagrangian as a maxima. These restrictions are more apparent expressing Λ as a quadratic function in v_{bg_p} :

$$\Lambda = \underbrace{-\beta^2 \left(u_n'' + \frac{u_c''}{(1-\tau)^2} \right) v_{bg_p}^2}_{>0} - \underbrace{2 \frac{\beta u_c'' u_n''}{1-\tau} v_{bg_p}}_{>0} + \underbrace{\left(U_{g_p g_p} \left(\frac{u_c''}{(1-\tau)^2} (\beta v_{bb} + u_n'') + \beta v_{bb} u_n'' \right) + \beta u_c'' u_n'' v_{bb} \right)}_{<0}.$$

The coefficients of this quadratic equation imply that a critical value represents a local maximum for v_{bg_p} contained in the connected open interval with bounds

$$\frac{u_c'' u_n'' \pm \sqrt{(u_c'' u_n'')^2 + (u_n''(1-\tau)^2 + u_c'') \left(U_{g_p g_p} \left(\frac{u_c''}{(1-\tau)^2} (\beta v_{bb} + u_n'') + \beta v_{bb} u_n'' \right) + \beta u_c'' u_n'' v_{bb} \right)}}{-\beta \frac{u_n''(1-\tau)^2 + u_c''}{1-\tau}}$$

at a critical value.

Note that for bequests b and private foundation giving g_p , the linearity of the budget constraint reduces the second partial derivatives of the Lagrangian expression of the constrained optimization problem to the second partial derivatives of the bequesting value function $v(b, g_p)$, so that at a local maximum,

$$\left(\frac{\partial^2 v}{\partial b \partial g_p} \right)^2 - \frac{\partial^2 v}{\partial b^2} \frac{\partial^2 v}{\partial g_p^2} = \left(\frac{\partial^2 \mathcal{L}}{\partial b \partial g_p} \right)^2 - \frac{\partial^2 \mathcal{L}}{\partial \mathcal{L}^2} \frac{\partial^2 v}{\partial g_p^2} < 0.$$

Regular substitution and normal income effects follow from allowing for $v_{bg_p} \geq 0$ within the above restrictions. However, imposing the requirement that $v_{bg_p} < 0$ introduces additional non-trivialities. Namely, the condition that $\left(\frac{\partial^2 v}{\partial b \partial g_p} \right)^2 - \frac{\partial^2 v}{\partial b^2} \frac{\partial^2 v}{\partial g_p^2} < 0$ allows for only one of the

following or neither to hold:

$$\begin{aligned}\frac{v_{g_p g_p}}{1 - \tau} &> v_{b g_p}, \\ v_{bb} &> \frac{v_{b g_p}}{1 - \tau},\end{aligned}$$

which implies the net inferiority of bequests or private foundation giving respectively.