The Influence of Inheritances on Wealth Inequality in Rich Countries*

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Abstract

This paper uses survey data from Germany, Spain, France, Italy, Great Britain and the United States to analyze how inheritances impact wealth inequality in a range of rich countries. Adopting an influence function regression approach, the paper calculates the counterfactual effects of small increases in the share of recipients of different-sized wealth transfers in each country. Results suggest that while a marginal increase in inheritance recipients generally contracts wealth inequality measures – confirming a common finding in the literature that inter-generational transfers tend to reduce relative wealth inequality – an increase in recipients of 'large' inheritances has the opposite effect. We determine what 'large' means in this context by point-estimating the thresholds above which transfers become disequalising. We find that transfers above the ninety-fifth percentile of the national transfer distribution are generally associated with an increasing effect on wealth inequality. Such thresholds are then put in perspective against the inheritance tax schedules in place in the six countries analyzed. No unique pattern emerges. While the thresholds are relatively close to tax exemption thresholds in Britain and Germany, they are somewhat higher in France and Spain and they are much lower in Italy and the United States.

JEL-Codes: D31, H20, G50
Keywords: *Wealth inequality, Inheritances, Gifts, Inter-generational wealth transfers, Inheritance taxation, Influence function*

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1 Introduction

Recent increases in the scale of wealth transfers in the form of inheritances and gifts have revived long-standing interest in their role in the generation of wealth inequality as well as in the design and implementation of taxes on these transfers. Piketty (2011) shows that annual wealth transmitted via inheritance and gifts in France rose from 2% of national income in 1950 to 15% by 2010, and Atkinson (2018) and Acciari, Alvaredo, and Morelli (2024) show substantial increases in the role of inheritances and gifts for the UK and Italy respectively. The importance of inherited wealth versus life-cycle saving for aggregate wealth accumulation has been debated for many years, with the differing estimates produced by Kotlikoff and Summers (1981) and Modigliani (1988) being a common initial point of reference. More recent work by Davies and Shorrocks (2000) and Piketty, Postel-Vinay, and Rosenthal (2014) provide updated discussion.

Several recent studies derived estimates of the wealth inequality attributable to the receipt of inheritances and gifts based on amounts reported in survey data. Most found that inheritances can be wealth-equalising: although wealth transfers generally widen *absolute* gaps in wealth holdings, the same is not true for gaps in *relative* wealth holdings (see Wolff and Gittleman (2014) and Wolff (2015) for the US, Karagiannaki (2017) and Crawford and Hood (2016) for Great Britain, and Bönke, Werder, and Westermeier (2017) and Nolan, Palomino, Van Kerm, and Morelli (2021) for comparative work across high-income countries).

A different wave of studies has exploited rich administrative data on wealth and wealth transfers to look at the wealth distribution before and after inheritance receipt in quasi-experimental settings where a group of recipients is matched to a comparable group of non-recipients to estimate the causal distributional effect of wealth transfers. Albeit differing in methodology, these studies also find that inheritances reduce relative wealth inequality (see Boserup, Kopczuk, and Kreiner (2016) for Denmark, or Elinder, Erixson, and Waldenström (2018) for Sweden). More recently, Nekoei and Seim (2022), however, find with Swedish data over a longer period that the inequality-reducing effect does not last as wealthy heirs deplete their inherited wealth at a much lower rate than less wealthy heirs. Their framework does not explicitly discuss how the distinction between large and small transfers could affect wealth inequality.

Divergent findings were also found using alternative counterfactual frameworks. One example is comparing the existing distribution with one where the rank in the wealth distribution would not depend on the receipt and size of an inter-generational transfer (Fessler & Schürz, 2018). Alternatively, some have compared the existing distribution with one where all the wealth that is attributable to transfers is instead distributed equally across the population (Feiveson & Sabelhaus, 2018). The fact that inheritances go predominantly to richer households and that households who do not receive inheritances have lower levels of wealth has inspired analytical counterfactuals in which the expected wealth is not conditioned by the inheritance received (Palomino, Marrero, Nolan, & Rodríguez, 2021; Salas-Rojo & Rodríguez, 2022). In these scenarios, inter-generational transfers are found to make a significant contribution to wealth rank and to wealth inequality.

Such mixed findings provide limited guidance on how to design the taxation of these transfers so that it serves to reduce wealth inequality. With this in mind, we apply here a novel strategy to estimate how wealth transfers affect the wealth distribution based on Influence Function (IF) regression methods and use this approach to determine 'disequalisation thresholds' beyond which transfers appear to be inequality-increasing rather than inequality-reducing. In a nutshell, the (observed) wealth distribution is compared with what one would expect to see if there were marginally more or fewer wealth transfer recipients, and recipients of transfers of different sizes. The difference in inequality in these two marginally different distributions – a functional derivative – is used to assess the strength and direction of the impacts of transfers of different sizes. We find that the impact of transfers on wealth inequality is approximately U-shaped with regard to the size of transfers, being inequality decreasing in most of the distribution, and inequality-increasing at the negative part of the wealth distribution and at the top. We can therefore empirically assess the positive thresholds beyond which transfers become inequality-increasing.

The influence function regression approach works as follows. An 'influence function' maps household wealth to the 'influence' that each recipient or non-recipient household exerts on a particular inequality measure of interest – such as the Gini coefficient or wealth shares – in the overall distribution. We define this key notion of 'influence' more formally below but, simply put, a marginal increase in the number of households whose wealth has a negative 'inequality influence' will tend to reduce inequality, while a marginal increase in the number of households whose wealth has positive 'inequality influence' will tend to increase inequality. Accordingly, the contribution of transfers to inequality is assessed by examining whether the receipt of a transfer (or a transfer above a given amount) in the past makes a household more or less likely to have a current wealth level whose influence on inequality is negative or positive. This is implemented using straightforward regression analysis (Choe & Van Kerm, 2018; Firpo, Fortin, & Lemieux, 2009).

This approach has advantages over methods usually employed in the literature. First, it allows us to assess the distributive impact of transfer receipt holding constant covariates such as age or income – and therefore address and control for the connection between transfers and wealth merely driven by the life-cycle. These type of controls have often been overlooked, especially in standard decomposition analyses. Second, it can be applied to any distributive statistic of interest, not only to specific decomposable measures such as the Gini coefficient or (half) the squared coefficient of variation, including alternative summary inequality measures and popular top shares measures. Third, it makes it possible to distinguish between larger and smaller transfers in the analysis and have a richer counterfactual framework. This is how we investigate the distinctive impact of large transfers on wealth inequality and show that while most inheritances have an equalising impact on wealth inequality, very high inheritances have a dis-equalising impact in all countries analyzed. Like most other approaches in this literature, causal or general equilibrium impacts are not identified: we explicitly focus here on assessing impact of hypothetical *marginal* changes in transfer receipts. The possibility of considering transfer sizes provides a more nuanced assessment of the contribution of inter-generational transfers to wealth inequality. [1]

[1] We succinctly explain how our approach relates to other strategies in Section 6 and elaborate at greater length in online supplementary material (Appendix A). We discuss the counterfactuals used implicitly or explicitly in the literature, summarize the key features of previous works on the topic, and explain how to connect analytically and empirically the IF-based approach to more standard ones. We also highlight the connections between the common inequality decomposition methods, the recent Nekoei and Seim (2022) conditions, and the elasticity expression of Stark, Taylor, and Yitzhaki (1986) for the effect on wealth inequality of (another type of) marginal change in the size of transfers within the Lerman-Yitzhaki decomposition framework.

We analyze survey data from around the year 2010 for six rich countries – the USA, France, Germany, Italy, Spain, and Great Britain. Baseline results show that in most of these countries having more transfer recipients (and, correspondingly, fewer non-recipients) would modestly reduce wealth inequality. This reflects the fact that, without distinguishing by transfer size, recipients are in general more concentrated around the middle of the wealth distribution than non-recipients. However, the distinction between 'large' and 'small' transfers is critical. In particular, whereas having marginally more recipients of small or intermediate-level transfers would lower wealth inequality, having marginally more large transfer recipients would instead lead to higher inequality. This seemingly obvious pattern may help to explain why the empirical literature to date has mixed messages about the impact of inter-generational transfers on wealth inequality.

We determine empirically what 'large transfers' are in the six countries. Transfers above the 95th percentile of the national transfer distribution are generally associated with an increasing effect on wealth inequality. More precisely, and in current local currency at the time of the survey (2010 for France, Germany, Spain and the US, 2012 for Britain and 2014 for Italy) transfers of at least \$ 507,000 are found to be disequalising for the US wealth distribution. That threshold is around £ 244,000 for Great Britain and € 303,500, € 221,500, € 346,500, and € 127,500 for Germany, France, Italy, and Spain, respectively. To put these in a policy perspective, we benchmark them against existing exemption thresholds in the tax schedules in place in those countries. In Germany and Great Britain, the existing inheritance tax exemption thresholds for offspring around the time of our analysis (€ 400,000 and £ 325,000 respectively) are relatively close to our 'disequalising thresholds'. The exemption threshold is somewhat *lower* than the estimated 'disequalising threshold' in the case of France and Spain (at approximately € 160,000 and € 16,000 respectively) and is much *higher* in the case of Italy and the United States (at € 1,000,000 and \$ 5,000,000 respectively).[2] Note that measured relative to the country's personal wealth distributions, the tax exemption thresholds are extremely generous in Germany, Italy, and the US where they are set at amounts equivalent to the 91st,

[2]In Spain that number refers to the national tax exemption threshold which can be modified by the regional governments, and in some regions, unlike what happens at the national level, the exemption thresholds is above the disequalising one that we find.

97th, and 99th wealth percentiles respectively.[3]

The marginal counterfactual change quantified by our influence function approach may be thought of as responses to (hypothetical) policy changes or macro trends. For instance, Bavaro, Boscolo, and Tedeschi (2024) project that changes in wealth distribution and demographic characteristics of the Italian population will lead to a gradual and overall reduction of the share of recipients over the total population from 2% in recent years to 1% by 2070. Likewise, a proportional increase in the share of recipients below a certain threshold could simulate the proposal of generalised wealth transfers discussed in the policy arena (e.g., universal inheritance schemes as discussed in Atkinson, 2015; Morelli, Nolan, Palomino, & Van Kerm, 2021; Piketty, 2020). Influence function regression results evaluate the potential distributive impact of such changes in the prevalence of transfer recipients.

The approach may also inform tax policy on transfers (gifts, inheritances, from all sources) received by beneficiaries, by guiding the choice of exemption thresholds or the value above which transfers could be taxed more progressively or at the highest marginal rate. As explained above, our empirical analysis provides estimates of thresholds above which transfers become disequalising – in expectation – for the wealth distribution. Such country-specific thresholds could therefore be informative for the design of recipient-based inheritance or lifetime capital receipts taxes, which are often justified on the grounds of reducing inequality of opportunities and enhancing social mobility (Atkinson, 1972, 2015; Meade, 1964; Mirrlees et al., 2011; Stantcheva, 2022). For example, the 2021 report on inheritance taxation by the OECD concludes that "There are strong equity arguments in favour of inheritance taxation, in particular of a recipient-based inheritance tax with an exemption for low-value inheritances" (OECD, 2021, p.137). The recommended exemption of low-value inheritances from the tax aims to "(...) avoid taxing small inheritances that may have an equalising effect, at least in the short run, while taxing larger inheritances" (OECD, 2021, p.44). Our estimates indicate that if equity is considered in the design of the tax, the exemption thresholds could be set at relatively high levels, namely around the 95th percentile of the transfer distribution. Transfers below that threshold tend to be inequality-reducing in expectation and therefore do not appear to call for taxation on grounds

[3] The exemption thresholds in 2021 remained unchanged for Germany, Italy, Great Britain, and Spain. However, it decreased to € 100,000 for France and increased substantially for the US to $ 11,700,000.

of inequality reduction.[4] Taxation of transfers beyond the dis-equalization threshold seem to offer scope to limit their inequality-increasing effect. Our estimates do not provide practical guidance about the rate at which transfers should be taxed – which can take other goals such as efficiency into consideration – although the higher the tax rate, the stronger is its potential impact to limit inequality in our framework. Note that the dis-equalization thresholds that we estimate depend on each country's distribution of transfers, distribution of net worth, and association between the two. The relatively large variations in their levels across the six countries analyzed reflect this, but we note also that there are even larger variations across countries in the tax exemption thresholds already in place, and these might be reconsidered in the light of the estimates shown in this paper.

The paper is structured as follows. Section 2 describes the household survey data on which the analysis is based and highlights some salient features of the pattern of wealth transfer receipts seen in those surveys. Section 3 details the influence function approach to assessing the impact of transfers on inequality. Section 4 presents our estimations of the influence of transfers on wealth inequality and we further discuss their potential implications for tax policy in Section 5. In Section 6 we then discuss the analytical settings of the main contributions in the literature on transfers and inequality and relate these to our analytical approach. Section 7 briefly concludes.

2 Wealth transfers in survey data

2.1 Net worth and transfers in three comparable surveys

We use data from the Survey of Consumer Finances (SCF) for the USA, the Household Finance and Consumption Survey (HFCS) for Italy, France, Germany, and Spain, and the Wealth and Assets Survey (WAS) for Great Britain. These are specially-designed wealth surveys, each seeking in-depth information from responding households about their assets and liabilities. The SCF has been carried out by the Federal Reserve every third year since 1983. The HFCS has

[4] In fact, the inequality-reducing impact of moderately-sized transfers could also be an argument for some form of universal capital endowments since increasing the share of transfer recipients – and correspondingly reducing the share of non-recipients – is found to reduce wealth inequality (consistent with this, see the analysis of Morelli et al., 2021 on the potential effect of universal inheritance schemes on wealth inequality).

been carried out every 3-4 years mostly since around 2010 by national central banks or statistical offices under the coordination of the European Central Bank. The WAS is a longitudinal survey carried out by the Office for National Statistics from 2006–08 with two-year intervals between interviews. By design, SCF oversamples the top of the distribution using data provided by the Internal Revenue Service on income from assets (see Bricker, Henriques, Krimmel, & Sabelhaus, 2016; Kennickell, 2019). Most countries in HFCS also seek to oversample the wealthy by geographical area or other means. Effective oversampling rates vary widely, with France, Germany, and Spain having high rates but Italy not oversampling. The WAS has an oversampling strategy based on geographical areas.

Net wealth in all datasets is the aggregate value of all marketable assets held minus debt outstanding (we do not attempt to include the value of private occupational pensions or entitlements to public pensions). To facilitate comparisons across countries we generally express individual- or household-level net worth relative to the national average (with the average estimated from the survey).

Both the SCF and HFCS, in the 2010 wave that we use (except for Italy, where inheritance information was only included in the 2014 wave) seek details on inheritances and gifts received by household members at any point over their lifetime, with respondents being asked to provide details of the largest three, including whether it was an inheritance or gift, the approximate value when received, the year of receipt, and from whom it was received. SCF also asks separately for the total market value of any other receipts, unlike HFCS. WAS, being longitudinal in design, only sought such retrospective information about wealth transfers in the first wave with subsequent waves asking about receipts since the previous wave.[5] We employ data from Wave 3 of WAS covering 2010-2012 to align with the first wave of HFCS, alongside SCF results for that year. As far as amounts are concerned, in both the SCF and the HFCS, respondents were asked whether they had ever received an inheritance or *substantial* gift; in WAS no such qualifier was used for gifts, so we imposed a threshold to improve alignment with the other

[5]For new households added to the WAS sample in Wave 3 (in light of substantial attrition) that retrospective information is not available. The 'continuing' sample remains however substantial and is similar to both the fully supplemented Wave 3 sample and the initial Wave 1 sample in terms of key characteristics. Issues with WAS including imputation of many missing values in Wave 1 are described in Nolan, Palomino, Van Kerm, and Morelli (2022).

surveys. Any inheritance irrespective of size should have been reported, but respondents may well not have done so for what they regarded as insignificant amounts. While the survey data allow receipts in the form of inheritances to be distinguished from those in the form of gifts, allowing us to compare patterns of receipt for each elsewhere (Morelli et al., 2021; Nolan et al., 2022), here it is the relationship between total wealth transfer receipts and total net wealth that is our focus.

The amounts for inheritances and gifts received at different points in time are reported in nominal values at the time of receipt in all surveys. We update them to values at the time of the survey using the change in the consumer price index over the intervening years. Our empirical investigation focuses first on this aggregate amount received without imputing any further return that may have accrued from amounts invested. We assess the sensitivity of conclusions to incorporating an annual rate of return of 3 percent as is common in the literature (see, e.g., Wolff, 2002).

Information on wealth and transfers is available at the individual adult level only in the WAS for Great Britain, and for consistency with the other surveys we aggregate these values by household. The HFCS and SCF obtain it at the household level. We therefore divide household totals in all countries by the number of adult members and focus our analysis on wealth and wealth transfers per adult and on inequality across the adult population. We refer throughout the paper to this final measure as the amount of cumulative wealth transfers (inheritances and gifts) received per adult.

Surveys have difficulty in capturing the top of the distribution and particular forms of wealth. Despite the over-sampling employed in most of the surveys we are using, wealth inequality tends to be underestimated (see Vermeulen, 2017). Recent efforts by the Federal Reserve, ECB, and researchers associated with the World Inequality Lab to develop Distributional Wealth Accounts for the USA and European countries have shed light on the extent and nature of that underestimation (see Batty et al., 2022; Blanchet & Martínez-Toledano, 2023; Engel, Riera, Grilli, & Sola, 2022). Among the countries we cover, results from the Federal Reserve show it has little impact when capturing the share of the top 1% while the ECB exercise shows that the complex adjustments they make to correct for the 'missing rich' and rescale survey amounts to match national accounts aggregates have almost no impact on the Gini coefficient for net wealth for Germany and increase it by 2% for Spain and 4% for France but by 17% for Italy (Batty et al., 2022, Table 8, p. 34). The amounts reported in these surveys for inheritances and gifts also fall short of what external data from tax sources would suggest, though the latter will also fail to capture some transfers depending on how taxes are structured in terms of thresholds, exemptions, etc. Investigating this using the rich WAS data for Great Britain on inheritances received in the last two years, we find an average inheritance-to-income ratio of 2.8% (3.5% when gifts are also included) in the survey. This can be compared with estimates based on tax data produced by Atkinson (2018) of 5.4% (7.4% including gifts). It is difficult to assess the surveys comparatively in terms of coverage given that external tax-based estimates vary in their capacity to capture such flows, reflecting differences in their underlying structures. The nature of the survey data must be kept to the fore in interpreting our results.

2.2 Descriptive statistics

About one-third of all households report having received some inter-generational transfer in the form of inheritance or substantial gift in Great Britain, France, Germany, Italy, and Spain. That figure is only one in five in the US. The mean aggregate amount received per adult ranges from about £ 55k in Great Britain to € 134k in Italy and $ 136k in the United States. A complete set of descriptive statistics is provided in the online supplementary material (Appendix B). We only highlight key features here.

The proportion reporting receipt generally rises with income, but the variation is often not particularly strong, and a substantial number of households in the bottom quarter and half of the income distribution have benefited from transfers. The likelihood of having received an inheritance or gift in the past has a stronger connection with wealth, and generally increases as one goes up the current wealth distribution, as do the amounts received. These are by far the largest for recipients in the top 1%, with the result that those households received about 15% of total transfers in the countries analyzed, reaching 18% in Great Britain and the US.

Both the likelihood of having received an inter-generational transfer and the position in the wealth distribution are related to age, with those aged under 35 less likely to have received a transfer. Still, even in households where the survey 'reference person' is aged 51 or over only about 40% of households report having received a wealth transfer in most countries analysed, and around 30% in the US. [6] As reported in Nolan et al. (2022), "In all countries, age is a relevant factor in predicting whether some transfer has been received... Those with higher levels of education are more likely to have received an inheritance or gift in a majority of countries but this was not the case in Italy or Spain. Low current wealth is associated with a lower probability of having previously received a wealth transfer in all countries " (p. 196).

Figure 1 shows kernel density estimates of the net worth distributions, for the overall population and separately for individuals that have received some transfers and for the others. The net worth distribution exhibits a spike at zero (or very low) wealth in all countries. The spike is primarily driven by adults who did not receive any transfer. The spike is absent or much more muted in the wealth distribution of adults who received some transfer. More generally, the mass of the net worth distribution for people who received a transfer is more spread out towards higher wealth. Transfer recipients are far less likely to have zero or negative wealth than non-recipients.

3 Estimating the contribution of wealth transfers to wealth inequality by influence function regression

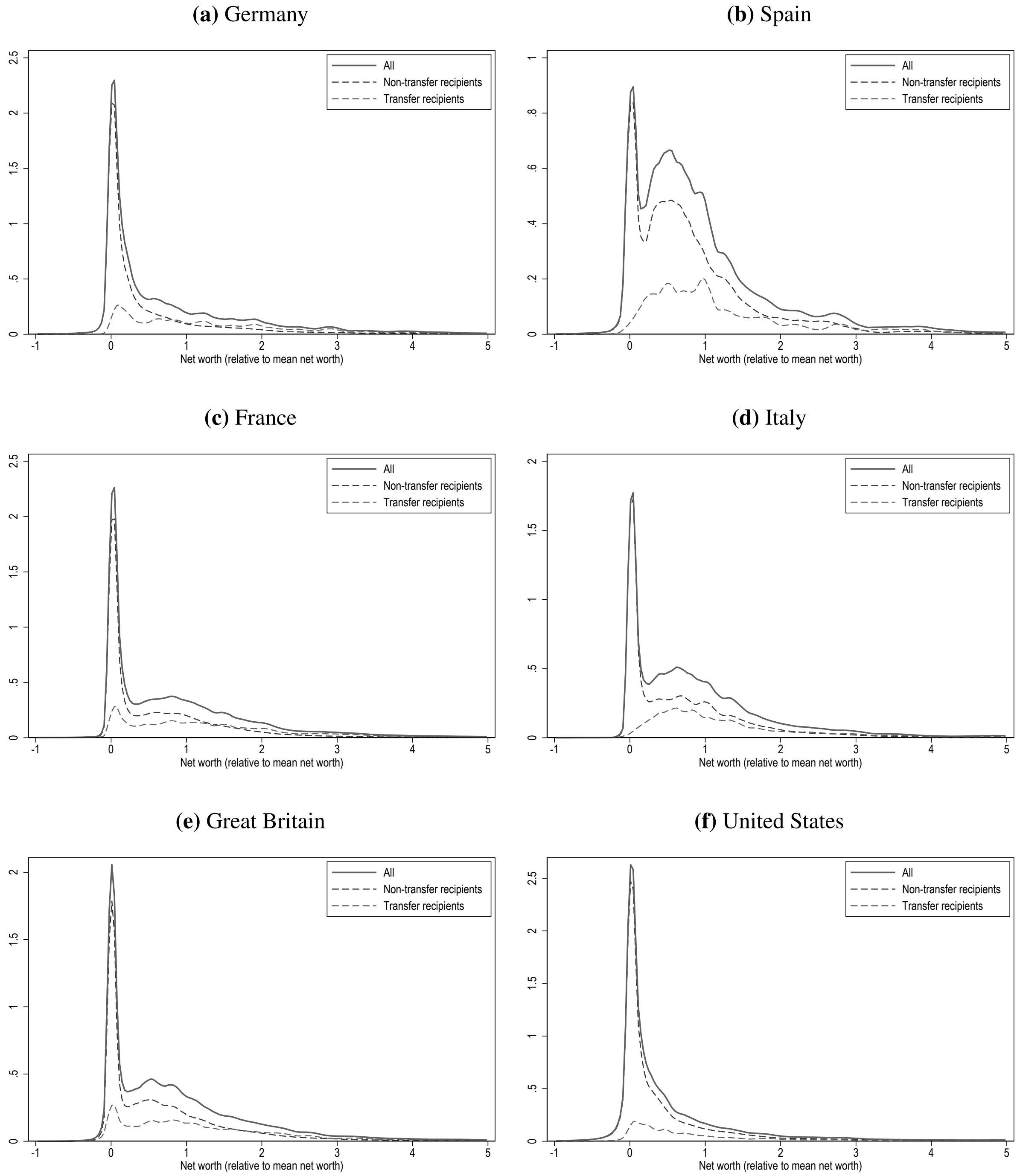
3.1 The influence function of wealth inequality functionals

Our strategy to assess the relationship between past transfers and inequality in the current wealth distribution is based on influence function regression. Its building block is the influence function of distribution functionals defined as follows.[7] Say we are interested in a statistic υ (for example the Gini coefficient, or a top wealth share statistic) measured in wealth distribution F. The influence function captures how the measure $\upsilon(F)$ would respond to a marginal modification of the wealth distribution consisting of an increase in probability mass at wealth w. Formally, the influence function is the functional derivative of υ in the direction of a Dirac

[6] We have no way of distinguishing respondents of whom (at least) one of parents is still alive from those who felt any inheritance from deceased parents was of too little value to report.

[7] We apply the term functional here in the modern usage: any function from a vector space into the scalar field.

Figure 1 – Kernel density estimates of net worth by transfer receipt status



Note: Each graph shows kernel density estimates across the net worth distribution of individual adults expressed relative to mean net worth (horizontal axis) for the whole population (continuous dark line), non recipients (dark dashed line) and recipients (light dashed line). Subgroup densities are scaled by the share of the group in the population: the subgroup densities add up to the population density estimate. Wealth holdings and wealth transfers receipts refer to individual adults. Household wealth and total wealth transfers are split equally among adult members. Data from first implicate samples in multiply imputed datasets.

function with mass point at w:

$$\text{IF}(w; \upsilon, F) = \lim_{\epsilon \downarrow 0} \frac{\upsilon((1-\epsilon)F + \epsilon\Delta_w) - \upsilon(F)}{\epsilon}$$

where Δ_w is an infinitesimal marginal increase in mass of F at wealth level w (Hampel, 1974). The shape of $\text{IF}(w; \upsilon, F)$ depends on both the nature of υ and on the shape of F itself. Intuitively, if υ is an inequality functional, the influence function is U-shaped: marginally increasing the probability to observe "low" wealth levels or "high" wealth levels will tend to increase inequality; by contrast, marginally increasing the probability of wealth in the "middle" of the distribution will tend to reduce inequality. What defines "low", "middle" and "high" wealth in this context is the initial shape of the distribution F and the choice of υ.

We focus on the Gini coefficient, but present results for the Top 5-to-Bottom 95 wealth ratio in online supplementary material (Appendix E).[8] The influence function for the Gini coefficient is

$$\text{IF}(w; \text{Gini}, F) = \frac{\mu(F) + w}{\mu(F)}\text{Gini}(F) + 1 - \frac{w}{\mu(F)} + \frac{2}{\mu(F)} \int_0^w F(x)dx \qquad (1)$$

where $\text{Gini}(F)$ is the Gini coefficient of F and $\mu(F)$ is the mean of F (see, e.g., Essama-Nssah & Lambert, 2012).

To make this concrete, Figure 2 plots $\text{IF}(w; \text{Gini}, F)$ in the distribution of net worth per adults in each of the six countries analyzed. Figure 2 also displays the underlying density and the cumulative wealth distribution function estimates to help visualise how the influence functions varies along locations in the distribution.

All plots exhibit a U-shape, but differences across countries highlight how the influence functions varies with the underlying distribution F. The roots of the function (marked by vertical dashed lines) reveal the wealth levels which demarcate what we previously loosely referred to as "low", "middle" and "high" wealth. Increases in density mass at wealth levels below the first root would tend to push inequality upwards "from below", increases in density mass between the two roots would tend to reduce inequality, and increases in density mass above the second root would tend to push inequality upwards "from above".

[8] Denoting with L the Lorenz curve of the net worth distribution, the Gini coefficient is $\text{Gini} = 1 - 2\int L(p)dp$ and Top 5-to-Bottom 95 wealth ratio is $\text{R} = \frac{1-L(.95)}{L(.95)}$.

The United States aside, there is regularity in the range of net worth that contribute negatively to the Gini: the influence function is negative for relative net worth falling between about 0.3 and about 4.5 in most countries (0.3 to 6.7 in Germany). These ranges generally cover individuals located between about the 40th percentile and the 97th percentiles of the net worth distribution. This implies that a marginal increase in the proportion of adults with relative net worth less than about 0.3 times average net worth would lead to an *increase* in wealth inequality in most countries, as would marginally increasing the proportion of adults with net worth above 4.5 times the average.

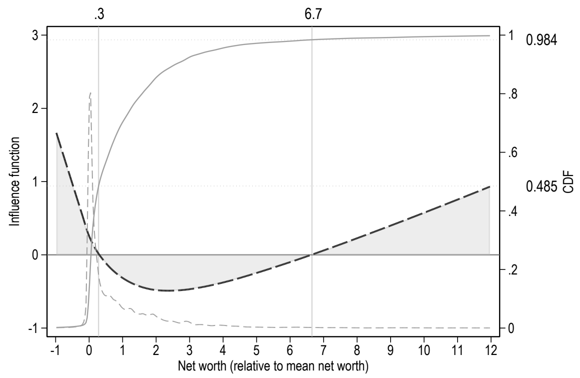
The United States stands as an outlier: the influence function turns negative at just 0.2 of average net worth and remains negative up until 13 times average net worth. This range covers the 46th to above the 99.5th percentile of the wealth distribution. The larger middle range in the United States is driven by the high inequality and the extremely large net worth recorded in the SCF data. What this means is that positive contributions to the Gini are made by the spike of adults with near-zero net worth and by individuals at the very top of the distribution, while almost all of the upper half of the population contributes negatively to the Gini coefficient.

3.2 Capturing the influence of transfers on wealth inequality

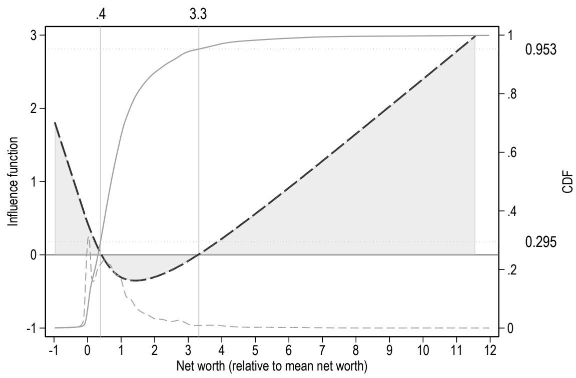
Our approach to assessing the contribution of wealth transfers to wealth inequality is based on examining how much transfers are associated with the location of individuals along the influence function – that is, how much transfers are associated with wealth levels with positive versus negative influence on the inequality functionals of interest (υ). A person with current wealth W_i having accumulated T_i in transfers will be considered to be υ-increasing if $\mathrm{IF}(W_i; \upsilon, F) > 0$, and will be considered to be υ-decreasing if $\mathrm{IF}(W_i; \upsilon, F) < 0$. Our analysis therefore consists in examining whether and how much the receipt of T_i makes individual i more or less likely to be υ-increasing or υ-decreasing. Have transfers been mostly received by individuals in the tails of the wealth distribution—notably in the upper tail—or by people now in the middle of the distribution where their influence on inequality is negative? By implication, holding the relationship between wealth and wealth transfers constant, would a marginal increase in the proportion of wealth transfer recipients push wealth inequality

Figure 2 – Influence functions for the Gini coefficient of net worth

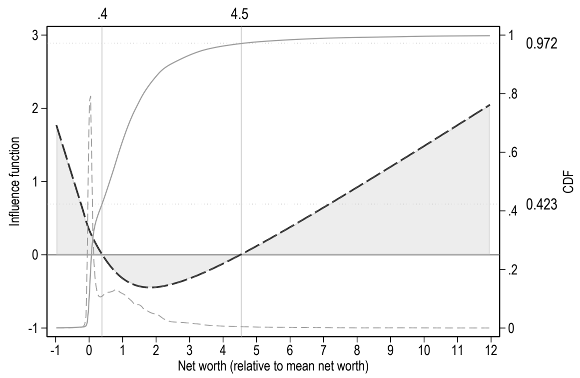
(a) Germany



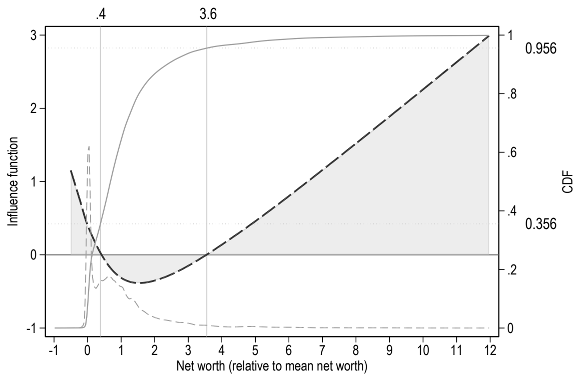
(b) Spain



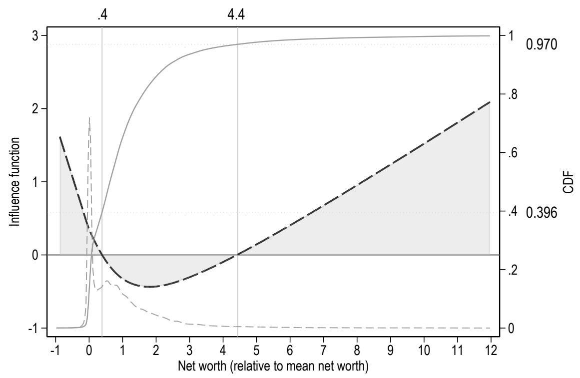
(c) France



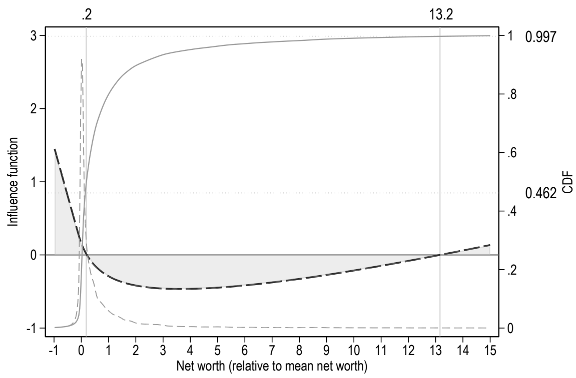
(d) Italy



(e) Great Britain



(f) United States



Note: Each graph shows in the dark dashed line and shaded area the influence function for the Gini coefficient (left vertical axis) across the net worth distribution of individual adults, expressed in terms of average net worth (horizontal axis). The panel also shows kernel density estimates and cumulative distribution estimates for net worth in light grey (dashed and continuous lines respectively). The two vertical lines delimit the net wealth range with a negative influence on the Gini (value provided at the top of the graph) and the two lightly marked horizontal lines show the population fractiles corresponding to this range of the CDF lines. Household wealth is split equally among adult members. Data from first implicate samples in multiply imputed datasets.

upwards or downwards?

This strategy is operationalised by regressing a binary transfer receipt indicator for individual i ($R_i = (T_i > 0)$) on the influence function value of her net worth (W_i):

$$\text{IF}(W_i; \upsilon, F) = \alpha + \beta R_i + e_i \tag{2}$$

with $E(e_i) = 0$ (Firpo et al., 2009). Choe and Van Kerm (2018) show that the parameter β times a constant $0 < t \leq 1$ linearly approximates the effect on $\upsilon(F)$ of an increase of t percentage points in the share of households receiving a wealth transfer. Negative β means that the wealth of transfer recipients are primarily located in areas of negative influence on inequality (that is, the average of their wealth's influence function value is negative), whereas positive β means that the wealth of transfer recipients are primarily located in areas of positive influence on inequality in the tails (that is, the average of their wealth's influence function value is positive). The case of $\beta = 0$ is one where the average influence of the wealth of transfer recipients is not systematically different from the wealth of non-recipients. Following Choe and Van Kerm (2018), we refer to $t \times \beta$ as an Unconditional Effect (UE) of a t-increase in the proportion of transfer recipients.

Conditioning on age The relationship between transfers and (the influence of) wealth can be partly driven by the individuals' age and their stage in the life-cycle. The IF-regression specification allows us to account for such confounding factors. Adding covariates to the regression equation (2) modifies the parameter of interest and turns it into a measure that we call the Conditional Effect (CE) of transfers. As shown in Choe and Van Kerm (2018), in a regression including additional covariates, where X_i represents a vector of household characteristics that may influence the level of wealth accumulation,

$$\text{IF}(W_i; \upsilon, F) = \alpha + \beta R_i + X_i \gamma + e_i, \tag{3}$$

$t \times \beta$ approximates the effect of a t-increase in the share of transfer recipients holding the distribution of X constant, that is, of a t-increase in the share of transfer recipients conditional on all configurations of characteristics X. The coefficient β is thus capturing the effect of substituting recipient individuals for ones that are equivalent in terms of other observed characteristics (age) but have not received transfers. If the two groups of recipients and non-recipients of similar characteristics have similar level of wealth, such a substitution would leave the wealth distribution unchanged. If, on the other hand, the wealth of recipients differs substantially from the wealth of non-recipients of similar age, the substitution will transform the shape of the overall distribution in different ways and will be captured by β.

When more flexible regression specifications are adopted, notably by adding interaction terms between transfer and characteristics,

$$\text{IF}(W_i; v, F) = \alpha + \beta_0 R_i + \beta_1 R_i \times X_i + X_i\gamma + e_i, \tag{4}$$

the effect of interest is then given by the average partial effects of transfers, that is, by calculating the expectation over X of $(\beta_0 + \beta_1 \times X)$, multiplied by the scaling factor t (Choe & Van Kerm, 2018).

Allowing for variations by size of transfers Specifications (2)–(4) capture the effect of a change in the share of transfer recipients, irrespective of the size of transfers received.

To differentiate between transfer sizes, instead of introducing a binary indicator R_i in equations (2)–(4), we first define $S_i = (s_{1i}, ..., s_{Ki})$ a row vector of K binary indicators capturing different positive wealth transfer ranges. In a regression of the form

$$\text{IF}(w_i; v, F) = \alpha + S_i\beta + X_i\gamma + e_i \tag{5}$$

the vector $t \times \beta$ captures the effect on v of an increase of a proportion t of transfer recipients in any of the transfer ranges represented in S_i with a corresponding decline in a proportion t of non-transfer recipients (the "omitted category"). If the vector of controls X_i is included in the regression, the shifts in proportions is such that it leaves the distribution of X_i unchanged. For example, say S_i differentiates between small and large transfers, the $t \times \beta$ coefficient on the 'small transfer' binary indicator captures the marginal effect on $v(F)$ of an increase of

t in the proportion of small transfer recipients and a corresponding reduction in the share of non-recipients holding the share of large transfer recipients unchanged.

The relationship between transfer sizes and the influence of the net wealth of recipients on wealth inequality turns out to be highly non-linear. To further document the shape of this relationship, we derive non-parametric estimates of the expected value of $\mathrm{IF}(w; \upsilon, F)$ conditional on the amount of past cumulative transfer receipts using local linear regression of the form

$$\mathrm{E}\left(\mathrm{IF}(w; \upsilon, F)|T\right) = \alpha(T) \tag{6}$$

where $\alpha(T)$ is the constant term in the local linear regression coefficients $\alpha(T)$ and $\beta(T)$ minimizing the weighted least squares

$$\sum_{i=1}^{n} K_b(T_i - T)\left(\mathrm{IF}(W_i; \upsilon, F) - \alpha(T) - \beta(T)(T_i - T)\right)^2$$

and K_b is an Epanechnikov kernel with bandwidth b set to unity (see, e.g., Fan & Gijbels, 1996; Hastie & Loader, 1993).[9] Evaluating the conditional expectation (6) at $T = 0$ and on a grid of 99 equally-spaced positive transfers values spanning the range of observed transfers in each country provides a smooth representation of the relationship between transfer size and wealth influence on inequality. As we show below, this will allow us to pin down thresholds at which expected wealth influence turns from υ-decreasing to υ-increasing.

Inference Estimation of the influence function regression is standard and can be adapted to handle the specificities of data drawn from wealth surveys, such as probability weights and multiple imputation. Sampling weights are provided in the datasets to correct for differences in sampling probabilities and survey participation rates across households, and we apply these throughout. The SCF and HFCS surveys provide multiply imputed values for missing wealth and transfer information. Unless otherwise mentioned, all estimates shown in the paper are averages of estimates of regression coefficients obtained from each of the five fully imputed 'implicates' available in the datasets, as recommended in, e.g., Rubin (1987).

[9]The choice of $b = 1$ provided a satisfactory balance between smoothness and variability in the six countries examined.

We conduct inference using an exchangeably weighted (Bayesian) bootstrap procedure to account for the estimation of the influence function (Praestgaard & Wellner, 1993; Rubin, 1981). All estimates are based on 499 replications. In each replication, estimates are obtained by averaging across the multiply imputed datasets to reflect the variability introduced by the imputations. All confidence intervals reported below are (point-wise) 95-percent confidence percentile bootstrap estimates.

4 Results

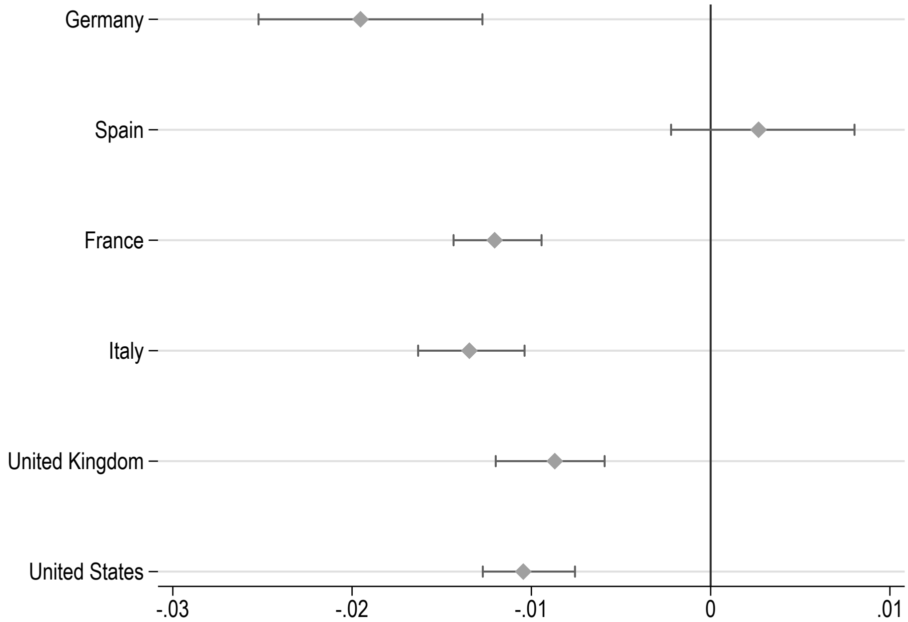
We now turn to our main results on the relationship between transfer receipts and the Gini coefficient of wealth distribution. We estimate models both with a dummy for general transfer receipt – to capture an overall 'effect' of transfer receipt – and with finer grids of transfer sizes to highlight the different influences on wealth inequality of transfers of different sizes. We use smooth locally weighted regression to evaluate thresholds beyond which transfers become inequality-increasing in Section 5.

To summarize, once the influence function is evaluated for all wealth levels observed in the data, one regresses its values on a transfer dummy (or a given size transfer dummy) and, optionally, a set of covariates. In its simplest specification, the regression only includes a dummy variable R indicating whether a household has ever received wealth transfers of any amount. The regression coefficient of such dummy variable in the 'influence function regression' calculates the effect that a marginal increase in the number of households in receipt of transfers would have on the wealth distribution statistic that is being considered, holding constant the wealth distributions conditional on the transfer and assuming an equal proportional marginal decrease in the number of households not receiving transfers. Adding covariates besides the wealth transfer dummy neatly modifies the interpretation of its coefficient from an 'unconditional' impact to a 'conditional' impact – that is, one that is cleared of the association between transfers and wealth induced by potential confounding factors. In our case, our preferred specification will include the age group covariates to control for the influence that the life-cycle could have in wealth levels and the cumulative transfers received.

To start, Figure 3 shows raw estimates of the impact of transfer receipt on wealth inequality without conditioning by age and without considering different transfers sizes – that is, the β parameter estimates of equation (2) for each country, multiplied by t percentage points (see also Table 1). The local approximation nature of the statistic (derived using a linearization approach) calls for a choice of t that is not distant from a marginal change in the mass. To discuss our main results we chose $t = 0.10$. To put this counterfactual into context, notice that recent work by Bavaro et al. (2024), combining survey and administrative data with microsimulation models that account for trends in wealth distribution and population aging, predicts that the share of successors over the total population will decrease between now and 2070 in Italy, with similar trends in wealth distribution and population dynamics expected also in other advanced economies (Krenek, Schratzenstaller, Grünberger, & Thiemann, 2022). This would imply the share of recipients in the total population in a given year in Italy would decrease gradually from 2% to 1% until 2070. Likewise, notice that policy proposals such that of universal inheritances discussed in Atkinson (2015); Morelli et al. (2021); Piketty (2020) would increase the proportion of transfer recipients by 1 percentage point every year (e.g., involving by construction a transfer to every person turning adult every year). A 10 percentage point change in this context, can be interpreted as a 1 percentage point change over 10 years of both the demographic and policy scenarios described above.

Figure 3 suggests that the average influence of the net worth of transfer recipients on the Gini coefficient is negative, when considering all transfers without distinction of amount. This reduction is larger in some countries than others, but in all, it is statistically significant except Spain. Transfer recipients are more frequently positioned around the middle of the wealth distribution than non-recipients. Increasing the proportion of transfer recipients would thus increase the number of individuals in the middle of the distribution, to which the Gini coefficient is particularly (negatively) sensitive. In the case of Germany, for example, increasing the number of transfer recipients by ten percentage points, and correspondingly reducing non-

Figure 3 – Influence function regression estimates of impacts of receipt of transfers (of any size) on the Gini coefficient (unconditional estimates without controls)



Note: Influence function regression estimates (horizontal axis) for each country. Confidence intervals are at the 95% confidence level and are obtained with a percentile bootstrap based on 499 replications.

recipient households, would reduce the Gini coefficient by 0.02.[10] These aggregate results are consistent with one of the main thrusts of the existing literature whereby wealth transfers have an equalising effect on the relative distribution of wealth.

However, it is revealing to bring out the heterogeneity of the distributional implications of transfers once we account for their size. Table 1 shows influence function regression estimates

[10]Almost identical unconditional results are obtained by re-weighting the data in a way to reflect such hypothetical proportional changes in the share of transfers recipient and assessing how the Gini changes. Results are shown in online Appendix G. This confirms that the linear approximation through influence function regression is accurate for our choice of $t = 0.10$. Note, however, that the hypothesized changes in the proportion of recipients – our 'policy exercise' – not only modifies the population composition between recipients and non-recipients but also affects the total value of transfers and, possibly, the total value of wealth if transfer recipients have higher contemporaneous average wealth than non-recipients. For completeness, we also calculate and show in online Appendix G the effect of an increase in the proportion of transfer recipients but holding total wealth constant by rescaling down the average wealth holdings of the two groups to the initial total. In the case of Germany, results suggest that the bulk of the reduction in the Gini coefficient of wealth is the result of the changes in the distribution of transfers. For countries like the US and Britain, the reduction in the Gini coefficient of wealth is confirmed even in this scenario, although the magnitude of such reduction is found to be smaller. In France, Italy, and Spain, instead, the change in the inheritance distribution, keeping the mean of transfer wealth as well as the wealth distribution unchanged, no longer brings about a reduction in wealth inequality. The overall negative effect is overturned into a positive one. These results mean that the estimated impact of an increase in the share of transfer recipients acts both through the relative position of recipients and the added amount of wealth that past transfers bring into the current distribution. Note that this further decomposition can only be implemented by rescaling the reweighted data and is not applicable to the detailed influence function regression results shown below.

Table 1 – Influence function regression estimates of transfers on Gini coefficient: unconditional and conditional on age and for alternative transfer size classification.

	Germany		Spain		France		Italy		Britain		United States	
Age controls (yes/no)	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Transfer (Yes/No)												
$T > 0$	−0.020***	−0.019***	0.003	0.002	−0.012***	−0.010***	−0.013***	−0.013***	−0.009***	−0.008***	−0.010***	−0.008***
	(0.003)	(0.003)	(0.002)	(0.002)	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)
Transfer size												
$0 < T <= P50$	−0.018***	−0.017***	−0.003	−0.004	−0.016***	−0.013***	−0.015***	−0.014***	−0.007***	−0.008***	−0.009***	−0.006***
	(0.002)	(0.002)	(0.003)	(0.003)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)
$P50 < T <= P75$	−0.035***	−0.034***	−0.004	−0.003	−0.016***	−0.016***	−0.026***	−0.025***	−0.016***	−0.015***	−0.018***	−0.016***
	(0.002)	(0.002)	(0.005)	(0.006)	(0.004)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
$P75 < T <= P90$	−0.039***	−0.040***	−0.010***	−0.014***	−0.015***	−0.014*	−0.023***	−0.023***	−0.017***	−0.016***	−0.020***	−0.017***
	(0.004)	(0.003)	(0.003)	(0.002)	(0.003)	(0.004)	(0.003)	(0.003)	(0.002)	(0.003)	(0.004)	(0.005)
$P90 < T <= P95$	−0.025***	−0.029***	0.001	0.002	0.012***	0.018***	−0.009	−0.013***	−0.001	−0.009	−0.007	0.008
	(0.007)	(0.006)	(0.005)	(0.005)	(0.006)	(0.009)	(0.006)	(0.004)	(0.009)	(0.005)	(0.007)	(0.044)
$T > P95$	0.111***	0.116***	0.140***	0.149***	0.036***	0.028***	0.085***	0.104***	0.031***	0.020***	0.045***	0.030***
	(0.045)	(0.047)	(0.035)	(0.034)	(0.010)	(0.008)	(0.022)	(0.034)	(0.012)	(0.012)	(0.014)	(0.013)

Note: Stars mark statistical significance at 10% (*), 5% (**) and 1% (***) levels. Confidence intervals are obtained with a percentile bootstrap based on 499 replications.

derived from a specification using categorical variables classifying transfers by size and adding controls for age interacted with the variables identifying different groups of wealth transfers by their size. The classification is based on percentiles of the transfer distribution, with cut-offs at the median, the 75th percentile, the 90th percentile and the 95th percentile of the (positive) transfer size distribution. The sign of the impact of transfer receipts on the Gini depends on the size of transfers involved. The inequality-reducing impact is confirmed when we consider transfers below the 95th percentile of transfers. However, when we consider the receipt of large transfers—in the upper 5% of transfer sizes—the influence on the Gini index turns positive. Thus, while a large majority of transfer recipients have current wealth in an υ-reducing range, marginally increasing the share of recipients of large transfers in the overall distribution would increase inequality.

Table 1 also reveals that coefficient estimates vary little after introducing age controls. The inequality-reducing effect of small and medium transfers persists even controlling for the potential confounding effects running through age. Increasing the proportion of recipients of such transfers and reducing the proportion of non-recipients by the same proportion *within every age group* would still reduce wealth inequality.[11]

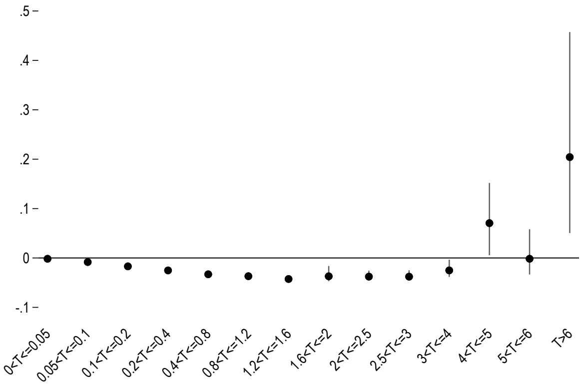
Results with transfer sizes classified in a more granular way and expressed in multiples of average net worth are shown in Figure 4. It is for individuals having received cumulative transfers larger than 3 to 4 times average net worth that the expected influence on the Gini coefficient turns positive in all countries. This pattern holds when including age controls. (see online Appendix C). The disequalising impact of transfers commences above several hundred thousands of currency units in all countries. We return to a discussion of these thresholds using non-parametric local polynomial estimation in Section 5.

Our counterfactual of 10 percentage-point increase in the share of adults that receive an inheritance – of any size, keeping the distribution of transfers unchanged – yields a change in the Gini index of -0.02 Gini points for Germany, or around -0.01 Gini points for most of the other countries. If that 10 percentage-point increase was of recipients of only very large

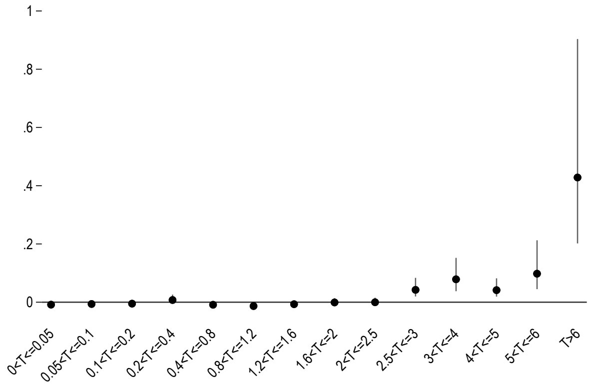
[11]Results reported in Table 1 are based on a specification with transfer dummies interacted with age group dummies. Estimates shown are average partial effects. Adding further income controls had no significant impact on the resulting partial effect estimates – results are available on request.

Figure 4 – The impact of wealth transfers on the Gini coefficient on net worth by transfer size expressed in multiples of average net worth. Influence function regression estimates without age controls.

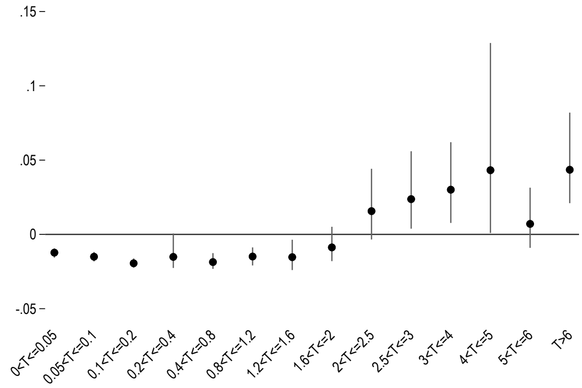
(a) Germany



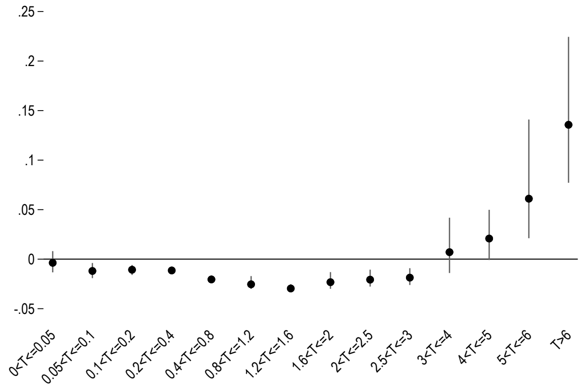
(b) Spain



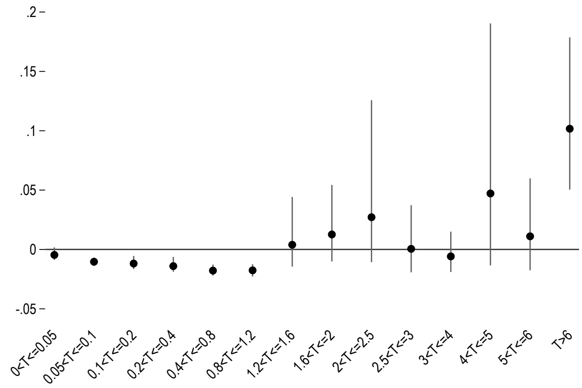
(c) France



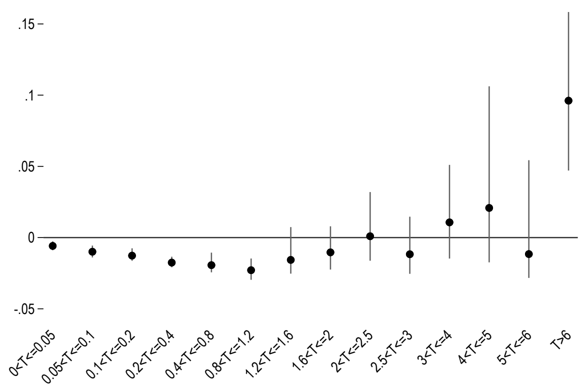
(d) Italy



(e) Great Britain



(f) United States



Note: Wealth transfers are classified into fourteen classes expressed as fractions or multiples of average net worth. Standard errors and confidence intervals (at 95% confidence level) are obtained by bootstrap replication. Wealth holdings and wealth transfers receipts refer to individual adults. Household wealth and total wealth transfers are split equally among adult members.

inheritances, measured as those above the 95th percentile of the original transfer distribution, we would find an implied change of $+0.1$ Gini points in Germany, Italy or Spain, and of $+0.02$ in France, Great Britain or the US (Table 1). If transfer groups are defined in terms of average net worth in the country (Figure 4), a 10 percentage-point increase in recipients of those larger than 6 times average net worth (and a corresponding reduction in other recipients) would yield a wider change in most countries, of approximately $+0.2$ Gini points in Germany, $+0.4$ in Spain, $+0.15$ in Italy. Those might appear small changes overall, but the magnitudes of the change due to inheritances in the literature using other datasets are never very big. Elinder et al. (2018), for example, find that the distribution of wealth in the treated group (with transfers receipt) saw a change of -0.05 Gini points.[12]

Note that we have not sought to include any investment returns that may have accrued to inter-generational transfers since they were received in the results presented so far. It is hard to get information on how much of each transfer was saved or consumed, what rate of return the amounts saved and invested generated, and what the impact was on the behavior of household members concerning earning and saving. To assess sensitivity, we repeated our analysis with transfers values capitalised using a rate of return of 3% per annum as commonly applied in the literature (see, for example, Crawford & Hood, 2016).[13] Our findings are however hardly affected by a stylised capitalization of transfers at a constant rate. Results available in online Appendix D show that employing this alternative measure of capitalised total transfers received in the conditional analysis produces results very similar to the non-capitalised values of Table 1. The online Appendix provides further sensitivity analysis with results based on samples excluding observations with the most extreme wealth and transfers values and with results based on a household-level perspective rather than on an individualised, adult-level perspective. These variations lead to results close to those reported here.

[12]Note that Elinder et al. (2018) confront a counterfactual of inheritances versus no inheritances at all, received over two years (2002–2004). We, instead, present a counterfactual of 10 percentage points increase in inheritances (of all sizes or above a given size) received over a lifetime.

[13]The application of an homogeneous rate of return is rather straightforward to employ. However, the credibility of such an application may be undermined by recent studies demonstrating that wealthier households generate higher rates of return on assets on average (see, for example, Fagereng, Guiso, Malacrino, & Pistaferri, 2020; Nekoei & Seim, 2022). Note also that when the value of transfers capitalised in this way is found to be greater than total current wealth, we cap transfers at the latter level following the argument by Piketty et al. (2014) that this results in a more plausible estimate of total ‘transfer wealth’.

We also examined the robustness of our conclusions using the ratio of the wealth held by the top 5% to the bottom 95% of the wealth distribution rather than the Gini. This produces similar results: the influence of large transfers receipt remains clearly disequalising, while small, medium and overall transfers tend to have an equalising effect. Results presented in online Appendix E show that this produces similar results. The influence of large transfers receipt remains clearly disequalising, having a significant impact in increasing this alternative inequality measure. Receipt of small, medium and overall transfers have an equalising effect on this alternative measure in all countries, and more strongly in Germany and the United States.

5 Implications for Inheritance Tax Policy?

There is growing evidence that wealth transfers account for an increasing share of national income and aggregate wealth (Acciari et al., 2024; Atkinson, 2018; Piketty, 2011). In his concluding remarks, Atkinson (2018) wrote that "[i]f inheritance is returning, then we need to look again at its role as a basis for taxation." As suggested by Cowell, Van de gaer, and He (2018), wealth transfer taxes are important for "the long-run distribution of wealth, reducing equilibrium inequality (the 'predistribution' effect) by a much larger amount than what is apparent in terms of the immediate impact of the tax (the 'redistribution' effect)."

As discussed above, a recent OECD report stresses the strong equity arguments that support inheritance taxation schemes that include an exemption threshold. The report underlines how the available empirical evidence "suggest[s] that a tax exemption threshold that allows small inheritances to be passed on free of tax, combined with a progressive inheritance tax rate schedule, may reduce absolute and relative wealth inequality. This would avoid taxing small inheritances that may have an equalising effect, at least in the short run, while taxing larger inheritances." (OECD, 2021, p.37)

The estimates from Section 4 reveal heterogeneous, non-monotonic effects of transfers on wealth inequality, highlighting that large enough transfers are on average dis-equalising for the wealth distribution. These findings speak directly to growing concern in the literature and the public about the growing importance of wealth passed from one generation to another and its implications for inequality. Such results could inform the design of tax policies on inter-generational transfers (inheritances and gifts) by characterizing 'small' and 'large' inheritances from their expected distributional effects. The identification of country-specific monetary thresholds above which wealth transfers appear to become dis-equalising may guide the choice of exemption thresholds for taxation of wealth transfers, or even the value above which transfers could be taxed more progressively or at the highest marginal rate. Recall that our analysis has focused on wealth transfers per adult, based on averaging reported household totals across adult members, to align as best as we can with taxation of receipts which is most often at the individual level.

The results presented in Section 4 have used discrete classes of transfers by size. This only allows us to identify a range of values whereby the distributional effects of wealth transfers change sign. To pin down thresholds, we use non-parametric estimates of the relationship between the expected υ-influence of current wealth and the amount of cumulative transfers received. Figure 5 displays such estimates for the six countries analyzed.[14] These fine-grained estimates allow us to detect the values (in local currency units at constant prices) along the range of transfer sizes where the expected influence on wealth inequality of transfer recipients changes sign (that is, the roots of the non-parametric curve). Note first that, as shown in the results from Section 4, individuals with small to moderately large transfers have a negative average influence – that is, a marginal increase in the number of these recipients would tend to reduce the Gini coefficient of net worth. It is only for large transfer levels – and a small share of the population – that the average influence turns positive again.[15]

The point at which sign changes – marked by vertical dashed lines in Figure 5 – are € 127,500 in Spain, € 221,500 in France, £ 244,000 in Great Britain, € 303,500 in Germany, € 346,500 in Italy, and $ 507,000 in the US (see Table 2 and Figure 5). These values, we recall, refer to the individual-level real value of cumulative transfers received at the date of the survey. These figures are not always estimated with a high degree of precision due to relatively small sample sizes when seeking to finely disaggregate survey data at high values of

[14]The non-parametric estimates do not control for age as these do not appear to play any significant role in the parametric estimations and their introduction would increase the sampling error around our non-parametric estimate.

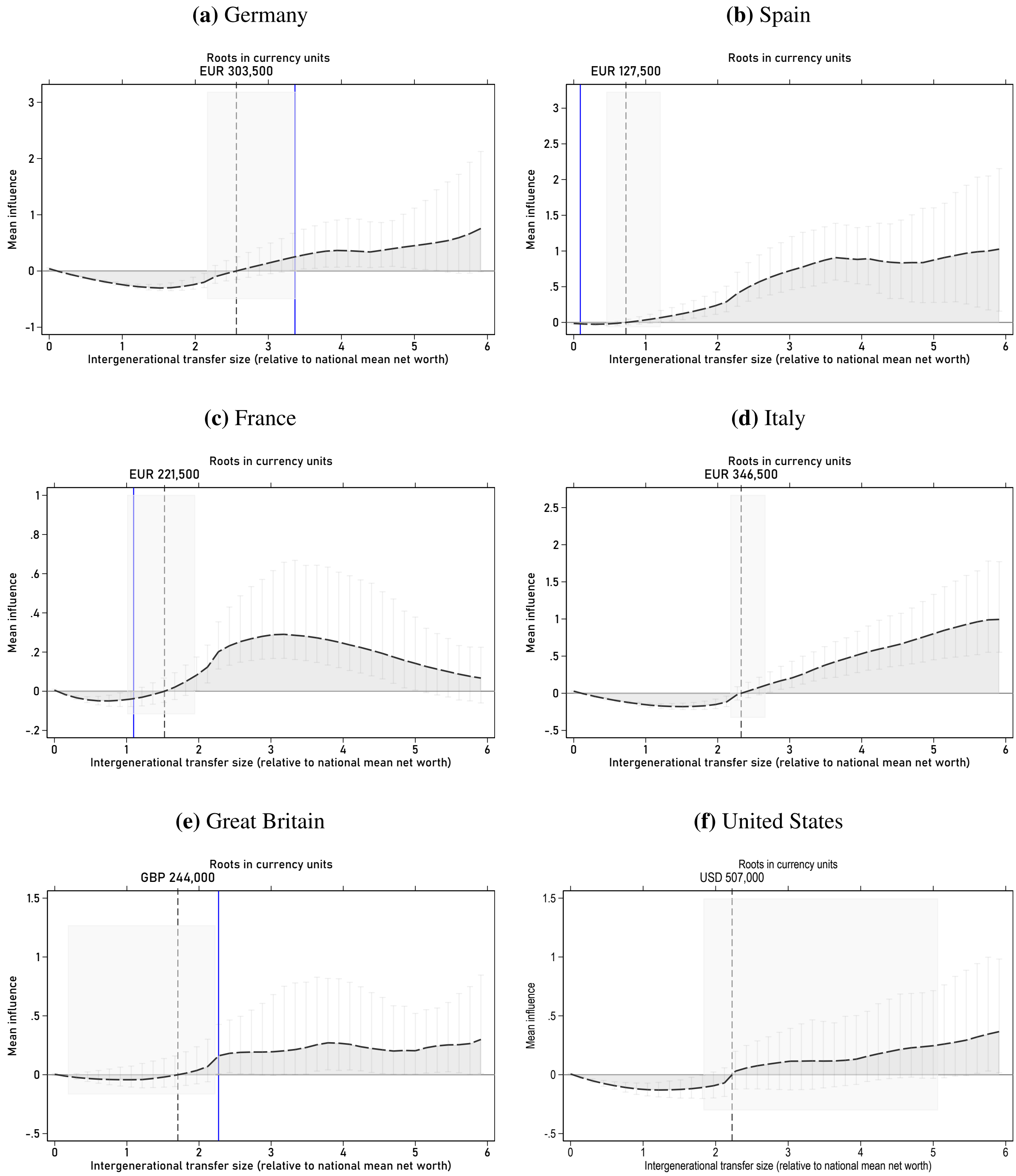
[15]The overall negative average influence value documented in Figure 3 is a weighted average of influence function values along the transfer distribution where the weights are the density of transfers, conditional on transfers being strictly positive. The regression coefficient of Eq. (2) is therefore equal to $\int E(IF(w)|T)f(T|T>0)dT$.

wealth and transfers. Bootstrap confidence intervals shown in Figure 5 as lightly shaded areas underline the range of uncertainty surrounding the point estimates of the estimated roots (see also Table 2).[16]

To put these values in perspective, it is revealing to compare the 'disequalising thresholds' to tax exemption thresholds available for the taxation of wealth transfers in the countries analyzed. These are shown in Figure 5 using solid vertical blue lines. We obtain these thresholds from the recent comprehensive compilation of estate, inheritance, and gift taxes across several countries from the GC Wealth Project (Morelli et al., 2023). We select 2011 as a comparable year to the data examined in the paper but we also discuss how these thresholds have been evolving to date (see online Appendix F for details). Note that whereas taxes in the US and the UK are based on the total value of net wealth transferred at death regardless of how it is divided among heirs (i.e., a tax on givers), the inheritance taxes in France, Germany, Spain, and Italy are based on the value of individual transfer received from a deceased person's estate regardless of its size (i.e., a tax on recipients). Moreover, in the latter case tax rates and tax-free allowances generally depend directly on both the amount involved and the relationship between the donor and the recipient. In Germany, the tax rate for transfers received by children ranges from 7% to 30%. The first marginal rate applies to any transfers higher than € 400,000 (equivalent to the 91st percentile of the personal wealth distribution) whereas the top rate applies above € 26.4 million. Incidentally, this is not too different from the identified threshold as shown by the the continuous blue vertical line in Figure 5. This also applies in the case of the UK, where a tax is applied at a 40% proportional rate to the total value of estates left at death that are worth over £ 325,000 (equivalent to the 85th percentile of the wealth distribution), and the identified disequalising threshold is estimated, albeit with a relatively large confidence interval, at around £ 244,000. In Spain, the tax exemption threshold for transfers to children is equivalent to € 15,956 (equivalent to the 26th percentile of the Spanish wealth distribution). Such exemption threshold falls substantially below the identified disequalising range. Notice, however, that Spain imposes a progressive tax structure with tax rates ranging from 7.65% to

[16]The roots are estimated by linear interpolation between the lowest two grid points at which estimates turn from negative to positive. This is calculated separately for each multiply imputed dataset and averaged. The estimation is repeated across all bootstrap replications and bootstrap estimates are combined to estimate a 95% percentile bootstrap confidence interval.

Figure 5 – Non-parametric estimates of the conditional expectation of current net worth influence on Gini coefficients by transfer size



Note: Each panel shows the mean influence function for the Gini coefficient for varying levels of transfers expressed in multiples of average annual net worth. Wealth holdings and wealth transfer receipts refer to individual adults. Household wealth and total wealth transfers are split equally among adult members. Estimates obtained by locally weighted linear regression with Epanechnikov kernel and a unit bandwidth. Confidence intervals are estimated by 499 bootstrap replications. Vertical dashed lines identify the thresholds where the function crosses the zero axis (i.e., the root of the function) and the corresponding values are expressed in currency units at constant prices 'around 2010'. The grayed areas indicate the sampling uncertainty around the estimates of the root by showing their 95% percentile bootstrap confidence intervals. Existing estate and inheritance tax exemption thresholds are located in the graph using the continuous vertical blue line. These are based on data from the GC Wealth Project (Morelli et al., 2023) for the year 2011. The exemption threshold for Italy and the U.S. does not show as it is off the x-axis scale. See Table 2 for details.

Table 2 – Estimated roots in relationship between expected influence on Gini coefficient of net worth and cumulative transfers.

	Germany	Spain	France	Italy	Britain	United States
Roots in the influence function to transfer size relationship in national currency units						
	EUR 303,282	EUR 127,301	EUR 221,623	EUR 346,701	GBP 244,211	USD 507,081
	[255,786 – 400,724]	[79,439 – 211,992]	[146,350 – 283,338]	[324,242 – 397,177]	[26,040 – 318,667]	[417,231 – 1153896]
Roots in the influence function to transfer size relationship expressed as percentile rank in the national wealth distribution						
	93.5	84.8	91.7	93.8	96.7	96.0
	[90.0 – 95.8]	[75.1 – 92.5]	[87.5 – 93.7]	[92.3 – 95.1]	[60.6 – 97.9]	[92.8 – 97.8]
National inheritance tax exemption thresholds in 2011						
... in national currency	EUR 400,000	EUR 15,956	EUR 159,325	EUR 1,000,000	GBP 325,000	USD 5,000,000
... as percentile rank	91.0	26.0	65.0	97.0	85.0	99.4

Note: Note: Amounts are in national currency units. Confidence intervals are percentile bootstrap estimates based on 499 bootstrap replications. Each replication is based on local linear estimates of the relationship between transfer size and average influence on net worth inequality with a unit bandwidth, averaged over multiple imputation implicates. Estate and inheritance tax exemption thresholds are from Morelli et al. (2023).

34% (i.e. the top marginal tax rate begins from transfers worth around € 800,000).[17] In France, the existing exemption threshold in 2021 was € 100,000, and tax rates for children range from 5% to 45% depending on the amount (i.e. the top marginal tax rate kicks in at around € 1.9 million). In 2011, however, every child could receive € 159,325 tax-free wealth transfer. Such an amount is somewhat lower than the identified disequalising threshold in the same year. In Italy transfers to spouses and children are taxed at a proportional 4% rate, with an exemption for the first € 1 million of assets transferred (equivalent to the 97th percentile of the adult wealth distribution). Such a threshold is almost three times as large as the disequalising range identified for the case of Italy. In the US, in 2011 the estate tax applied only to those estates worth more than $ 5 million with a proportional tax rate of 40% (the threshold is very close to being representative of the richest 0,5% of the US adults). Such an exceptionally large amount is found to be approximately ten times larger than our estimated disequalising threshold, falling outside both the relatively large confidence interval and the x-axis scale itself in Figure 5. The threshold was in 2021 much larger, namely $ 11.7 million. In Spain, Italy, Germany, and the UK, on the contrary, the tax exemption thresholds remained unchanged from 2011 to 2021.

The taxation of inheritances and gifts is often justified on the grounds of reducing inequality of opportunities and enhancing social mobility (Mirrlees et al., 2011), and recipient-based inheritance taxes rather than an estate tax levied on donors are more consistent with those objectives. Such arguments are even used to justify that large inherited wealth should be taxed at even higher rates than earned income and self-made wealth (Batchelder, 2020).[18] Consistently with this view, one of the main advantages of the survey data used in our analysis is that they allow to track cumulative transfers received throughout life, which could be an ideal tax base to achieve greater equality of inherited economic advantages. In his 1972 book, Unequal Shares, Anthony Atkinson proposes such a form of taxation for the UK and states it would

[17]Note also that in Spain the inheritance tax – as well as the wealth tax – has been transferred to the regions, which can subsidize it completely or up to a certain threshold. Madrid, Balearic Islands and several others subsidize 99.9% of the inheritance tax regardless of the tax base, virtually removing this tax figure for direct descendants. Others have enlarged the national exemption thresholds in practice, like Aragon, where the first € 500,000 of the tax base are subsidized.

[18]The work by Piketty and Saez (2013) proposes an optimal taxation framework whereby the optimal inheritance tax rate is up to 50% or 60% under the conditions that inheritances are highly concentrated in the hands of few individuals, that the elasticity of bequests to tax is low, and that society cares about recipients of relatively small inheritances.

"make clear the object of redistribution" and "It would provide a strong incentive for donors to spread their wealth widely" (Atkinson, 1972, p.175).[19] As discussed in Stantcheva (2022) "Rather than taxing transfers at each 'death', such a system would tax the total transfers (gifts, inheritances, from all sources) received by the heir, and those who receive more would be taxed at higher rates (progressivity). It is possible to put the exemption threshold relatively high in that case, truly exempting the middle class, while still being able to tax very wealthy families... Such a beneficiary-based system could at once be more progressive and also much more accepted and better understood by citizens...". What 'relatively high' should mean in this context is difficult to determine. Our results may however inform this discussion by providing initial estimates of the currency threshold above which accumulated transfers are associated with an increase in wealth inequality – a point at which taxation may therefore be recommended to limit inequalities in wealth.

Nekoei and Seim (2022) show the existence of heterogeneity in the depletion rates of inherited wealth by both the size of pre-inheritance wealth and inheritance amounts, which leads to their main finding that inheritances can increase wealth inequality in the long-run. Using their words, this result "calls for a nontraditional form of inheritance taxation that is progressive in terms of both the inheritance amount and pre-inheritance wealth".[20] The influence function approach illustrated here implicitly accommodates such more complex forms of taxation that jointly consider the value of transfers received and the existing levels of wealth since the sign of the influence function value on average depends on the size of transfers in connection with the level of total wealth holding of the recipient (e.g., individuals with a large influence can be individuals that combine both large transfers and high non-transfer wealth).

[19] Atkinson (2015) proposed again to reform the current UK proportional tax on total wealth left at death into a progressive 'lifetime capital receipts tax', Before him, James Meade, made a similar proposal: "Every gift or legacy received by any one individual would be recorded in a register against his name for tax purposes. He would then be taxed when he received any gift or bequest... according to the size of the total amount which he had received over the whole of his life by way of gift and inheritance. The rate of tax would be on a progressive scale according to the total of gifts or bequests recorded against his name in the tax register." (Meade, 1964, quotation through Atkinson, 1972)

[20] Conditioning the tax liability to both individual inheritance, gift, or bequest from one person and to the existing level of wealth of the recipient was already proposed in Meade (1964), to encourage the diffusion of wealth to those who one relatively little. However, as noticed in Atkinson (1972), this form of taxation may be particularly difficult to administer as it would "involve the valuation of the wealth of each beneficiary each time that a transfer was made, which means considerable administrative problems and expense." (p. 169), especially in the absence of a recurrent wealth tax.

6 Relationship to alternative empirical approaches

In the approach used in this paper, the observed wealth distribution is compared to what one would expect to see if there were marginally more wealth transfer recipients, ceteris paribus. This provides a clear marginal counterfactual in assessing potential transfer impacts on inequality. This strategy is a form of 'association' approach which assesses the relationship between current wealth and the cumulative transfers received. Implications for inequality are derived by focusing on the relationship between past transfers and the influence of (current) wealth on (current) inequality. Embedded in a regression framework, this strategy has the advantage of allowing assessment of transfers of different sizes, and for introducing controls for potential confounding factors. However, this is also an interpretation of transfer impacts that differs from the existing literature (which we thoroughly review in the online Appendix A).

Much of the existing empirical literature has used what we call 'ascription' approaches. These are based on simulations or decomposition properties of inequality indices, which require one to quantitatively determine the share of a household's total wealth that can be ascribed to some past wealth transfers. Any given (current) wealth W_i is described as the sum of A_i due to 'accumulation' and savings and T_i linked to the receipt of wealth transfers (Crawford & Hood, 2016; Karagiannaki, 2017; Wolff, 2015; Wolff & Gittleman, 2014). Nolan et al. (2021) apply an 'ascription' approach and present decompositions of the Gini coefficient for the household wealth surveys examined using a classic Lerman-Yitzhaki decomposition of wealth into its two components. As shown in Stark et al. (1986), such decompositions can be used to derive an elasticity for the effect on wealth inequality of a marginal change in the aggregate *size* of transfers (holding its relative distribution constant) – whereas the influence function approach captures the effect of a marginal change in the *share* of transfer recipients. Table in online Appendix A reproduces estimates of Nolan et al. (2021) for the terms of a Gini decomposition and the estimated Lerman-Yitzhaki elasticity based on our data.

A more recent wave of studies has exploited administrative data on wealth and wealth transfers and quasi-experimental settings to estimate the causal effect of wealth transfers on wealth distribution. These studies use richer data on the history of both transfers and wealth to 'control' distributions of equivalent non-recipients and do not rely on ascribed past transfers nor a reconstructed pre-transfer distribution of wealth (Boserup et al., 2016; Elinder et al., 2018). Although different in methodology, these studies also find that inheritances reduce wealth inequality. Nekoei and Seim (2022), however, finds with Swedish data over a longer period that this effect is short-lived and that this immediate inequality-reducing effect of a transfer does not last as wealthy heirs deplete their inherited wealth at a much lower rate compared to less wealthy heirs.

On the measurement side, Nekoei and Seim (2022) derived analytical conditions for wealth transfers to reduce wealth inequality when the latter is measured as wealth share of the top θ group. In this setting, inheritances decrease wealth inequality when inheritance inequality is lower than initial wealth inequality and when mobility is sufficiently low. We show in the online supplementary material how one can generalise Nekoei and Seim's framework within a Lorenz setting and obtain conditions applying to Gini coefficients and concentration indices (online Appendix A). These conditions turn out to be closely related to that derived from the elasticity condition within the Lerman-Yitzhaki decomposition framework: what is assessed is the impact on inequality of a change in the size of transfers holding its distribution constant and the conditions under which this is inequality-reducing.

Further discussion in online supplementary material also highlights the empirical connections between the influence function approach and other approaches. In particular, it is shown that, although the influence function regression approach is seemingly similar to Gini decomposition and to (modified) Nekoei-Seim conditions, these exploit different empirical aspects of the relationship between wealth and transfers.

7 Conclusions

We use influence function regression to design a novel strategy to examine how wealth transfers affect wealth distribution, and use it to derive potential guidance for the design of inheritance tax schedules. In essence, the (observed) wealth distribution is compared with what one would expect to see if there were marginally more wealth transfer recipients, and recipients of transfers of different sizes.

We apply this framework in a comparative investigation of the role that receipt of inter-generational wealth transfers plays in influencing wealth inequality in six large rich countries, Germany, Spain, France, Italy, Great Britain, and the United States. While a number of recent studies see inheritance as equalising rather than disequalising, the 'no transfers' counterfactual implicit in previous prominent approaches may not be the most relevant reference point. Here, by contrast, we employ influence function regressions to estimate the impact on wealth inequality of a marginal increase in the proportion of recipients of transfers of differing sizes. This allows to assess heterogeneity in the impact and, ultimately, to estimate a threshold from which inheritances become disequalising in each country studied.

The results suggest that, in all countries examined, having more recipients of small or medium-sized inter-generational transfers would be expected to reduce wealth inequality modestly, as it would to generally have more recipients without discriminating by size. This reflects the fact that recipients are in general more concentrated around the middle of the wealth distribution than non-recipients. In contrast, however, an increase in the proportion of recipients of large transfers – above the 95th percentile of the transfers distribution – is seen to increase overall wealth inequality, reflecting the fact that those recipients are concentrated around the top of the wealth distribution. This result is robust to both the use of the Gini coefficient and the Top 5 to Bottom 95 wealth share ratio. We find that accounting for the potential confounding effect of age has negligible impact and the results hold when conditioning the regression by age groups to address the possible connection with the life-cycle.

The analysis finally helps determine for each country the threshold above which transfers become disequalising for the wealth distribution and we compare these thresholds to the existing estate or inheritance tax exemption thresholds in place each country's tax schedules. We find that transfers above the ninety-fifth percentile of the national transfer distribution are generally associated with an increasing effect on wealth inequality. Such thresholds are relatively close to actual tax exemption thresholds in Britain and Germany, while they are somewhat higher in France and Spain and much lower in Italy and the United States. The results substantiate and provide further justification to the design of recipient-based inheritance tax schemes that exempt small and medium-sized inheritances and preserve a progressive taxation structure above the disequalising thresholds for inheritance tax to address growing concerns about wealth inequality.

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