Behavioral Responses to Wealth Transfer Taxation: Bunching Evidence from Germany

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Abstract

Increasing inequality in recent decades has triggered a heated debate on whether *wealth transfer taxation* is an appropriate countermeasure to the perpetuation of inequality. A major factor in making progress in this discussion is understanding how taxpayers respond to incentives generated by wealth transfer taxes. Using administrative tax records from Germany, this paper investigates behavioral responses to a very large *transfer tax kink* in the *inheritance* and *inter vivos gift* tax schedule. We find sharp *bunching* of taxable inheritances and even larger bunching of taxable inter vivos gifts. However, because the kink is large, the underlying *taxable inheritance and gift elasticities* are moderate and amount up to 0.11. In line with the notion of accidental bequest models, further evidence suggests that the amount of wealth bequeathed is uncertain. This may explain the small size of the inheritance elasticities. Based on the results, the present paper lends strong support to the hypothesis that wealth transfers are relatively inelastic along the intensive margin in the short term.

JEL codes: H21, H24, H26, H31
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1 Introduction

With an increasing concentration of wealth in the hands of a few, *progressive inheritance or estate taxes* have been repeatedly proposed as an antidote to the perpetuation of wealth inequality [Piketty and Saez 2013, Piketty 2014, Piketty 2015].[1] However, besides the potential to ameliorate equity, wealth transfer taxes might impose efficiency costs on the economy by reducing the incentives to work or save. They also could lead to tax evasion or avoidance, reducing the usefulness of taxation in counteracting wealth inequality. A major element of making progress in the discussion on the role of wealth transfer taxation is thus understanding the impact of taxes on individuals' behaviors. However, to date, there is still a lack of reliable analysis of *behavioral responses* due practical difficulties that limit empirical work [Kopczuk 2013]. It is not only that exogenous variation in tax rates is rarely available but also that wealth transfer data are hard to find. Behavioral responses to wealth transfer taxation are, therefore, not well understood.

The present paper illuminates individuals' behavioral responses considering the *German inheritance and inter vivos gift tax*. Two key features render the German setting well suited to spotlight novel and valuable insights: first, the progressive tax introduces large jumps in the marginal tax rates at taxable wealth transfer cutoffs, creating strong *bunching* incentives. Those *kinks* in individuals' budget constraints allow for non-parametric identification of behavioral responses using a bunching approach [Saez 2010, Chetty *et al.* 2011, Kleven and Waseem 2013]. The substantial size of the kinks makes the analysis especially valuable. That is because taxpayers unlikely ignore large changes in tax rates and, therefore, estimates of behavioral responses are less likely downward biased [Chetty 2012]. Second, the rich administrative data available in Germany covers the universe of tax assessments for each year. This implies that the data contain a large number of very prosperous individuals who play an important role in the overall distributional implications of taxation.

The behavioral parameter of interest in this paper is the *compensated elasticity of reported taxable transfers* with respect to the net-of-tax rate. This is a broad measure of behavioral responses, reflecting the reactions of different

[1] Piketty et al. argue that when the economy's growth rate is smaller than the rate of return to capital, wealth becomes highly concentrated, and inheritances play an important role in wealth accumulation. Transfer taxes then mechanically reduce the rate of return net-of-taxes and build a counteracting force to inequality. Auerbach and Hassett [2015], Mankiw [2015], and Weil [2015] have criticized this main conclusion.

actors (donors, donees) along a multiplicity of margins (real responses, non-real responses).[2] Conceptually, this tax base elasticity is not only of paramount importance to quantify the marginal welfare costs of taxation [Feldstein 1995, Feldstein 1999, Kopczuk 2013], but it is also crucial for determining optimal tax rates [Piketty and Saez 2013].[3]

We present three sets of empirical findings. The first set of findings relates to the bunching of *taxable inheritances* at a large convex kink point. Bunching is noticeable and sharp for transfers between close relatives, but is not statistically significant for other relatives and unrelated individuals. Precisely, close relatives reduce taxable transfers by approximately 1.7% in response to an increase in the marginal tax rate; the underlying elasticity of 0.03 is small. This highlights the fundamental design issue with large wealth transfer kinks: even with small elasticities, large kinks can trigger substantial behavioral responses.

The second set of findings is derived from studying different types of wealth transfers at death. When making their will, testators can choose between *proportional inheritances* (heir inherits a proportion of the total estate) and *pure predefined inheritances* (heir inherits specific items of the estate but no proportion). If taxes are tied to a proportion of the total estate at death, responses to the tax schedule are weak and statistically insignificant. This result is in line with the notion that if the lifetime is uncertain, the estate at death is difficult to plan [Yaari 1965, Hurd 1989, Friedman and Warshawsky 1990, Mitchell *et al.* 1999, Kopczuk 2013]. As a consequence, proportional inheritances are at least partially accidental at the intensive margin, making responses to the tax schedule less likely. If the value of the wealth transfer is instead certain before death, as for predefined inheritances, individuals are capable of responding. Indeed, we document a large behavioral response of taxable predefined inheritances. The estimated reduction of taxable predefined inheritances is 6.1%, implying an underlying elasticity of 0.11. Because of the pervasive use of proportional inheritances, the overall elasticity is small.

Our third set of findings emerges from examining the effects of taxation on *taxable inter vivos gifts*. The analysis reveals that there is again heterogeneity in the estimates. The elasticity of taxable gifts for close relatives amounts to 0.07 and for other relatives to 0.02. In contrast, there is no significant bunching for

[2]We define real responses as those that involve real behavior. In contrast, non-real responses are solely intended to reduce tax liability and might take the form of tax avoidance or tax evasion.

[3]See Slemrod [1998], Chetty [2009], and Saez *et al.* [2012] for a discussion on when the tax base elasticity is or is not an appropriate measure of the marginal excess burden.

unrelated individuals. It is not surprising that the elasticities of taxable gifts are larger than those of taxable inheritances: similar to predefined inheritances, gifts do not involve uncertainty over wealth transfers. Besides, because gifts offer tax avoidance opportunities, individuals who transfer wealth inter vivos might be a selective sample of responsive types.

In a nutshell, this paper lends strong support to the hypothesis that wealth transfers are relatively inelastic along the intensive margin. Because we study taxable transfer elasticities, which also include tax avoidance and tax evasion responses, this main conclusion is particularly strong. However, the observed behavioral responses are of short-term nature due to the fact that tax schedules are only valid for a limited period. In the long term, behavioral responses to taxes are likely larger than in the short term, not only because individuals have more time to adjust taxable transfers but also because tax avoidance opportunities are higher. Furthermore, frictions such as inattention or adjustment costs should play a minor role in the long term. The bunching approach also does not capture extensive responses. Therefore, we cannot claim that wealth transfer taxes are in general without any distortions.

Behavioral responses to wealth transfer taxes are understudied in the empirical public finance literature, and this paper contributes to closing this gap. A first small body of literature has studied the question of how taxation affects bequests. Kopczuk [2009] points out that while this question is straightforward to ask, it is particularly difficult to answer, as establishing a causal link between tax rates and bequests is an arduous task. Nevertheless, some earlier work from the US has taken up this challenge [Holtz-Eakin and Marples 2001, Slemrod and Kopczuk 2001, Joulfaian 2006].[4] Remarkably, even though these articles applied different empirical methods, they all report similar estimates of estate or wealth elasticities with respect to the net-of-tax rate ranging from 0.1 to 0.2. More recently, two contributions made further progress in overcoming the identification issues [Jappelli *et al.* 2014; Goupille and Infante 2014]. In contrast to this paper, both studies focused on the responsiveness of specific assets of the estate instead of on inheritances.

A second body of empirical literature focuses on the effect of taxation on giving while alive [McGarry 2001, Poterba 2001, Page 2003, Joulfaian 2004, Joulfaian and McGarry 2004, Joulfaian 2005, Ohlsson 2011]. This part of the literature has mainly come to the conclusion that gifts are more responsive than

[4] In a related paper on behavioral responses to the Swedish annual wealth tax, Seim [2014] shows significant responses of reported wealth to marginal tax rate incentives.

estates but at the same time are underused as a tax planning instrument. The main contribution of this paper is twofold: first, we estimate a broader set of responses (inheritances, inter vivos gifts) in an integrated framework. Second, we exploit extensive administrative data and rich quasi-experimental variation. This helps to overcome the identification problem.

The paper proceeds as follows: section 2 describes the institutional context and the data, section 3 presents our conceptual framework and the estimation strategy, section 4 reports the empirical results, and section 5 concludes the paper.

2 The German Inheritance and Gift Tax

2.1 Institutional Framework

This section highlights the main characteristics of the *German wealth transfer tax*, referring to tax years 1996-2002. The tax applies to transfers of wealth at death and inter vivos gifts. Taxation of transfers of wealth at death takes the form of an *inheritance tax*. This means that the tax base is defined at the level of the heir and mirrors the *taxable inheritance* a particular donee receives. More formally, the taxable inheritance of heir i is

$$b_i = \alpha_i(E - D) + P_i + G_i - X_i, \tag{1}$$

where E is the estate, D is the debt of decedent's estate, α_i is i's share of the estate net-of-debt, P_i are predefined assets or liabilities that donee i inherits, G_i are inter vivos gifts that heir i has received from the same testator within the last ten years, and X_i are tax exemptions.[5] Equation (1) illustrates that a testator can choose between two different forms of transfers at death. First, she might name a community of heirs, each of them receiving a proportion of the estate net-of-debt (*proportional inheritance*). Second, she can bequest each asset or liability she possesses to particular heirs (*predefined inheritance*). Predefined inheritances reduce the value of the estate E that is proportionally allocated among heirs. Wealth transfers inter vivos are taxed under the same rules as inheritances to ensure neutrality between both types of transfers. For gifts, b_i mirrors the *taxable inter vivos gift*, α_i is zero, and P_i represents the value of the

[5]See Table A1 in the Appendix for a more detailed decomposition of taxable transfers and Table A2 for tax exemption values.

gift.

Taxable transfers are taxed according to one of three *progressive tax schedules*. Which of these schedules applies depends on the tax class: Class I is for transfers between *close relatives*, Class II for *other relatives*, and Class III for *unrelated individuals*.[6] Although each schedule features seven tax brackets, in what follows, we focus on the first two tax brackets because 93% of all observations fall into those.[7]

What is crucial for this paper is that the tax schedules feature jumps in the *marginal tax rates*, creating a source of quasi-experimental variation in tax incentives. Panel A of Figure 1 shows the tax liability as a function of the taxable transfer in Deutsche Mark (DM) for close relatives.[8] Within each tax bracket, the tax liability is a percentage of the taxable transfer. To be precise, the statutory tax rate is 7% up to the bracket cutoff at 100,000 DM and 11% above. Therefore, without additional regulations, the tax liability would discretely increase at the cutoff, i.e., there would be a notch at the threshold (see Panel A). Increasing taxable transfers by one Deutsche Mark at the threshold would raise the tax liability from 7,000 DM to approximately 11,000 DM. However, the tax code smooths the transition between brackets. Taxable transfers above the threshold are subject to a substantially higher marginal tax rate, replacing the notch in the tax liability with a large *convex kink* (see dashed blue line). Above some taxable transfer level, however, taxes are lower when calculating them as a percentage of taxable transfers using the second tax bracket's statutory tax rate. Hence, the second tax bracket effectively begins at this second cutoff, introducing a substantial *concave kink*. We label the range between both cutoffs the *transition area*. Panel B of Figure 1 illustrates the underlying jumps in the marginal tax rates for all tax classes, delivering the quasi-experimental variation we exploit for identification.

The following additional features of the tax schedules are important to note. First, taxation favors transfers within families. Aside from the transition area, the marginal tax rates for close relatives (bracket 1: 7%, transition area: 50%, bracket 2: 11%) are lower than the rates that apply to other relatives (12%, 50%, 17%) and to unrelated individuals (17%, 50%, 23%). The tax exemptions for close relatives are also the highest. Second, the marginal tax rate changes are substantial. For close relatives, the marginal tax rate increases by 43 percentage

[6]See the notes of Table A2 in the Appendix for a detailed description of the tax classes.

[7]Thereby, we account for approximately one-third of total tax revenues. See Table A2 as well as Figure A1 in the Appendix for a description of the full tax schedules.

[8]The exchange rates in 2002 was 1 USD = 2.2469 DM.

points (p.p.) at the convex kink. The corresponding value for other relatives (unrelated individuals) is 38 p.p. (33 p.p.). Third, while the tax code explicitly states the location of the convex kink point, the location of the concave kink point must be calculated using a complicated formula.[9] The salience of the convex kink is thus much higher than the salience of the concave kink.

Turning to the tax assessment, donees have the obligation to inform the German tax authorities within three months of any wealth transfer they have received. The enforcement system additionally includes third-party reporting: registry offices, courts, local authorities, notaries, and financial institutions report all information relevant for the tax assessment to the tax authorities. If the tax authorities infer from the received information that the transferred wealth likely exceeds the tax exemptions, they request that donees file a tax return. Given the upfront information transmitted to the tax authorities, enforcement of taxes is powerful.

Comparing the incentives to bequest with those to give, we might note that although inheritances and gifts are assessed and taxed under the same rules taxation is in fact a disincentive to leave bequests. Donors can use personal tax exemptions every ten years to transfer wealth tax-free. Furthermore, the instruments to enforce transfers at death are more powerful: the German tax law imposes freezing of all assets after a person dies, and heirs need an official certificate of inheritance or a power of attorney to claim assets, hampering misreporting possibilities.

2.2 Data

The study draws on *administrative data* from the German Federal Statistical Office, including the universe of transfers for which a tax assessment has been done in 2002.[10] The tax statistic includes detailed transfer-specific information on all characteristics relevant for the assessment of taxes. In our analysis, we focus on the first two tax brackets. The corresponding sample consists of 21,927 gifts and 99,804 inheritances for 47,644 communities of heirs.[11] Table 1 decomposes taxable transfers into its components and presents summary statistics.

Several aspects of the sample are worth noting. First, the universe of tax

[9]Denoting by b_1^* the location of the convex kink, by b_2^* the location of the concave kink, by t_0 the marginal tax rate in the first bracket, by t_1 the marginal tax rate in the transition area, and by t_2 the marginal tax rate in the second bracket, the location of the concave kink is $b_2^* = b_1^* \cdot \frac{t_1 - t_0}{t_1 - t_2}$.

[10]Tax assessments cover transfers realized between 1996 and 2002.

[11]Because the tax schedules changed slightly in 2002, we exclude this year from the analysis.

assessments does not overlap with the universe of transfers due to the tax exemptions. Second, the population of tax filers included in the data is a wealthy subsample of the total population because the exemptions are very high.[12] Third, in 62% of all cases, wealth is transferred between close or other relatives. Fourth, the inheritance and gift subsamples differ highly in nature. For example, while business assets and real estate account for 71% of total gifts, total inheritances consist of 61% of other assets, such as bank deposits, insurance benefits, or equity shares. Fifth, considering the inheritance sample, only every fourth heir receives predefined inheritances.

3 Conceptual Framework and Empirical Approach

3.1 Conceptual Framework

We now outline a simple theory that creates the basis for our bunching estimation approach. Consider a standard *static donor-donee framework*. A donor has strictly quasi-concave preferences and not only cares about her own consumption but also has a motive to transfer wealth to a donee, such as the *warm glow of giving* [Andreoni 1990] or *altruism* [Barro 1974].[13] She trades off own consumption against transfers to a donee.

Assume a *pre-reform* situation in which a large number of donors faces a linear tax schedule $T(b) = tb$, where b are taxable transfers. Due to heterogeneity in preferences, taxable transfers are distributed according to the smooth density function $h_0(b)$. A *tax reform* introduces a convex kink in the tax schedule at the taxable transfer level b^* at which the marginal tax rate increases from t to $t_1 = t + \Delta t$. The kinked tax schedule reads

$$T(b) = tb + [\Delta t(b - b^*)] \cdot \mathbb{1}(b > b^*), \tag{2}$$

where $\mathbb{1}(\cdot)$ is an indicator variable for being above the cutoff. Let us denote by $h(b)$ the corresponding density under this kinked budget set scenario.

The reform has the following consequences. Individuals with pre-reform transfers $b \leq b^*$ are not affected by the change. We have $h_0(b) = h(b)$ for

[12] In 2002, the mean individual net-of-debt wealth of the living population above the age of 17 years was 156,574 DM [Frick and Grabka 2009]. The 90th percentile was 407,757 DM.

[13] The cross-sectional data neither allows us to study dynamics nor to analyze how individuals use gifts to avoid taxes. Therefore, the conceptual framework ignores dynamic accumulation of wealth across generations and does model the decision to give and to bequest jointly.

$b < b^*$. Donors who chose $b > b^*$ before the reform will reduce their wealth transmissions in response to the reform. Individuals who were initially located in the segment $(b^*, b^* + \Delta b^*]$ will bunch at the kink point b^*, resulting in a spike in the density distribution. Note that Δb^* is the *behavioral response* of the individual who gave the highest pre-reform transfer among all bunchers, i.e., the marginal buncher.

What is fundamental to the agenda of this paper is that the transfer response of the marginal buncher Δb^* is related to the characteristics of the tax schedule and the *elasticity of taxable transfers*. Therefore, we can recover the elasticity if behavioral responses and tax system characteristics are known. To be precise, for infinitesimal values of Δt and Δb^*, we can define the local compensated elasticity of taxable transfers with respect to the net-of-tax rate $1-t$ at the kink point b^* as

$$e = \frac{\text{change of } b \text{ in } \%}{\text{change of } 1-t \text{ in } \%} \approx \frac{\frac{\Delta b^*}{b^*}}{\ln\left[\frac{1-t}{1-t-\Delta t}\right]}. \tag{3}$$

In equation (3), t, Δt, and b^* are known, while the transfer response Δb^* is not directly observable. However, Δb^* is associated with estimable quantities. More precisely, as noted by Saez [2010] and Chetty *et al.* [2011], the fraction of individuals who bunch at the kink is

$$B = \int_{b^*}^{b^*+\Delta b^*} h_0(b)\mathrm{d}b = h_0(a)\Delta b^* \approx h_0(b^*)\Delta b^*, \tag{4}$$

where $h_0(a)$ is the average of $h_0(b)$ over the interval $[b^*, b^* + \Delta b^*]$.[14] Given an estimate of the counterfactual density $h_0(b^*)$ at b^*, the excess mass of taxpayers at the kink $B/h_0(b^*)$ approximates the marginal buncher's transfer response.

There are several points to note about elasticities estimated from equation (3). First, the estimated elasticities reflect the behavioral responses of all involved actors (donor, donee) via all margins that affect the tax base (real response, non-real response). Second, when a donor transfers wealth to multiple donees and the tax is assessed at the level of the donee, then equation (3) does not identify the elasticity of the total taxable estate but identifies that of the individual taxable transfer. Third, for large values of Δt, e is no longer a pure compensated elasticity but rather a mixture of the uncompensated and compen-

[14]The second equality is derived from the mean value theorem of integral calculus. The approximation assumes a roughly constant counterfactual density $h(b)$ on the bunching segment.

sated elasticity. However, Bastani and Selin [2014] illustrate that the bias of the compensated elasticity is negligible even if tax rate changes are substantial, as in this paper. Fourth, if elasticities are heterogeneous across individuals, Saez [2010] shows that bunching is proportional to the average behavioral response $E[\Delta b^*]$. Then, we might estimate the average elasticity $E[e]$ at b^*.

The preceding analysis considers a setting with one convex kink only instead of a setting with multiple kinks, as implemented in Germany. That is because we do not observe significant behavioral responses to the concave kink point, most likely due to its minor salience. In Appendix A, we nevertheless develop a framework for nonparametrically identifying structural elasticities under salient double kinked tax schedules.[15]

3.2 Approach to Estimate Behavioral Responses

Identifying behavioral responses and corresponding elasticities from bunching requires an estimate of the *unobserved counterfactual* distribution we would have observed had there not been a kinked tax schedule. We follow Chetty *et al.* [2011] and fit a polynomial to the empirical transfer distribution, excluding observations in a range around the convex kink. We then construct an estimate of the counterfactual as the predicted values from this regression. The key identifying assumption underlying this approach is that there should be no spike at the convex kink point in the unobserved counterfactual distribution.

A complication of identifying the counterfactual is that taxpayers tend to report taxable inheritances and taxable gifts in round numbers. Because the kinks are also located at salient round numbers, we would overestimate behavioral responses if we did not take round number bunching into account. Like Kleven and Waseem [2013], we control for round number bunching at kinks by exploiting excess bunching at similar round numbers that are not kinks. However, in our case, the pattern of round number bunching changes along the taxable transfer distribution. Bunching at round numbers is strongest at the bottom of the distribution. Therefore, we allow for a flexible form of round number bunching.

The details of the empirical approach are as follows. Pooling taxable transfers

[15] We find that elasticity formulas are unchanged if the marginal buncher at the convex kink point b_1^* does not jump the concave kink b_2^* (i.e., $b_1^* + \Delta b_1^* \leq b_2^*$). In contrast, if the convex kink creates such powerful incentives that the marginal buncher comes from above the concave kink (i.e., $b_1^* + \Delta b_1^* > b_2^*$), then we have to modify the elasticity formula. The altered equation accounts for tax rate changes at both b_1^* and b_2^*. In our case, all estimates of $b_1^* + \Delta b_1^*$ lie far below the concave kink point.

into bins $i = \{1, 2, \ldots, B\}$ using a bin width of 1,000 DM, we estimate a regression of the following form:

$$n_i = \sum_{j=0}^{q_1} \beta_j \cdot (z_i)^j + \sum_{j=L}^{U} \gamma_j \cdot \mathbb{1}[z_i = j] + \sum_{j=0}^{q_2} \delta_j \cdot \mathbb{1}\left[\frac{z_i}{10,000} \in \mathbb{N}\right] \times (z_i)^j + \varepsilon_i, \quad (5)$$

where n_i is the fraction of taxable transfers that fall in bin i, z_i is the taxable transfer level in bin i, and $\mathbb{N}$ is the set of natural numbers. The model includes a polynomial of order q_1 (first term), indicator variables for each bin in the range $[L, U]$ around the considered convex kink point (second term), and interactions between a round number dummy for multiples of 10,000 DM and a polynomial of order q_2 (third term).[16] The estimated counterfactual distribution is the predicted values of (5), omitting the contribution of the dummies in the excluded ranges but not setting the round number dummies to zero:

$$\hat{n}_i = \sum_{j=0}^{q_1} \hat{\beta}_j \cdot (z_i)^j + \sum_{j=0}^{q_2} \hat{\delta}_j \cdot \mathbb{1}\left[\frac{z_i}{10,000} \in \mathbb{N}\right] \times (z_i)^j. \quad (6)$$

The corresponding estimate of excess bunching $\hat{B}$ is the difference between the observed and the counterfactual fraction of the population locating around the convex kink point: $\hat{B} = \sum_{i=L}^{U}(n_i - \hat{n}_i)$.[17]

Using $\hat{n}_i$ and $\hat{B}$, we can determine the excess mass around the kink point relative to the average height of the counterfactual distribution as

$$\hat{b} = \frac{\hat{B}}{\sum_{i=L}^{U} \hat{n}_i / N_i}, \quad (7)$$

where N_i is the number of bins in the excluded range. This measure translates to the behavioral response of the marginal buncher via the relationship $\Delta\hat{b}^* \approx \hat{b} \times bin\text{-}width$ and, hence, is the relevant measure for the elasticity estimate. Note that $\hat{b}$ is not independent of the unit of measurement and varies with the choice of the bin width.

[16] We select the polynomial orders case-by-case using a combination of the AIC, MSE, and R^2. By including dummies for bins around the cutoff, we account for diffuse bunching.

[17] $\hat{B}$ tends to overestimate excess bunching if the empirical transfer distribution is positively skewed and higher tax rates above the kink trigger individuals to reduce transfers. That is because, in this case, the estimated counterfactual lies underneath the unobserved counterfactual. To address this bias, we shift the estimated counterfactual to the right of the convex kink upwards until the fraction of taxable transfers in the estimated counterfactual is equal to the fraction in the empirical distribution. See Chetty *et al.* [2011] for a more detailed description.

We calculate the standard error for $\Delta\hat{b}^*$ and e by applying a parametric residual bootstrap approach. Specifically, this bootstrap procedure generates a large set of transfer distributions and associated estimates by randomly resampling residuals. The standard error is then defined as the standard deviation of the distribution of the estimates.

4 Behavioral Responses to Wealth Transfer Taxes

4.1 Results for Inheritances

Overall Responses We begin with analyzing bunching at the 100,000 DM kink point, considering wealth transfers in the form of *inheritances*. Bunching estimation is mainly a graphical technique. Accordingly, the blue line in Panel A of Figure 2 shows the empirical distribution of taxable inheritances around the 100,000 DM cutoff pooled across all tax classes.[18] Because the marginal incentives depend on the donor-donee relationship, the figure also presents empirical distributions separately for close relatives in Panel B, other relatives in Panel C, and unrelated individuals in Panel D. Each panel additionally includes the accompanying estimated counterfactual distribution, which is depicted by the dashed black lines. The vertical red line in Panel A represents the location of the convex kink point. The shaded areas in Panels B to D mark the transition areas. The panels also show $\hat{b}$, the estimate of excess bunching around the kink point relative to the average density of the counterfactual net-of-round number bunching. This estimate enables the comparison of excess bunching across panels, is related to the pecuniary behavioral response $\Delta\hat{b}^*$, and serves as the basis for the estimation of the elasticities e.

The following insights emerge from *inspection* of Figure 2. First, Panel A illustrates that the overall density function is discontinuous and exhibits a spike at the 100,000 DM kink point that is significant at the 10% level (two-tailed confidence interval). This result provides the first evidence of behavioral responses to the tax schedule. The excess mass is remarkably sharp, suggesting that behavioral responses are very precise. Second, Panels B to D point at a pronounced heterogeneity across tax classes: we find noticeable bunching for close relatives that is significant at the 1% level but no significant bunching in the other two tax classes. There is a variety of competing explanations for the finding that the

[18] All figures zoom in on a relatively narrow area around the cutoff to clearly illustrate the results. Figure A2 in the Appendix presents the overall distribution for the first two tax brackets.

responses of closely related individuals are the most pronounced. Individuals might have an aversion against taxation of family property; for close relatives, jumps in marginal incentives at the convex kink are the most extreme; and tax evasion and tax avoidance might require coordination between the donor and the donee, which could be easier with close family. Third, turning to the concave kink points at the end of the shaded areas in Panels B to D, we find little evidence of holes in the distribution.[19] This might be explained by imperfect information on the location of the concave kink [Card *et al.* 2015], high costs for individuals to process the information on the location of the kink [Sims 2003, Schwartzstein 2014], or confusion of marginal and average tax rates [Liebman and Zeckhauser 2004].

Let us now turn to the estimation of *behavioral elasticities* to evaluate the magnitude of the effects, combining the estimates of $\Delta\hat{b}^*$ with the elasticity formula (3). Part A of Table 2 (columns 1-3) shows the main results for different tax classes. Column 1 contains the changes in the marginal tax rates at the convex kink $\Delta t = t_1 - t$, column 2 the estimated pecuniary behavioral response of the marginal buncher $\Delta\hat{b}^*$ in DM, and column 3 the elasticities e. Considering close relatives, the estimated behavioral response of the marginal buncher is 1,699 DM; she reduces taxable inheritances by 1.7%. The underlying elasticity is small and amounts to 0.03. All estimates are statistically different from zero at the 1% significance level. The combined findings of non-negligible bunching responses and small elasticities emphasize the fundamental design issue of the kinked tax schedule. Under tremendous jumps in marginal tax rates, even small elasticities result in noticeable bunching. In line with the graphical analysis, elasticities for other relatives and unrelated individuals are very close to zero and statistically insignificant.

When interpreting the elasticities, it is important to consider that these capture the behavioral responses of all involved actors (testators, heirs), including pre-death responses (real and non-real) and post-death responses of heirs, most likely in the form of misreporting (non-real).[20] From a positive perspective, two questions arise: first, notwithstanding the small size, we would like to know the

[19] Visual inspection hints at a slight gap in the density around the concave kink for close relatives. However, the missing mass is not significantly different from other holes in the distribution occurring where incentives do not change. To test this, we extend regression (5) by including dummies for the missing mass region around the concave kink and dummies for placebo missing mass regions. We then use F-tests to test the equality of real and placebo missing mass.

[20] Naturally, real responses and tax avoidance take place before death, and all post-death responses reflect the behavior of heirs.

nature of the responses. Do we observe the consequences of decisions made long before death or, do we rather observe the post-death behavior of heirs? Second, we would like to get a better understanding of why elasticities are so small. As it turns out, we can make progress in answering both questions by comparing predefined inheritances and proportional inheritances.

Suggestive Evidence on the Anatomy of Responses Panel A in Figure 3 shows the empirical distribution of *pure predefined inheritances*, i.e., cases in which heirs solely inherit specific items of the estate. Panel B depicts the distribution of all other inheritances that at least partly consist of *proportional inheritances*. Parts B and C of Table 2 present the corresponding behavioral responses and elasticities. All results rely on the close relatives sample.

For predefined inheritances, the behavioral response amounts to a precisely estimated value of 6,504 DM, implying a reduction of taxable inheritances by 6.5%. The corresponding elasticity to this large inheritance response is still moderate and takes a value of 0.11. The estimates are significantly different from zero at the 1% level. In sharp contrast, if proportional inheritances are involved, there are no statistically significant behavioral responses, and the elasticity is also close to zero and statistically insignificant. These findings, combined with the fact that 87% of transfers at death contain proportional inheritances, explain the overall small elasticities.

Turning to the *nature of the response*, Figure 3 suggests that behavioral responses reflect pre-death behavior. That is because if the response is of a post-death nature, we should also find larger bunching of proportional inheritances.[21] Additional evidence buttresses the suggestion that the excess mass is not caused by underreporting. There are certain asset types that cannot be tracked by the tax administration and, hence, are especially prone to misreporting behavior. Those are all valuable items that are not deposited in any financial institution (e.g., cash, jewelry, precious metals), movables (e.g., cars, paintings, collections), and household inventory (e.g., household appliances, dishes). If bunching is indeed of a reporting nature, we expect heirs to misreport these assets so as to locate at

[21] This interpretation is valid if the inheritance type is uncorrelated with the heirs' post-death behaviors. One possible concern is that the characteristics of family members are correlated so that predefined inheritance givers have heirs who misreport wealth. However, our results stay unchanged if we consider a sample in which each testator leaves both predefined and proportional inheritances (see Figure A4 in the Appendix). Another concern is that an heir's ability to respond to taxes is correlated with the inheritance type. But because identical rules apply to proportional and predefined inheritances, the opportunities to respond should be the same.

the kink point. We do not find any evidence in favor of this hypothesis using the pure predefined inheritance sample: only 0.9% of all predefined inheritances cases contain self-reported items. Therefore, heirs may already choose the corner solution of full evasion of self-reported items. The increase in the tax rate at the kink point then cannot trigger any additional misreporting response. Or, individuals possess no self-reported items at all so that misreporting in response to the tax rate change is impossible.

Given that responses seem to be of a pre-death nature, a natural explanation for the concentration of responses on predefined inheritances is that these involve *less uncertainty* than proportional inheritances. When bequeathing claims to certain assets of the estate, testators decide on the particular asset allocation before they die. Thus, the value of the transfer is certain and, as a result, plannable. Testators are capable to precisely react to the incentives provided by the tax schedule. The sharpness of bunching indeed shows that behavioral responses are very accurate. In contrast, responding to taxes via the proportional inheritance channel is more difficult. The value of the transfer depends on the total estate at death, and when the length of the lifetime is uncertain, then proportional inheritances are at least partly accidental at the intensive margin. Thus, proportional inheritance givers are likely incapable of responding to taxation, as predicted by accidental bequest models [Yaari 1965, Hurd 1989, Friedman and Warshawsky 1990, Mitchell *et al.* 1999, Kopczuk 2013].[22] This may explain why overall elasticities are so small.

4.2 Results for Inter Vivos Gifts

Overall Responses This section presents the results for *inter vivos gifts*. Because gifts do not involve uncertainty about the transfer, provide tax avoidance opportunities, and are less strongly enforced than inheritances, we expect to observe larger bunching of taxable inter vivos gifts than of taxable inheritances.

Figure 4 presents the empirical distributions. Part A of Table 2 (columns 4-5) reports the corresponding behavioral responses and elasticity estimates. The pooled distribution of taxable inter vivos gifts features a large excess mass that is significant at the 1% level. Again, bunching is extremely sharp. The findings regarding the heterogeneity across tax classes are similar to those for inheritances.

[22] It might also be the case that responsive testators self-select themselves into the group of individuals who bequest claims to certain assets of the estate. This could happen if responding via predefined inheritances is "less expensive".

We document large bunching for close relatives that is significant at the 1% level, somewhat smaller bunching for other relatives that is significant at the 5% level, and no statistically significant bunching for unrelated individuals.[23]

Considering close relatives, excess mass transforms into large behavioral responses but moderate elasticities: the marginal buncher reduces inter vivos gifts by 4,406 DM, resulting in an elasticity of 0.07. The gift response for other relatives is 1,400 DM, and the corresponding elasticity takes a value of 0.02. We conclude that gifts are indeed more elastic than inheritances.

5 Conclusion

According to economic theory, individuals should bunch at convex kink points if they have convex preferences that are smoothly distributed in the population. This paper is the first to examine bunching at wealth transfer tax kinks, considering the German inheritance and gift tax. The substantial size of the kinks and the fact that they apply to very prosperous individuals render the setting particularly valuable. Our key finding is that although bunching of taxable inheritances and taxable inter vivos gifts is large in some subsamples, the underlying behavioral elasticities are moderate. We conclude that wealth transfers are relatively inelastic along the intensive margin in the short term.

In this paper, we have made a step toward pinning down the magnitude of short-run elasticities. However, in the long term individuals have more time to adjust taxable transfers, and they have additional opportunities to respond to tax incentives. The long-run elasticities are thus likely to be larger. In the same vein, our analysis is limited to examining responses to marginal tax rates at death rather than to incentives over the lifetime. This also precludes the study of long-term responses. Further, we recover the elasticity of taxable inheritances instead of the elasticity of the total taxable estate, which should be larger. For these reasons, we cannot conclude that the overall long-run elasticity is necessarily small in Germany. Future studies on behavioral responses to wealth transfer taxation should, therefore, aim at studying the long-term responses of the total estate. A particularly important subtopic is exploring the nature of the responses, as different types of responses lead to alternative conclusions [Saez *et al.* 2012].

[23]There is no visual evidence of a hole in the density around the concave kink. Particularly, for close relatives, for whom we find the largest excess mass, we do not observe missing mass in the distribution. This makes us confident that individuals are not responding to the concave kink.

Table 1: Summary Statistics

	Mean (1)	Std. Dev. (2)
A Inheritances ($N = 99{,}804$)		
Proportional Inheritances		
Estate (E)	421.4	2,716.1
Debt of Decedent's Estate (D)	54.5	178.2
Proportion of the Estate in % (α_i)	42.3	37.7
Predefined Inheritances (P_i)	23.6	83.2
Previous Inter Vivos Gifts (G_i)	5.4	38.5
Tax Exemptions (X_i)	58.3	156.6
B Inter Vivos Gifts ($N = 21{,}927$)		
Inter Vivos Gifts (P_i)	165.0	288.7
Previous Inter Vivos Gifts (G_i)	30.1	104.8
Tax Exemptions (X_i)	144.8	221.0

Notes: The table decomposes taxable transfers into their components and presents summary statistics (arithmetic mean, standard deviation). The sample consists of transfers for which a tax assessment has been done in 2002 that fall in the first two tax brackets. Taxable inheritances are calculated as $b_i = \alpha_i(E-D)+P_i+G_i-X_i$, where α_i is heir i's share of the estate net-of-debt. We have $\alpha_i = 0$ for inter vivos gifts. Proportion of the estate in %. All other values in 1,000 DM.

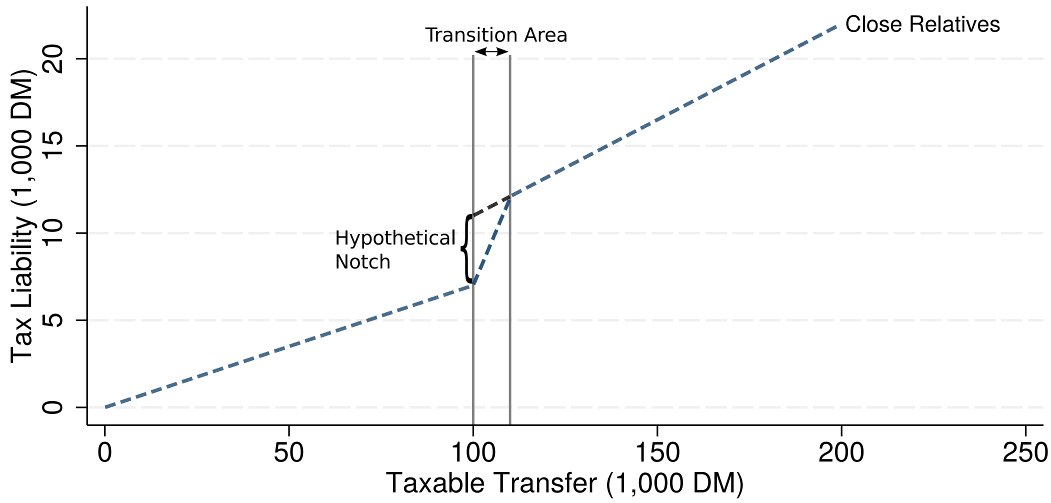
Table 2: Behavioral Responses to Wealth Transfer Kinks

		Inheritances		Inter Vivos Gifts	
	Jump in Marginal Tax Rate Δt	Response $\Delta\hat{b}^*$	Elasticity e	Response $\Delta\hat{b}^*$	Elasticity e
	(1)	(2)	(3)	(4)	(5)
A Overall Responses					
Close Relatives	0.43	1,699***	0.027***	4,406***	0.071***
		(401)	(0.006)	(628)	(0.010)
Other Relatives	0.38	503	0.009	1,490**	0.024**
		(342)	(0.006)	(690)	(0.011)
Unrelated Individuals	0.33	286	0.006	−16	−0.001
		(597)	(0.012)	(574)	(0.009)
B Predefined Inheritances					
Close Relatives	0.43	6,504***	0.105***		
		(1320)	(0.021)		
C Proportional Inheritances					
Close Relatives	0.43	231	0.004		
		(213)	(0.003)		

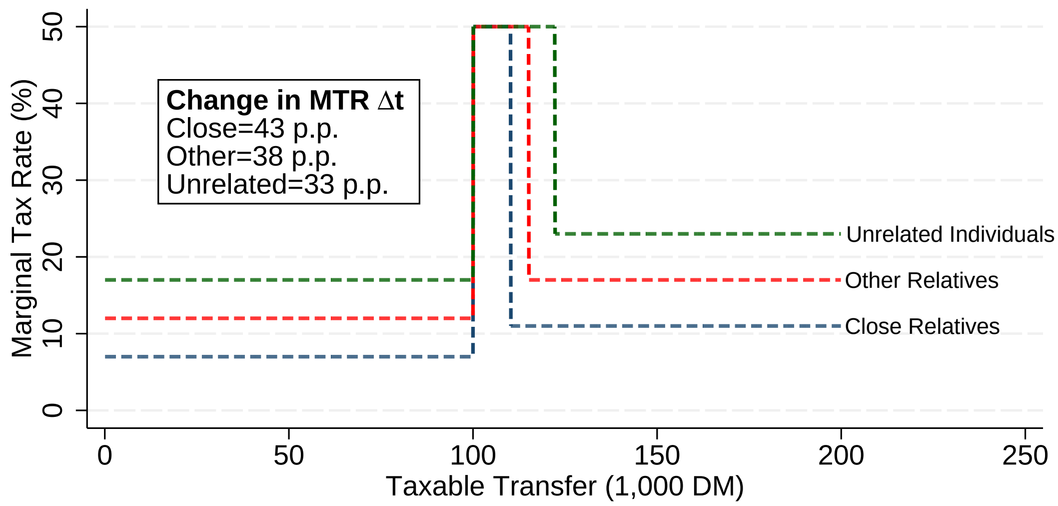
Notes: The table summarizes responses of taxable inheritances and taxable inter vivos gifts to wealth transfer kinks depending on the donor-donee relationship. It contains the changes in the marginal tax rates at the convex kink point $\Delta t = t_1 - t$, estimated responses to kinks in DM $\Delta\hat{b}^*$, and reduced form elasticities e. Part A presents overall responses; Part B focuses on predefined inheritances; Part C concentrates on inheritances that at least partly consist of proportional inheritances. See Table A2 for a detailed definition of tax classes and Figures 2, 4, and 3 for further details on the estimation procedure. Bootstrap standard errors are shown in parentheses. Stars indicate significance levels. ***= 1% level, **= 5% level, and *= 10% level.

Figure 1: Inheritance and Gift Taxation (1996-2001)

A. Tax Liability

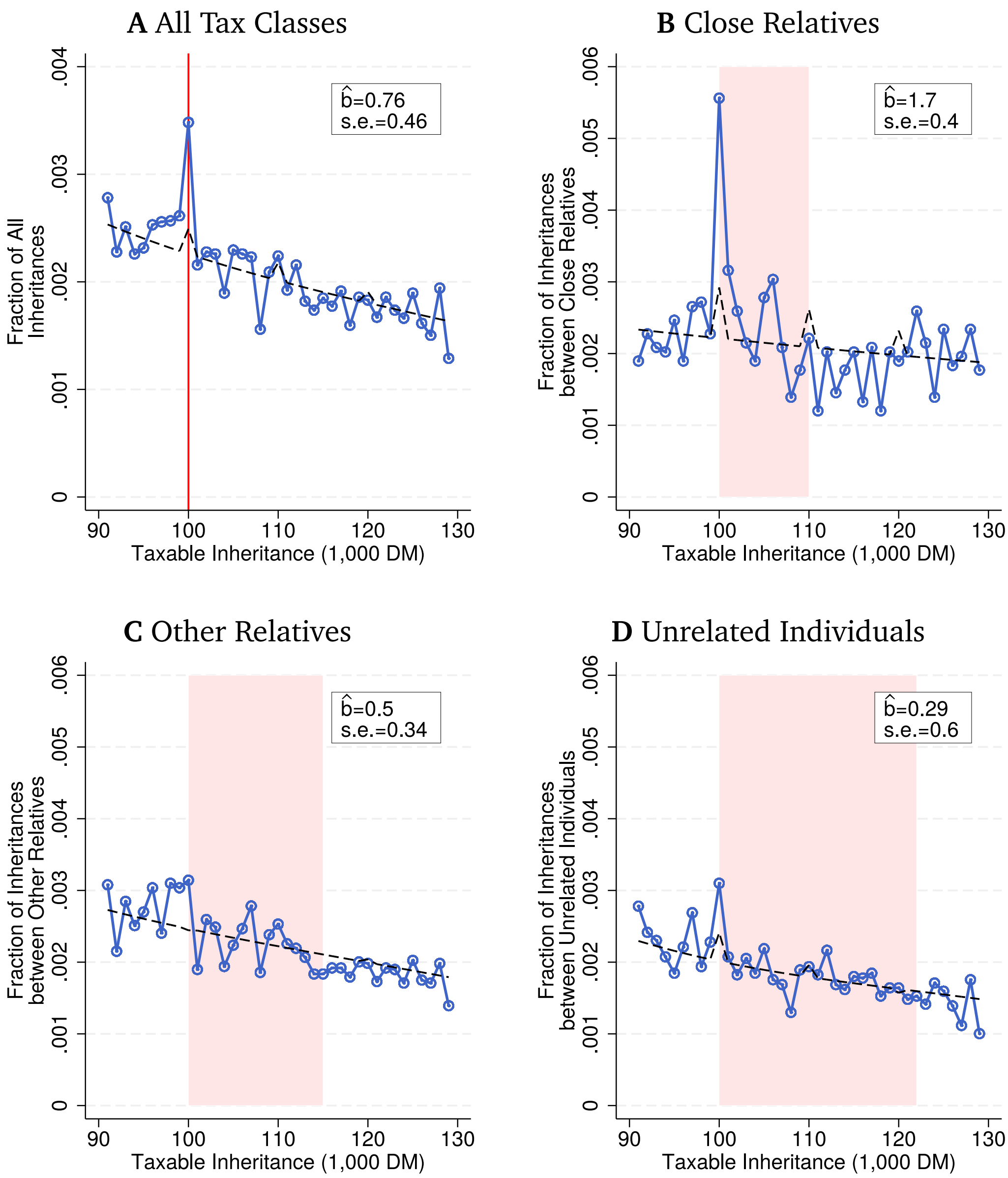


B. Marginal Tax Rates



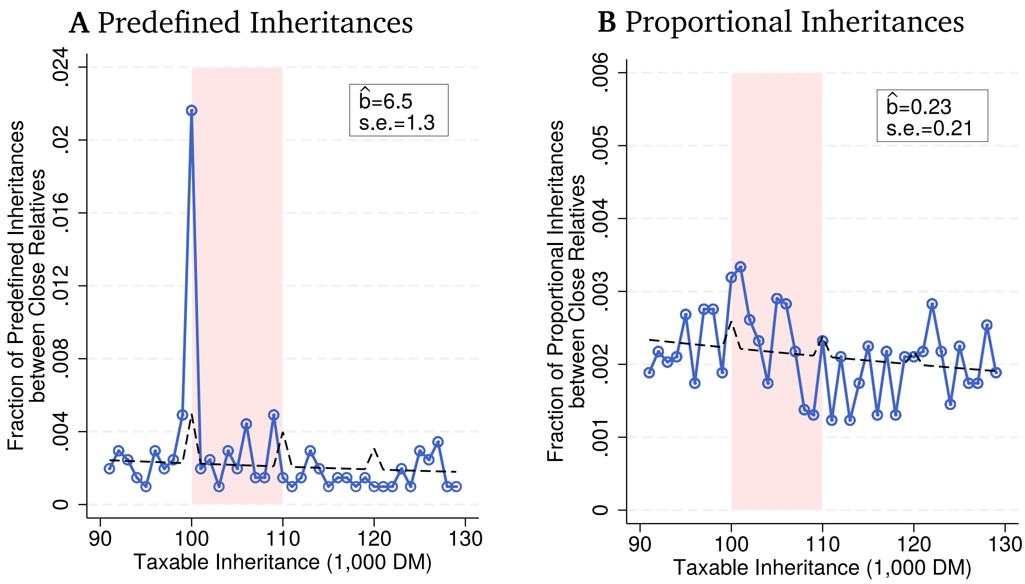
Notes: *Panel A* plots the tax liability as a function of the taxable transfer for close relatives. Within each tax bracket the tax liability is a percentage of the taxable transfer, creating a notch at the bracket cutoff (see dashed black line). The tax code smooths the transition between tax brackets and replaces the notch in the tax liability with two kinks (see dashed blue line). *Panel B* shows the underlying jumps in the marginal tax rates by plotting tax rates as a function of the taxable transfer. Tax rates depend on the donor-donee relationship. For close relatives, the marginal tax rate increases from 7% to 50% and subsequently falls to 11%. The corresponding values for other relatives (unrelated individuals) are 12%, 50%, and 17% (17%, 50%, and 23%). The figure also shows the change in the marginal tax rate at the convex kink in percentage points $\Delta t = t_1 - t$ (see box). The jumps are substantial and most pronounced for close relatives.

Figure 2: Empirical Distribution around Kink for Inheritances



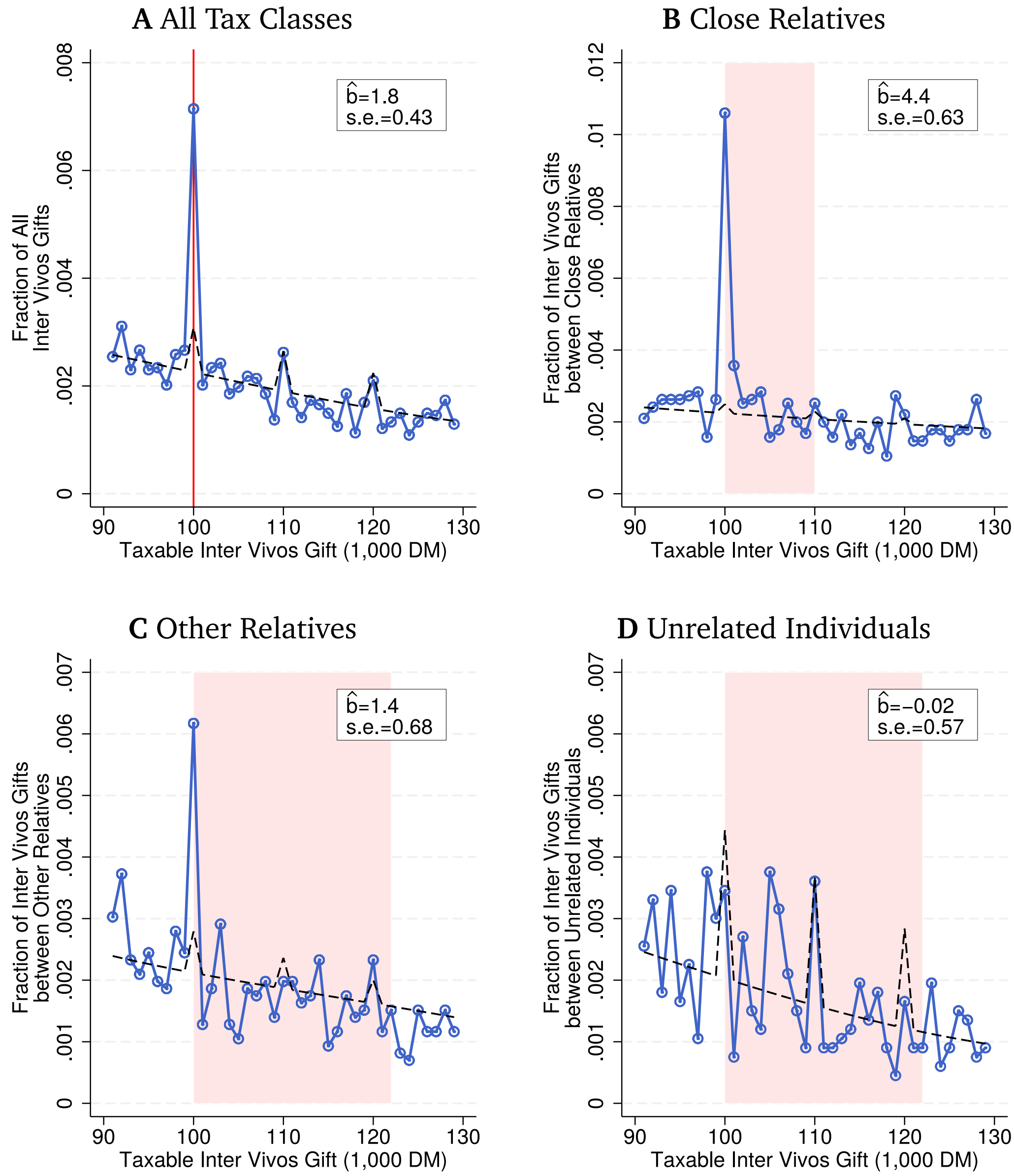
Notes: The figure shows the empirical distribution of taxable inheritances (blue lines) pooled across all tax classes (Panel A) and the empirical distributions of taxable inheritances separately for close relatives (Panel B), other relatives (Panel C), and unrelated individuals (Panel D). The bin width is 1,000 DM. Each circle represents a bin indicating the fraction of all inheritances in the relevant subsample that fall in the range of this specific bin. The vertical red line in Panel A marks the 100,000 DM kink point, and the shaded areas in Panels B to D indicate the transition areas. The panels also include the estimated counterfactual distributions (dashed black lines). We obtain these counterfactuals by fitting q_1-order polynomial regressions on the binned data, including the interactions between a round number dummy and polynomials of order q_2, and excluding the data around the convex kink point (see equation (6)). We choose $q_1 = 7$ and $q_2 = 5$ for Panels A and D, $q_1 = 2$ and $q_2 = 3$ for Panel B, and $q_1 = 4$ and $q_2 = 5$ for Panel C. $\hat{b}$ is the excess mass around the convex kink point relative to the average density of the counterfactual distribution (see equation (7)). We derive standard errors using a bootstrap procedure.

Figure 3: Predefined vs. Proportional Inheritances



The figure shows the empirical distributions (blue lines) of taxable predefined inheritances (Panel A) and taxable proportional inheritances (Panel B) for close relatives. The bin width is 1,000 DM. Each circle represents a bin indicating the fraction of all inheritances in the relevant subsample that fall in the range of this specific bin. The shaded areas indicate the transition areas. The panels also include the estimated counterfactual distributions (dashed black lines). We obtain these counterfactuals by fitting 2nd-order polynomial regressions on the binned data, including the interactions between a round number dummy and polynomials of order 3, and excluding the data around the convex kink point (see equation (6)). $\hat{b}$ is the excess mass around the convex kink point relative to the average density of the counterfactual distribution (see equation (7)). We derive standard errors using a bootstrap procedure.

Figure 4: Empirical Distribution around Kink for Inter Vivos Gifts



Notes: The figure shows the empirical distribution of taxable inter vivos gifts (blue lines) pooled across all tax classes (Panel A) and the empirical distributions of taxable inter vivos gifts separately for close relatives (Panel B), other relatives (Panel C), and unrelated individuals (Panel D). The bin width is 1,000 DM. Each circle represents a bin indicating the fraction of all inter vivos gifts in the relevant subsample that fall in the range of this specific bin. The vertical red line in Panel A marks the 100,000 DM kink point, and the shaded areas in Panels B to D indicate the transition areas. The panels also include the estimated counterfactual distributions (dashed black lines). We obtain these counterfactuals by fitting q_1-order polynomial regressions on the binned data, including the interactions between a round number dummy and polynomials of order q_2, and excluding the data around the convex kink point (see equation (6)). We choose $q_1 = 7$ and $q_2 = 5$ for Panels A and D, $q_1 = 2$ and $q_2 = 3$ for Panel B, and $q_1 = 4$ and $q_2 = 5$ for Panel C. $\hat{b}$ is the excess mass around the convex kink point relative to the average density of the counterfactual distribution (see equation (7)). We derive standard errors using a bootstrap procedure.

A A Structural Model of Behavioral Responses

The analysis in section 3 considers the case with only one convex kink. Subsequently, we show if and how multiple kinks affect elasticities. For that purpose, we need to impose further assumptions on the structure of a donor's preferences. We proceed in two steps. First, we set up a simple structural model and consider a single kink setting. Second, we extend the analysis to a double kinked schedule.

A.1 Single Kink Setting

In the following, we build on the seminal joy of giving model of Andreoni [1990] that has been the standard choice for investigating the consequences of wealth transfer taxes when focusing on decisions of donors only [e.g., De Nardi 2004, De Nardi *et al.* 2010, Ameriks *et al.* 2011, Lockwood 2014].

Each donor maximizes the quasi-linear and iso-elastic utility function

$$u(c,b) = c + \rho^{\frac{1}{\varepsilon}} \cdot \frac{[b - T(b)]^{1-\frac{1}{\varepsilon}}}{1-\frac{1}{\varepsilon}}, \tag{8}$$

subject to the budget constraint $w = c + b$, where c is consumption, b refers to the taxable transfer, $T(b)$ denotes a donee's tax liability, ρ captures the strength of warm glow of giving that the donor experiences, and ε is the constant elasticity of the net-of-tax transfer $b - T(b)$ with respect to the net-of-tax rate $1 - t$.

Under the pre-reform schedule $T(b) = tb$, maximization of $u(c,b)$ yields $b = \rho(1-t)^{\varepsilon-1}$. Under the post-reform schedule (2), we still have $b = \rho(1-t)^{\varepsilon-1}$ for $b \leq b^*$. However, we have $b = \rho(1-t-\Delta t)^{\varepsilon-1} - \Delta t b^*(1-t-\Delta t)^{-1}$ for $b > b^*$. Assuming that the strength of warm glow ρ is smoothly distributed in the population, it is straightforward to show that donors who locate in the segment $(b_1^*, b_1^* + \Delta b_1^*]$ before the reform bunch at b^* afterward.

Given the structure of the preferences, we can derive a structural form equivalent to the reduced form elasticity formula (3). For this purpose, consider the marginal buncher who has $\rho^* + \Delta\rho^* \equiv b^*(1-t)(1-t-\Delta t)^{-\varepsilon}$. This warm glow type is located at $b^* + \Delta b^* = (\rho^* + \Delta\rho^*)(1-t)^{\varepsilon-1}$ before the reform. After inserting $\rho^* + \Delta\rho^*$ into $b^* + \Delta b^*$, we can rearrange terms so as to obtain the elasticity locally at b^*:

$$\varepsilon = \frac{\ln\left[1+\frac{\Delta b^*}{b^*}\right]}{\ln\left[\frac{1-t}{1-t-\Delta t}\right]}. \tag{9}$$

While t, Δt, and b^* are known, we can estimate Δb^* as described in section 3. Note that $\ln(1+\frac{\Delta b^*}{b^*}) \approx \frac{\Delta b^*}{b^*}$ if $\frac{\Delta b^*}{b^*} \approx 0$. Therefore, the reduced form elasticity (3) and the structural form elasticity (9) are approximately the same size if the behavioral response is small relative to the threshold. Table A3 in the Appendix reports elasticities estimated according to equation (9).

A.2 Multiple Kink Setting

Consider an alternative tax reform that introduces two discrete changes in the marginal tax rate. First, there is a convex kink at b_1^*, where the marginal tax rate increases from t to $t+\Delta t_1$. Second, there is a concave kink at b_2^* at which the marginal tax rate decreases from $t+\Delta t_1$ to $t+\Delta t_2$. In the plateau area $(b_1^*, b_2^*]$, the marginal tax rate remains at the substantially higher level $t+\Delta t_1$. The complete schedule reads

$$\begin{aligned} T(b) = tb &+ [\Delta t_1(b-b_1^*)]\cdot \mathbb{1}(b_1^* < b \leq b_2^*) \\ &+ [\Delta t_1(b_2^*-b_1^*)+\Delta t_2(b-b_2^*)]\cdot \mathbb{1}(b > b_2^*), \end{aligned} \tag{10}$$

where $\mathbb{1}(\cdot)$ are indicator variables. The reform has the following consequences: individuals with pre-reform transfers $b \in (b_1^*, b_1^*+\Delta b_1^*]$ will bunch at the convex kink point b_1^*. Furthermore, the concave kink creates a region of dominated choice $[b_2^*-\Delta b_{2-}^*, b_2^*+\Delta b_{2+}^*)$ in which no individual is willing to locate as long as the utility function is differentiable. There are two different cases.

Case 1: Concave Kink Outside Bunching Segment If the concave kink lies outside the bunching segment of the convex kink $b_1^*+\Delta b_1^* \leq b_2^*$, kinks are sufficient far apart and elasticities are small enough so that both kinks can be analyzed in isolation. Equation (9) identifies the elasticity.

Figure 5 conveys the underlying intuition in a budget set (Panel A) and density distribution diagram (Panel B). As apparent from Panel A, the marginal unaffected donor L chooses the lowest pre-reform transfer (perceives the lowest joy of giving ρ_1^*) amongst those who locate at b_1^*. The tax-reform does not influence transfers of this individual; she selects b_1^* both before and after the tax reform. In contrast, donors with pre-reform transfers $b > b_1^*$ reduce wealth transfers. The marginal buncher H chooses the highest pre-reform transfer $b_1^* + \Delta b_1^*$ (perceives the highest joy of giving $\rho_1^* + \Delta\rho_1^*$) amongst those who locate at b_1^* after the reform. Because this individual locates below b_2^* before the reform, she solely reacts to the tax rate change at b_1^*; she behaves as if there is only one convex kink and lowers transfers by Δb_1^*. The marginal spreader I chooses the lowest post-reform transfer $b_2^* + \Delta b_{2+}^*$ (perceives the lowest joy of giving ρ^I) amongst those who locate above b_2^*. This individual is the lowest joy of giving type who reacts to the shift at b_2^*; precisely, her behavioral reaction to the tax rate change at b_2^* is $\Delta b_{2-}^* + \Delta b_{2+}^*$. This follows from the fact that I is indifferent between an interior point on the plateau $b_2^* - \Delta b_{2-}^*$ and an interior point in the top bracket $b_2^* + \Delta b_{2+}^*$. In a nutshell, every individual with $\rho \leq \rho_1^*$ is unaffected by the tax reform; all individuals with $\rho \in (\rho_1^*, \rho_1^* + \Delta\rho_1^*]$ bunch at the kink; individuals with $\rho \in (\rho_1^* + \Delta\rho_1^*, \rho^I)$ locate on the plateau, and individuals with $\rho \geq \rho^I$ prefer interior solutions in the top bracket. The reform is not affecting the density to the left of b_1^*; there is a spike in the density distribution at b_1^*; and there is a hole in the density distribution in the range $[b_2^* - \Delta b_{2-}^*, b_2^* + \Delta b_{2+}^*)$.

Case 2: Concave Kink Inside Bunching Segment If the concave kink lies instead in the bunching segment of the convex kink $b_2^* \in (b_1^*, b_1^* + \Delta b_1^*]$, the incentives created by the tax schedule are so powerful that the marginal buncher is coming from above the concave kink. In this case, we need to modify the elasticity formula so that it accounts for tax rate changes at both kink points b_1^* and b_2^*.

Figure 6 illustrates this second scenario. As apparent from Panel A, the marginal buncher H, who choose pre-reform transfers $b_1^* + \Delta b_1^* \geq b_2^*$, is indifferent between bunching at the convex kink point b_1^* and locating at an interior point $b_2^* + \Delta b_{2+}^*$ after the reform. As a result, individuals with $\rho > \rho_1^* + \Delta\rho_1^*$ choose interior solutions above b_2^* and no single individual locates in the plateau area. This is reflected in the density distribution: once again, there is bunching at b_1^* and a density hole surrounding b_2^*, but the region of dominated choice ranges from b_1^* to $b_2^* + \Delta b_{2+}^*$ and fully includes the plateau $(b_1^*, b_2^*]$.

To derive the modified elasticity formula, we exploit that the marginal buncher who has $\rho_1^* + \Delta\rho_1^*$ is indifferent between the kink point b_1^* and her best interior solution $b_2^* + \Delta b_{2+}^*$. At the kink point b_1^* her utility level is

$$u^K = w - b_1^* + (\rho_1^* + \Delta\rho_1^*)^{1/\varepsilon} \cdot \frac{[(1-t)b_1^*]^{1-1/\varepsilon}}{1-1/\varepsilon}$$

In contrast, at $b_2^* + \Delta b_{2+}^*$ she obtains utility

$$u^I = w + \frac{1/\varepsilon}{1-1/\varepsilon}(\rho_1^* + \Delta\rho_1^*)(1-t-\Delta t_2)^{\varepsilon-1} + \frac{b_1^*\Delta t_1 + b_2^*(\Delta t_2 - \Delta t_1)}{1-t-\Delta t_2}.$$

Noting that the marginal buncher locates at $b^* + \Delta b^* = (\rho^* + \Delta\rho^*)(1-t)^{\varepsilon-1}$ before the reform and using the equality $u^K = u^I$, we can rearrange terms so as to obtain

$$\begin{aligned} 0 = 1 &+ \frac{1/\varepsilon}{1-1/\varepsilon}\left[1+\frac{\Delta b_1^*}{b_1^*}\right]\left[\frac{1-t}{1-t-\Delta t_2}\right]^{1-\varepsilon} - \frac{1}{1-1/\varepsilon}\left[1+\frac{\Delta b_1^*}{b_1^*}\right]^{1/\varepsilon} \\ &+ \left[1-\frac{b_2^*}{b_1^*}\right]\left[\frac{\Delta t_1}{1-t-\Delta t_2}\right] + \frac{b_2^*}{b_1^*}\left[\frac{\Delta t_2}{1-t-\Delta t_2}\right]. \end{aligned} \tag{11}$$

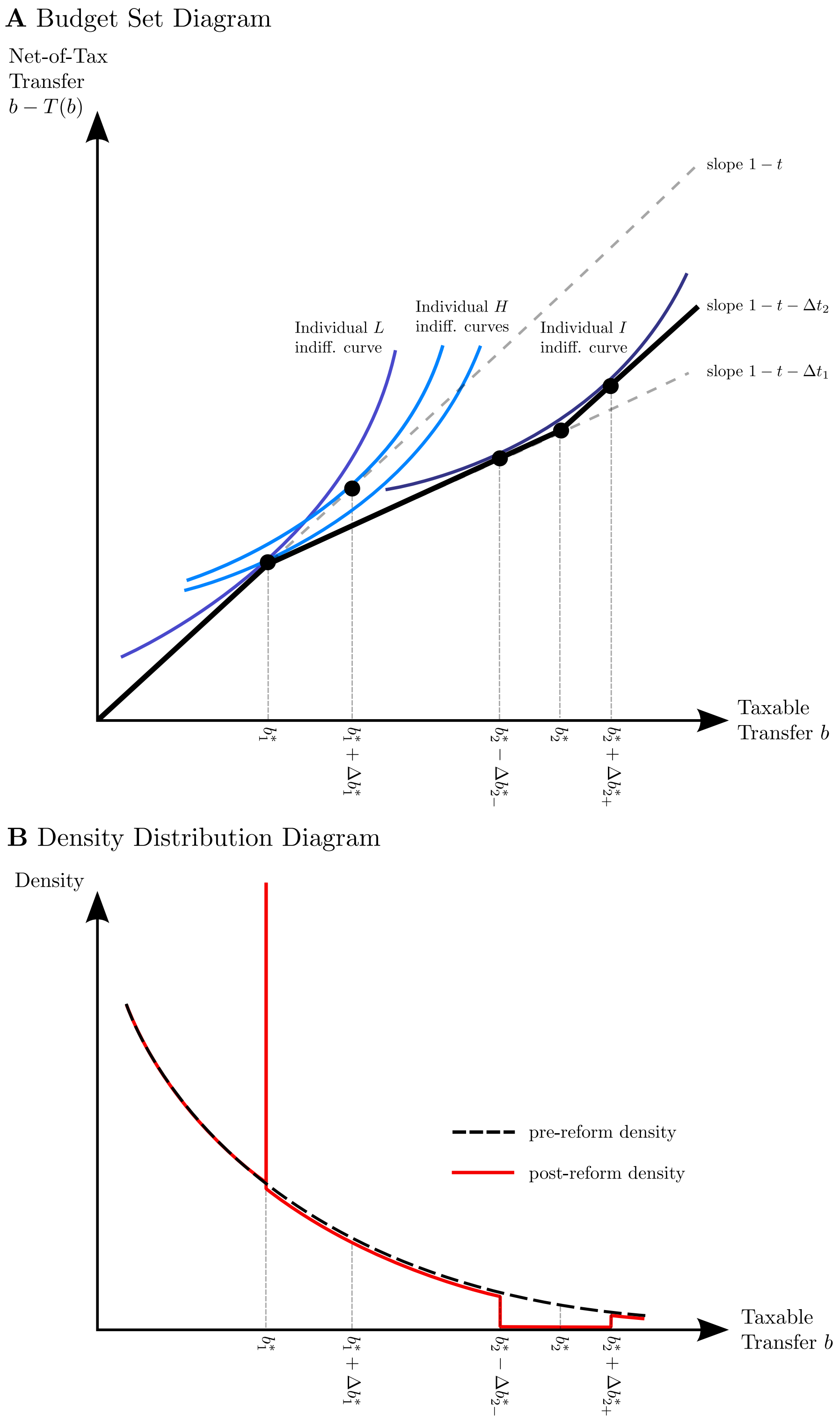
This equation specifies the relationship between the elasticity ε, and tax schedule characteristics. To recover ε, we can solve equation (11) numerically given the known tax schedule characteristics and an estimate of the transfer response Δb_1^*.

Equation (11) nests the case where the marginal buncher is coming from below the concave kink. To see this, note that when the marginal buncher is only reacting to the first and not to the second tax rate change ($\Delta t_2 = \Delta t_1$), equation (11) simplifies to

$$\begin{aligned} 0 = 1 &+ \frac{1/\varepsilon}{1-1/\varepsilon}\left[1+\frac{\Delta b_1^*}{b_1^*}\right]\left[\frac{1-t}{1-t-\Delta t_1}\right]^{1-\varepsilon} \\ &- \frac{1}{1-1/\varepsilon}\left[1+\frac{\Delta b_1^*}{b_1^*}\right]^{1/\varepsilon} + \left[\frac{\Delta t_1}{1-t-\Delta t_1}\right]. \end{aligned} \tag{12}$$

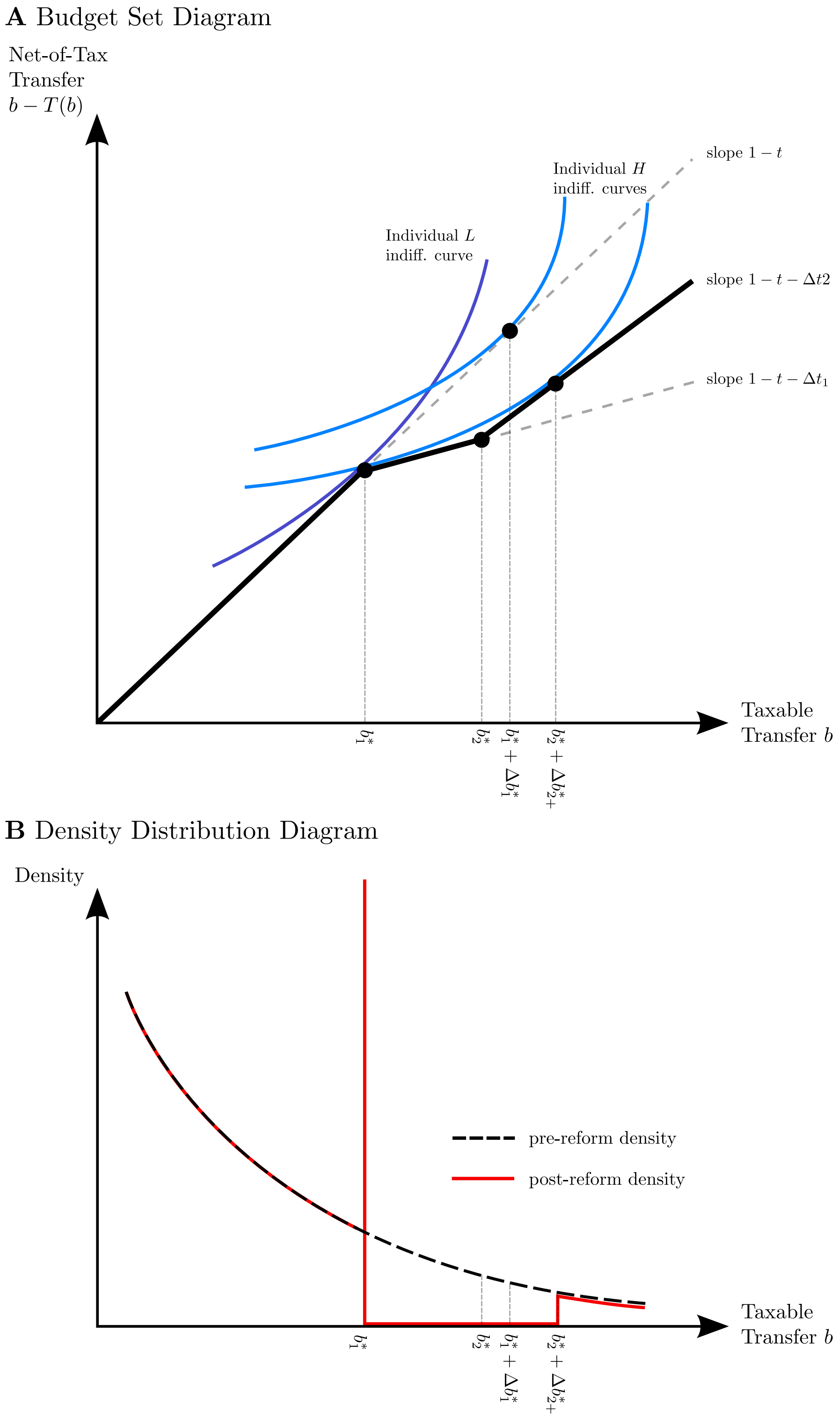
By inserting elasticity formula (9) into (12), the right hand side becomes zero. Therefore, (9) is the solution to equation (11) for $\Delta t_2 = \Delta t_1$.

Figure 5: Concave Kink Outside Bunching Segment of Convex Kink



Notes: The figure illustrates behavioral responses to marginal tax rate plateaus in a budget set diagram (Panel A) and a density distribution diagram (Panel B) for $b_1^* + \Delta b_1^* \leq b_2^*$. Donor L perceives the lowest satisfaction of giving among all individuals at b_1^*, and individual H receives the highest joy of giving among bunchers. I is exactly indifferent between the interior points $b_2^* - \Delta b_{2-}^*$ and $b_2^* + \Delta b_{2+}^*$.

Figure 6: Concave Kink Inside Bunching Segment of Convex Kink



Notes: The figure illustrates behavioral responses to high marginal tax rate plateaus in a budget set diagram (Panel A) and a density distribution diagram (Panel B) for $b_2^* \in (b_1^*, b_1^* + \Delta b_1^*]$. Donor L perceives the lowest satisfaction of giving among all individuals at b_1^*, and individual H receives the highest joy of giving among bunchers. H is exactly indifferent between the kink point at b_1^* and her best interior point $b_2^* + \Delta b_{2+}^*$.

B Tables

Table A1: Decomposition of Taxable Transfers

Concept	**Definition**
1. Estate (E)	
Agricultural & Forestry Assets	Domestic and foreign agricultural and forestry assets
Real Estate	Domestic and foreign real estate values
Business Assets	Domestic and foreign business assets
Other Assets	Securities, equity shares, capital claims, bank deposits, building savings deposits, interests, tax refund claims, other receivables, insurances, death benefits, pensions and other recurring payments, other rights, cash♣, precious metals♣, jewelery♣, beads♣, coins♣, household items♣, other tangible movable property♣
2. Debt of decedent's estate (D)	Loan debts, tax liabilities, other liabilities
3. Predefined Inheritances (P_i)	Agricultural & forestry assets, real estate, business assets, other assets
4. Previous Gifts (G_i)	Gifts from the same donor within the past 10 years
5. Tax Exemptions (X_i)	Personal tax exemption, special exemption for partners and children, exemptions for enterprises, exemption for household inventory or other movable items, exemption for landed property, exemption for donations to charitable bodies or political parties

Notes: The table shows the decomposition of taxable transfers. For inheritances, the taxable transfer is $b_i = \alpha_i(E - D) + P_i + G_i - X_i$, where α_i is heir i's share of the estate net-of-debt. A testator might leave a proportion of $E-D$ to i (proportional inheritance) and/or bequests specific assets or liabilities to i (predefined inheritance). In general, testators are able to allocate every asset or liability that is part of the estate to specific donees. For inter vivos gifts, we have $\alpha_i = 0$. ♣marks self-reported assets.

Table A2: Inheritance and Gift Tax Schedules (1996-2001)

Taxable Transfer in 1,000 DM	Partner	Close Relatives Descendants	Ancestors	Other Relatives	Unrelated
0-100		7%		12%	17%
100-500		11%		17%	23%
500-1,000		15%		22%	29%
1,000-10,000		19%		27%	35%
10,000-25,000		23%		32%	41%
25,000-50,000		27%		37%	47%
50,000		30%		40%	50%
Exemptions in 1,000 DM	1100	500	100	20	10

Notes: The table displays the tax schedules of the German inheritance and gift tax for the period 1996-2001. As apparent from the table, statutory tax rates depend on the donor-donee relationship and the value of the taxable transfer. The table also includes the sum of maximal personal tax exemptions and special exemptions granted to children and partners of the deceased. The classification of the donor-donee relationships is as follows. *Partner*: spouse, life partner; *Descendants*: (step)child, (step)grandchild; *Ancestors*: parent (inheritance), grandparent (inheritance), other descendants of child; *Other Relatives*: sibling, niece, stepparent, parent-in-law, child-in-law, divorce, parent (gifts), grandparent (gifts); *Unrelated*: earmarked transfers, others.

Table A3: Structural Elasticities

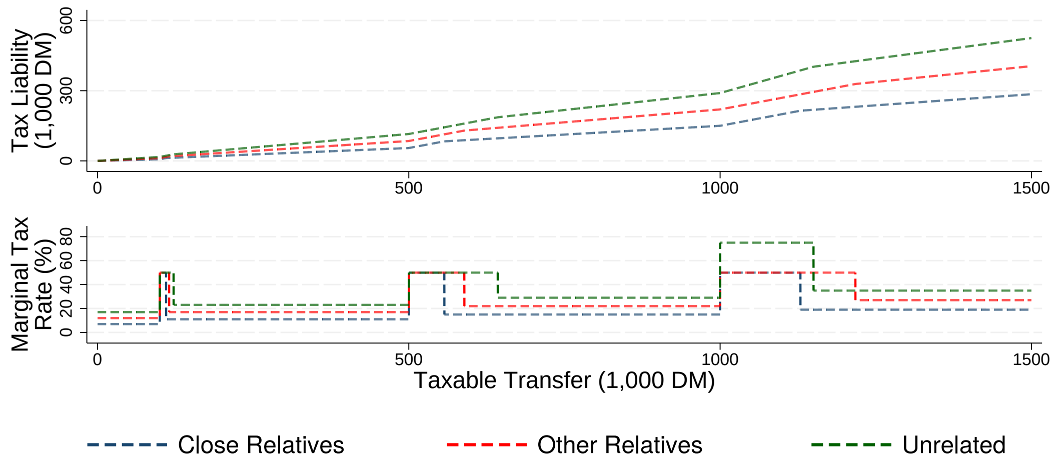
		Inheritances		Inter Vivos Gifts	
	Jump in Marginal Tax Rate Δt (1)	Response $\Delta\hat{b}^*$ (2)	Elasticity ε (3)	Response $\Delta\hat{b}^*$ (4)	Elasticity ε (5)
A Overall Responses					
Close Relatives	0.43	1,699***	0.027***	4,406***	0.069***
		(401)	(0.006)	(628)	(0.010)
Other Relatives	0.38	503	0.009	1,490**	0.024**
		(342)	(0.006)	(690)	(0.011)
Unrelated Individuals	0.33	286	0.006	−16	−0.001
		(597)	(0.012)	(574)	(0.009)
B Predefined Inheritances					
Close Relatives	0.43	6,504***	0.102***		
		(1320)	(0.020)		
C Proportional Inheritances					
Close Relatives	0.43	231	0.004		
		(213)	(0.003)		

Notes: The table summarizes responses of taxable inheritances and taxable inter vivos gifts to wealth transfer kinks depending on the donor-donee relationship. It contains the changes in the marginal tax rates at the convex kink point $\Delta t = t_1 - t$, estimated responses to kinks in DM $\Delta\hat{b}^*$, and structural elasticities ε. Part A presents overall responses; Part B focuses on predefined inheritances; Part C concentrates on inheritances that at least partly consist of proportional inheritances. See Table A2 for a detailed definition of tax classes and Figures 2, 4, and 3 for further details on the estimation procedure. Bootstrap standard errors are shown in parentheses. Stars indicate significance levels. ***= 1% level, **= 5% level, and *= 10% level.

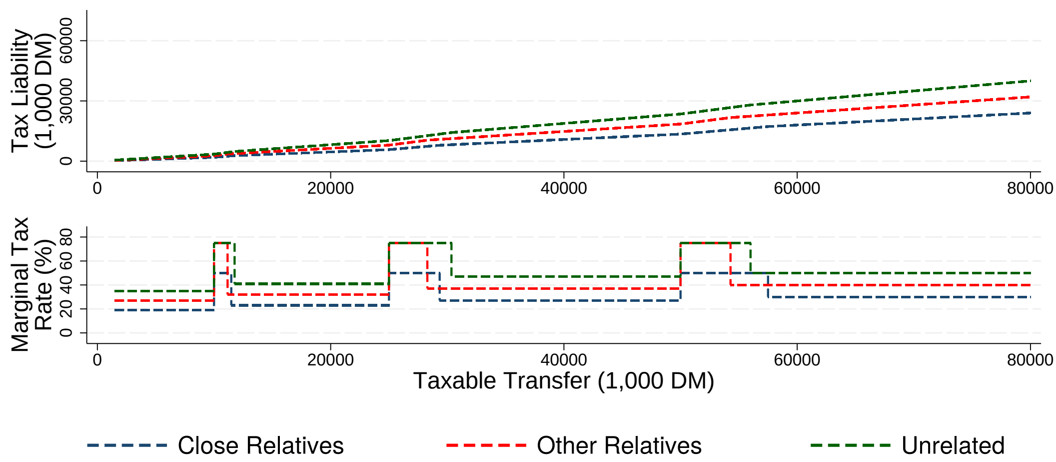
C Figures

Figure A1: Full Tax Schedule (1996-2001)

A. First Six Kinks

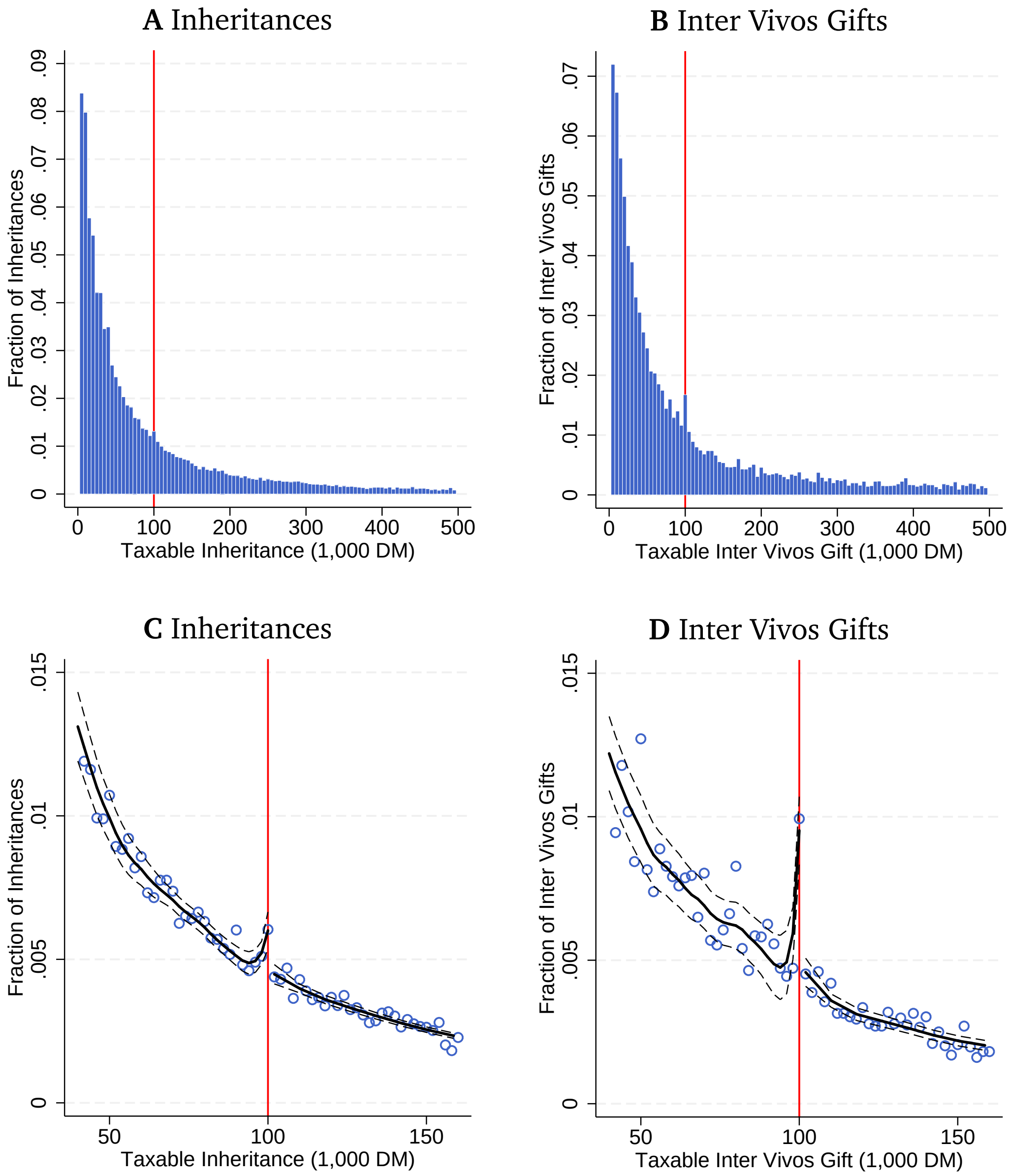


B. Second Six Kinks



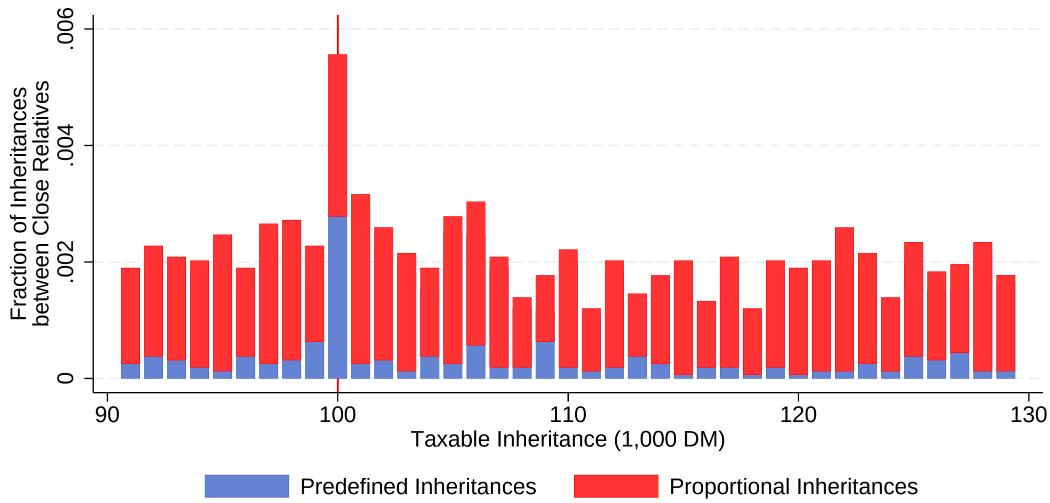
Notes: *Panel A* plots the tax liability (upper panel) and the marginal tax rate (lower panel) as a function of the taxable transfer for the first six kinks. *Panel B* considers the second six kinks. For close relatives, the marginal tax rate increases gradually from 7% to 30%, for other relatives from 12% to 40%, and for unrelated individuals from 17% to 50%.

Figure A2: Overall Distribution around Kinks



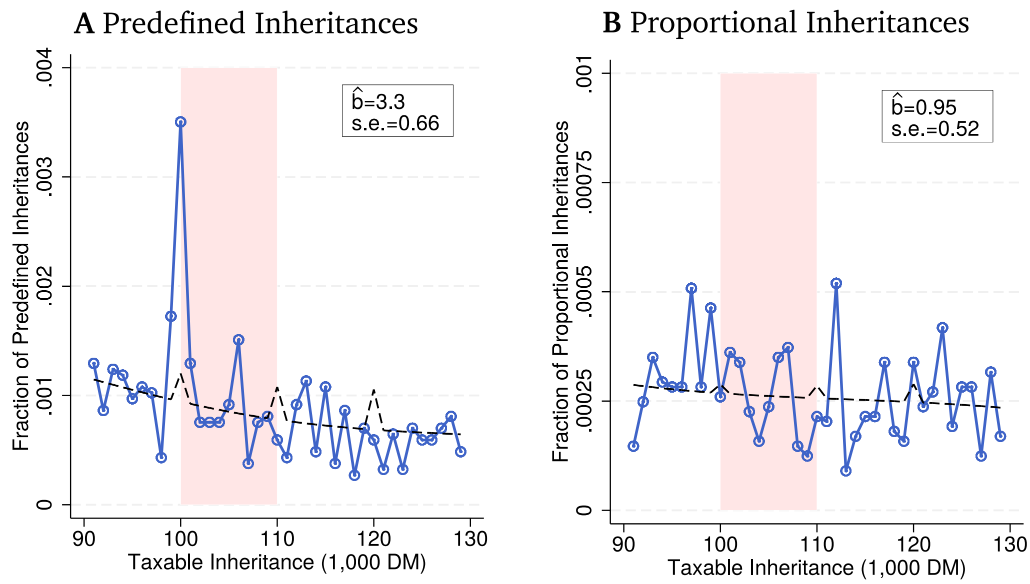
Notes: Pooling the data across tax classes, Panel A shows the empirical distribution of taxable inheritances and Panel B the distribution of taxable inter vivos gifts for the first two tax bracket (bin width 5,000 DM). Panel C and D zoom in on the distributions around the 100,000 DM cutoff (bin width 2,000 DM). The panels in the second row also include smooth distribution estimates obtained using local linear regressions on the binned data (solid black lines). The underlying local linear regressions allow for jumps at the cutoff, include 3rd-order polynomials, and use triangle kernels. The dashed black lines represent 95% confidence bands. The vertical red lines mark the 100,000 DM kink point.

Figure A3: Decomposition of Inheritances Between Close Relatives



Notes: The figure decomposes the empirical distribution of inheritances between close relatives. The red bars (blue bars) represent the distribution of inheritances that at least partly consist of proportional inheritances (pure predefined inheritances). Stacking bars on top of one another results in the overall distribution of inheritances (see also Panel B in Figure 2). The bin width is 1,000 DM. The vertical red line represents the cutoff value.

Figure A4: Predefined vs. Proportional Inheritances (Multiple Heirs)



Notes: The figure shows the empirical distributions (blue lines) of predefined inheritances (Panel A) and proportional inheritances (Panel B) pooled across all tax classes. The sample consists of all cases in which (a) there are at least two heirs and (b) the deceased gives at least one proportional and at least one predefined inheritance to different people. See Figure 3 for further notes.

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