



# Inheritance and wealth inequality: Evidence from population registers

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## ABSTRACT

This paper uses population register data on inheritances and wealth in Sweden to estimate the causal impact of inheritances on wealth inequality. We find that inheritances reduce wealth inequality, as measured by the Gini coefficient or top wealth shares, but that they increase absolute dispersion. This duality in effects stems from the fact that even though richer heirs inherit larger amounts, the relative importance of the inheritance is larger for less wealthy heirs, who inherit more relative to their pre-inheritance wealth. This is in part driven by the fact that heirs do not inherit debts, which makes the distribution of inheritances more equal than the distribution of wealth among the heirs. Behavioral adjustments seem to mitigate the equalizing effect of inheritances, possibly through higher consumption among the poorer heirs. Inheritance taxation counteracts the equalizing inheritance effect, but redistribution of inheritance tax revenues can reverse this result and make the inheritance tax equalizing. Finally, we also find that inheritances increase intragenerational wealth mobility, but the effect is short-lived.

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## 1. Introduction

The evolution of wealth inequality and its determinants have received tremendous attention in recent years. After decades of decreasing or relatively low levels of wealth inequality throughout the Western world, wealth inequality may now be on the rise.<sup>1</sup> A small but growing body of research has also shown that the importance of inherited wealth has increased recently (Piketty, 2011; Ohlsson et al., 2014). If wealthy children inherit from wealthy parents and inheritances therefore primarily benefit a small elite, there may be a link between increased inheritance flows and increased inequality in the wealth distribution.

In this paper, we investigate the impact of inheritances on the distribution of wealth. Although we are not the first to address this issue, it is

fair to say that a consensus has not been reached in the literature about whether inheritances increase or decrease wealth inequality. To the best of our knowledge, we are, however, the first to use population-wide individual-level data on both inheritances and wealth to estimate the causal effects of inheritances and characterize the underlying mechanisms. We also contribute by studying the impact of inheritances on wealth mobility and the ways in which inheritance taxation influences wealth inequality.

At our disposal is a new population-wide database that contains detailed individual-level information about the estates and bequests of all Swedes who passed away during the 2002–2004 period. Our analysis is based on 168,000 decedents, and of all their family and non-family heirs, comprising 475,000 individuals. The panel dimension of the data allows us to follow heirs and their marketable net worth (which we will hereafter refer to as wealth) for several years—both before and after they inherit.

Our identification strategy relies on observing inheritances and wealth distributions for yearly cohorts of heirs. Two different causal effects are identified. First, we estimate a *direct mechanical effect* (DME), which captures the immediate impact of inheritances, and occurs before any behavioral responses (i.e., before heirs can consume the inheritance). Although we ideally want to evaluate this effect by comparing inequalities just before and just after heirs receive their inheritances, we come close to identifying this effect by comparing wealth inequality at the end of the year preceding the inheritance year, with a

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<sup>1</sup> Roine and Waldenström (2015) document long-run trends in wealth concentration throughout the Western world since the industrial era (see also Piketty and Zucman, 2015). In terms of recent developments, few countries offer consistent wealth inequality trends. For the United States, Saez and Zucman (2016) present evidence that suggests dramatic increases in wealth inequality (but the exact size and timing of the increase is discussed, e.g., by Kopczuk, 2015 and Bricker et al., 2015). For Sweden, Lundberg and Waldenström (2018) document modest increases in the years following the Great Recession.

measure of post-inheritance wealth inequality, obtained by adding the value of the inheritance to each heir's wealth in the year preceding the inheritance year.

The second effect, denoted the *behavior-adjusted effect* (BAE), shows that heirs may change their behaviors in response to their inheritances, e.g., by consuming or investing part of their inheritances or by working less. We identify this effect by using a difference-in-differences estimator, which compares pre-inheritance inequality with post-inheritance inequality across the three sequentially inheriting cohorts. Heirs who inherit one or two years later serve as the control group for those who inherit in a given year. Note that our focus on heirs only is not very restrictive because everyone will inherit at some point (although a zero amount in some cases).<sup>2</sup> This estimation strategy effectively removes biases stemming from macroeconomic events that might influence wealth inequality from one year to the next, as well as biases stemming from the aging of heirs. As pre-inheritance inequality trends are almost perfectly parallel across inheritance cohorts, we are confident in making a causal interpretation of the estimated effects.

Our main finding is that inheritances reduce relative wealth inequality. The direct mechanical effect works to reduce the Gini coefficient by approximately 7%. As a point of reference, this decline is about as large as the equalization following the dotcom crash in 2000, when the stock prices of internet companies, presumably owned by the rich, plummeted. Examining different parts of the wealth distribution, we find that the top decile's wealth share decreases substantially, whereas the wealth share of the bottom half increases from a negative to a positive share.

While inheritances reduce relative inequality, we find that they increase the absolute dispersion of wealth. This discrepancy between relative and absolute inheritance effects exists because, while wealthier heirs inherit larger amounts, less wealthy heirs receive much larger inheritances relative to their pre-inheritance wealth.

Behavioral adjustments appear to dilute the equalizing impact of inheritances. The behavior-adjusted effects are generally smaller than the direct mechanical effects; for example, the Gini coefficient falls by 4% rather than 7%. This equality-diluting effect is consistent with previous research showing that less wealthy heirs spend a larger share of their inherited wealth than wealthier heirs (Drue Dahl and Martinello, 2017).

We are also able to present the first register-based empirical estimates of how inheritance taxation affects wealth inequality, exploiting information about actual individual tax payments.<sup>3</sup> The results indicate that the inheritance tax *increases* wealth inequality, reflecting that less wealthy heirs pay more in taxes relative to their wealth than wealthier heirs do. Still, wealthier heirs pay higher inheritance taxes, but their tax payments are almost always negligible relative to their wealth. However, we show that the redistribution of inheritance tax revenues can reverse this result and make the inheritance tax equalizing.

Moreover, we estimate the effect of inheritances on wealth mobility. The welfare interpretation of our inequality results may partly depend on whether heirs switch places in the wealth distribution or retain their ranks after they inherit. We find that, overall, mobility rises substantially, with increased mobility across all parts of the wealth distribution.

A series of sensitivity checks suggest that our main findings are robust across several dimensions. First, they do not change when the observed wealth levels are adjusted for potential measurement errors in our wealth and inheritance data. Second, they do not seem to be driven by unobserved inter vivos gifts from wealthy decedents; if anything, adding estimated gifts strengthens the equalizing impact of

<sup>2</sup> Had we instead compared heirs with the entire population, that would have resulted in a control group containing a combination of individuals, some of which had already inherited and some who were still to inherit at some future point in time and we would have no possibility to know which one of these would be true in each case.

<sup>3</sup> Castañeda et al. (2003), Cagetti and De Nardi (2009) and Benhabib et al. (2011) calibrate dynamic models to evaluate the impact of the U.S. estate tax on income and wealth inequality.

inheritances. Third, only analyzing inheritances from parents to their children (and neglecting one-third of heirs with more distant family or non-family ties) has a negligible impact on our conclusions. Fourth, we study the importance of young heirs (40 and younger), who could be driving the results because they tend to have relatively little wealth and thus should be affected relatively more by inheriting. While inheritance effects are indeed substantially larger in this younger group, inheritance effects are also important among older heirs. Finally, we exploit parent-child correlations in wealth accumulation and sudden deaths to examine whether heirs adjust their saving behaviors in response to expectations about future inheritances. If such responses were quantitatively important, we would miss a relevant aspect of how inheritances influence the wealth distribution. However, we find no indications of their importance or influence in the data.

Our study contributes to the previous empirical literature on the distributional consequences of inherited wealth.<sup>4</sup> One group of studies uses simulation methods to model people's savings and giving behavior to calibrate synthetic wealth and inheritance distributions. A sweeping generalization is that these studies tend to find that inheritances constitute a major source of wealth inequality.<sup>5</sup>

Another group uses individual-level data on people's self-reported wealth and their receipt of gifts and inheritances. The seminal contributions of Wolff (2002, 2003, 2015) and Wolff and Gittleman (2014) use data from the Survey of Consumer Finances to estimate how gifts and inheritances influence the distribution of wealth in the United States. A consistent finding in these studies is that the rich inherit more than the less affluent, but that the rich inherit less relative to their existing wealth, causing inheritances to have an equalizing effect on the distribution of wealth. Similar equalizing effects of inheritances are found in survey data from the United Kingdom (Karagiannaki, 2015; Crawford and Hood, 2016), Japan (Horioka, 2009), Sweden (Klevmarken, 2004) and eight EU countries (Bönke et al., 2017).

In a study closely related to ours, Boserup et al. (2016) examine Danish individual-level tax register data on wealth to estimate the effect of inheritances on wealth inequality. The identification of the effect is based on following the wealth of children (45 to 50 years old) before and after the demise of their parents and then comparing this evolution to the wealth of similarly aged children whose parents did not pass away during the study period. The main findings are similar to ours, that is, inheritances cause an increase in the absolute dispersion of wealth and a decrease in the relative wealth inequality. They find larger equalizing effects than we do, although our studies cannot be directly compared with each other. While their approach has several similarities with our BAE analysis, our population is different from theirs in that it includes all adult heirs (not only children). The key difference, however, is that our data contain information about the value of their inheritances, which allows us to estimate the direct mechanical effect and dig deeper into how and why inheritances affect wealth inequality and mobility. It also allows us to study how inheritance taxation affects wealth inequality.<sup>6</sup>

The remainder of the paper is structured as follows. Section 2 presents the institutional context and the data. Section 3 presents our

<sup>4</sup> See Davies and Shorrocks (2000) and Wolff (2015, chapter 2) for reviews of this literature.

<sup>5</sup> A disequalizing effect of inheritances is in accordance with exchange models, which are predicated on the idea that the most supportive—and typically the most resourceful—heirs receive more transfers in exchange for their support of donors (Bernheim et al., 1985; Cox, 1987). Other models of intergenerational transfers emphasize the role of family patterns, e.g., assortative mating, fertility or estate division, and luck components, in distributional outcomes. Some of these models suggest that inheritances are equalizing (e.g., Laitner, 1979a, b; Gokhale et al., 2001), while others suggest a disequalizing impact of bequests (e.g., Atkinson, 1971; Blinder, 1973; Davies and Shorrocks, 1978; Davies, 1982; Davies and Kuhn, 1991; Greenwood and Wolff, 1992; De Nardi, 2004).

<sup>6</sup> In a recent paper using Swedish register-based microdata, Nekoei and Seim (2018) directly address how inheriting affects both consumption behavior and wealth inequality; and have reported that consumption responses may dilute the equalizing effects of inheritances in the long-run.

main findings. Section 4 explains how wealth mobility is influenced by inheritances, and Section 5 discusses the role of inheritance taxation. Section 6 discusses some implications of our findings.

## 2. Institutional context and data

In this section, we present the Swedish legislation regarding inheritances and inheritance taxation. Moreover, we provide descriptions of the data and the study population and discuss the various measures of wealth inequality that we use in the empirical analysis.

### 2.1. Inheritance legislation and taxation

In Sweden, when a person passes away, an estate inventory report should be filed with the tax agency, reporting the values of the decedent's assets and debts. If the decedent has a positive net worth, his or her estate is distributed to the heirs according to a succession scheme that is based on genetic relationships. The decedent's relatives are classified into three groups of legal heirs: children and their offspring, parents and their offspring (the decedent's siblings, nephews and nieces), and grandparents and their children (i.e., aunts and uncles).<sup>7</sup> Heirs in the second (third) group inherit only if there are no heirs in first (first or second) group. If the decedent has a spouse, the estate is transferred to him or her. If the spouses have common children, the surviving spouse receives what is referred to as free disposal of the estate, which means that the money could be spent but not bequeathed to others than the children. The common children receive the inheritance from the first deceased parent when the second parent passes away. The deceased's children who are not common with the surviving spouse will, on the other, hand inherit immediately when their parent passes away.

The default succession scheme can be set aside by a will, but children are always entitled to half of what they would inherit in the case of intestacy, i.e., in the absence of a will. It should be noted also that heirs do not inherit any debts that the decedents may have at the time of death.

Inheritance and gift taxes existed in Sweden until their abolishment by the end of 2004.<sup>8</sup> In the early 2000s, inheritances exceeding SEK 70,000 (approximately USD 11,000)<sup>9</sup> were taxed according to a progressive three-bracket schedule, with marginal tax rates ranging from 10% (paid by heirs who inherited amounts approximately between the 70th and the 90th percentiles in the inheritance distribution) to 30% in the highest bracket on inheritances over SEK 600,000 (USD 91,000, paid by, approximately, the top 2%).<sup>10</sup> All inherited assets were taxable, but important concessions were made to keep the effective tax down on certain assets, especially firm equity (see also Ohlsson, 2011 and Henrekson and Waldenström, 2016).

### 2.2. Data and study population

Our main data source is a population-wide register called Belinda. It originates from the Swedish Tax Agency and contains detailed accounts of the estates of, and inheritances, from all individuals who passed away in 2002–2004 and all of their biological and non-biological heirs. Data are available from this period because the tax agency was obliged to electronically codify all estate reports starting in July 2001, but this obligation was suspended in 2005 when the inheritance tax had been abolished. To these data, we have added information from other administrative registers, primarily those covering personal wealth but also

other relevant economic and demographic characteristics for both the decedents and their heirs.

In particular, the information about *decedents* in Belinda includes the net worth at death and its main components (total assets and total debts), the value of the estate, a list of heirs, special rules that apply to the estate and the bequests (e.g., will, prenuptial agreement, and life insurance policy) and personal details (e.g., identity number, marital status, and death date).

The information about *heirs* in Belinda includes the value of their received inheritance, inheritance tax payments (if any), the taxable gifts received over the past ten years, the receipt of life insurance payments from the deceased and personal details (e.g., identity number and relationship to the decedent). Inheritances from a previous decedent (e.g., a late spouse), which the current decedent possessed with free disposal, are divided between the previous decedent's heirs, and the amounts are listed separately in the database.

We define *inheritance* as the total net-of-tax value of inheritances and any insurance received from the decedent (unless it is explicitly stated to be the before-tax inheritance). For heirs who receive two inheritances when the decedent passes away (typically a child who receives one inheritance from the recently deceased parent and one from a previously deceased parent), we define the inheritance as the total sum of these transfers (plus any insurance payments from the two decedents, net of tax). It should be noted that the estates and inheritances observed in the data are reported at tax values, which are sometimes lower than the market values. For instance, real estate was valued at the tax-assessed value, intended to correspond to approximately 75% of the market value. In the main analyses, we use the amounts as given in the database but, in robustness tests, we investigate how the results change when we attempt to adjust the inheritance values to their market values.

We define heirs as individuals who live in Sweden and receive an inheritance through the succession order, are beneficiaries of a will, or are beneficiaries of a life insurance policy. We focus on the final estate division of a household and, therefore, do not include heirs who were the spouse or partner of the decedent in our study population. We further restrict our attention to heirs who were at least 18 years old in the year when the decedent passed away because inheritances received by minors fall under the protection of a guardian and are, in practice, controlled by the parents.<sup>11</sup>

A key feature of our analysis is our classification of heirs into *inheritance cohorts* according to the year when the deceased passed away. We thus have three inheritance cohorts: 2002, 2003 and 2004, covering a total of 475,120 heirs connected to 168,055 decedents.

Wealth data are collected from the wealth register of Statistics Sweden, which is available for the 1999–2007 period, i.e., several years before and after the 2002–2004 inheritance years. The wealth register contains detailed accounts of real and financial assets and debts, all recorded in market values at each year's end, for all individuals in the population. We focus on private net worth, which is the market value of real and financial assets less all debts. Specifically, on the asset side, the wealth portfolios comprise non-financial assets (owner-occupied housing, secondary homes, land, agricultural property, commercial real estate, etc.) and financial assets (bank deposits, listed stocks and bonds, mutual funds and other financial securities). Debts are mainly mortgage loans and state-subsidized loans for higher education. The wealth data are particularly advantageous because the bulk of the records come from third-party reports to the tax agency by financial institutions. The wealth register has limited information about some assets. The register does not cover funded pension assets. In addition, closely held corporations are incompletely covered, and compared

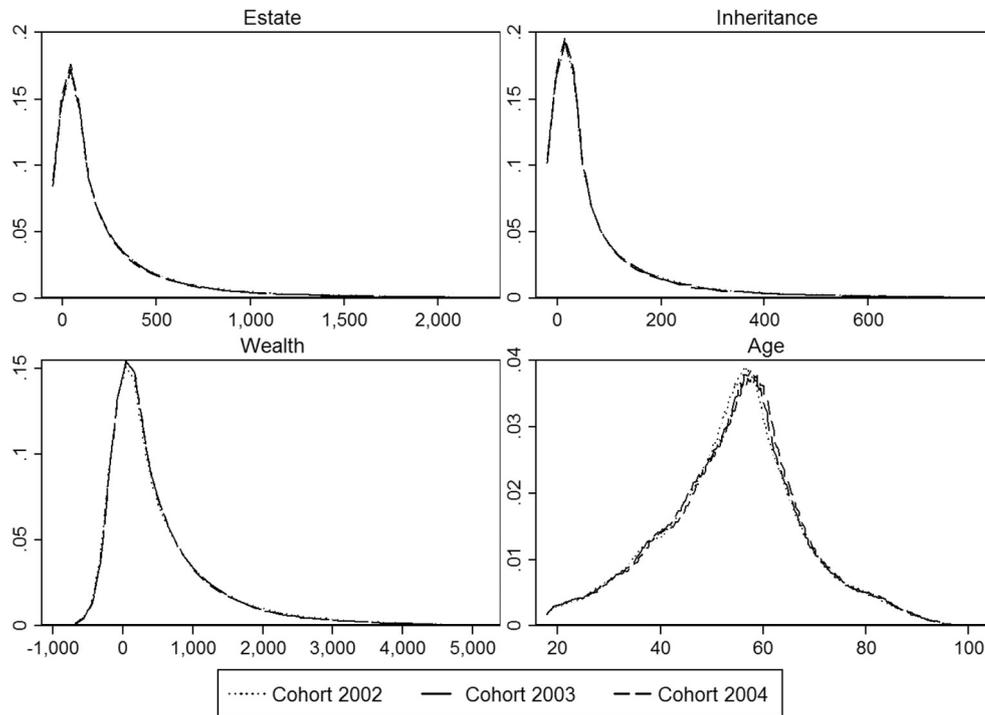
<sup>7</sup> Cousins do not inherit according to the inheritance law. If there are no legal heirs in these three groups, no spouse, and no will, the estate will go to a public fund: the Swedish Inheritance Fund.

<sup>8</sup> The inheritance tax had been criticized for complicating the succession of family firms and for generating unreasonably large tax payments for widows.

<sup>9</sup> Using the exchange rate as of Dec. 30, 2004: 6.6 SEK/USD.

<sup>10</sup> For a comparison of inheritance and estate taxes between countries, see Cremer and Pestieau (2011).

<sup>11</sup> Moreover, from the study population we drop individuals for which we lack inheritance data or a personal identity number, in total 16% of the population. See Online Appendix A for further details about the selection of the study population and the analysis sample.



**Fig. 1.** The estate, inheritance, wealth, and age distributions. Estates, inheritances and wealth are presented in SEK 1000 in 2003 constant prices. The distribution graphs of estates are calculated for the decedents (168,055) and the other graphs are calculated for the heirs (475,120). The top percentile is excluded in the estate and inheritance distribution graphs. The top and bottom percentiles are excluded in the wealth distribution graph. The bandwidths used in the estate, inheritance, and wealth graphs are SEK 50,000, 20,000 and 150,000, respectively. The reported densities (vertical axes) are scaled with the bandwidths.

with estimates of their aggregate value reported in the Financial Accounts, only about one tenth is accounted for in the wealth register. While these limitations are unfortunate, even when these assets are observed, e.g., in surveys, they are notoriously difficult to value and are, moreover, not always fully marketable. Moreover, consumer durables are not well covered by the wealth register. This may be problematic for an analysis of distributional consequences of inheritances since these goods can be important, not least in relative terms in less wealthy households.<sup>12</sup> In the robustness analyses we, therefore, attempt to assess how sensitive our results are to the undervaluation of consumer durables by approximating the value of these goods using, e.g., estimated car values.

Despite some shortcomings, it should be noted that our wealth data are the same ones as those used in the international wealth data project, the Luxemburg Wealth Study (see [Sierminska et al., 2006](#)).

### 2.3. Descriptive statistics

This study offers the first comprehensive view of the distribution of estates and inheritances in a population-wide register (see [Fig. 1](#)).<sup>13</sup> First, we observe that the distribution of the decedents' estates is highly skewed, as most of the mass is located in the left tail and 17% of the estates have zero value. The median value is just over SEK 93,000 (approximately USD 14,000), the mean is approximately SEK 264,000 (USD 40,000) and the 99th percentile of estates is approximately SEK 2.2 million (USD 330,000). The top percentile share accounts for 19% of the total estate wealth, and the top decile accounts for 55%, which are levels that are consistent with those of previous wealth distribution studies ([Roine and Waldenström, 2009](#)). Second, the distribution of the

inheritances that the heirs receive is similar to that of the estates—skewed, with 19% of the heirs inheriting nothing at all; the top tenth of inheritances represent 56% of the total inherited wealth. Third, the graph in the lower left-hand corner displays the wealth distributions in the year before inheritance ( $T - 1$ ) for each inheritance cohort. These distributions are nearly identical across the cohorts, highly skewed (with Gini coefficients of approximately 0.8, as examined further in the next section) and show that a non-negligible fraction of the heirs have zero<sup>14</sup> or close to zero wealth. Finally, the figure displays the heirs' age distribution. A slight majority of the heirs (56%) are between 50 and 70 years old.

[Table 1](#) presents additional descriptive statistics. The inheritance cohorts are nearly identical in all dimensions, which is also expected, as they comprise essentially the entire population of inheriting individuals for each year.<sup>15</sup> The average wealth of the heirs one year prior to the inheritance year varies somewhat across cohorts. This variation likely reflects annual differences in macroeconomic conditions, particularly stock market and housing price changes. The bottom panel of the table shows statistics for the decedents. Similar to the statistics for the heirs, the differences are very small, and we thus conclude that the inheritance cohorts are also similar in terms of the characteristics of the donors.

### 2.4. Measuring wealth inequality

The measurement of wealth inequality is somewhat more complex than the measurement of, for instance, income inequality because some individuals have negative wealth (i.e., when debts are larger than assets). Therefore, we conduct our analyses using various unidimensional inequality measures that are defined for variables containing

<sup>12</sup> Consumer durables amounted to approximately 10% of total household assets in Sweden in the early 2000s ([Waldenström, 2016](#)).

<sup>13</sup> See [Elinder et al. \(2014\)](#) for a more comprehensive description of Belinda and details on estates and inheritances in Sweden.

<sup>14</sup> 3% have exactly zero wealth.

<sup>15</sup> In [Online Appendix B.1, Table B1](#), we display comparisons of the heir-decedents relationships for the three cohorts.

**Table 1**  
Comparison of cohort means for economic and demographic variables.

	Inheritance cohort		
	2002	2003	2004
<i>Characteristics of heirs</i>			
Age at inheritance	54.0	54.1	54.4
Child of the decedent (%)	58.8	59.5	57.7
Woman (%)	50.6	50.4	50.7
Married (%)	53.3	52.7	52.2
Upper secondary or post-graduate degree (%)	24.7	25.5	25.6
Taxable labor income	224,600	228,800	230,900
Wealth $T - 1$	643,900	593,500	627,700
Gross inheritance	94,600	96,100	101,400
Net inheritance	83,600	85,300	89,500
Paying inheritance tax (%)	35.8	36.4	37.6
Received taxable gifts (%)	2.0	2.0	2.1
Taxable gifts	2800	3000	3000
<i>Characteristics of decedents</i>			
Age	80.9	80.7	81.0
Woman (%)	61.2	60.3	61.0
Marital status			
Widow/widower (%)	60.3	59.5	60.5
Never married (%)	17.0	17.1	17.3
Divorced (%)	17.0	17.7	18.0
Number of heirs	2.81	2.80	2.86
Number of children	1.65	1.67	1.65
Estate	263,300	257,100	273,700
Number of decedents	58,925	57,213	52,083
Number of heirs	165,641	160,387	149,092

Notes: All monetary values are measured in the year prior to the inheritance, and they are expressed in 2003 constant prices, rounded to nearest hundreds. Means of the decedents' characteristics are calculated over the number of decedents.

positive as well as negative values.<sup>16</sup> Our focus is on the Gini coefficient, which is the most widely used inequality measure. While the statistical properties of the Gini coefficient are fully intact when negative values exist, the normative interpretations from a certain level or trend may be less straightforward (e.g., How should the negative shares of a pie be distributed?). We complement the analysis with other unidimensional inequality measures that can handle negative values: top and bottom wealth shares, wealth percentile ratios, and a measure of absolute dispersion (the interquartile wealth range, and, in the Online Appendix, also the range between the 1st and 99th wealth percentiles, as well as the coefficient of variation).

### 3. The effect of inheriting on wealth inequality

We estimate two types of inheritance effects on wealth inequality among heirs: one direct mechanical and one behavior-adjusted. Conceptually, the direct mechanical effect (DME) represents the immediate distributional change that arises from adding the inherited amount to the heirs' pre-inheritance wealth. This is our main estimator of interest as it offers the clearest channel from inheritance to inequality change. The behavior-adjusted effect (BAE) accounts for behavioral responses among heirs, which reflect that receiving an inheritance may influence labor supply, consumption and investment decisions that, in turn, may affect wealth accumulation and inequality. The estimations of the two effects are performed both non-parametrically, showing how the distribution changes graphically, and for the different unidimensional measures of inequality.

We focus on heirs of all the decedents who passed away between 2002 and 2004. Focusing on heirs is a natural starting point for our study of the distributional consequences of inheritances because almost everyone inherits sooner or later in life, whether the inheritance is a tiny amount (or even zero) or a larger sum.

<sup>16</sup> The Theil and Atkinson indices are examples of inequality measures that cannot handle negative values. For more detailed discussions of inequality measures with negative values, see Cowell (2013) and OECD (2013, Ch. 7).

### 3.1. The direct mechanical inheritance effect

The DME captures how the wealth distribution among the heirs will change if the heirs save their entire inheritances and nothing else happens. To evaluate this effect, we would like to compare the inequality in the wealth distribution in the period just before the heirs inherit to the inequality in the distribution in the period just after the inheritance. Denoting the measure of the wealth distribution of interest  $D^W$  (e.g., the Gini coefficient), the time of the inheritance  $T$  and the length of time until the inheritance  $\varepsilon$ , the DME on  $D^W$  would be given by  $D_{T+\varepsilon}^W - D_{T-\varepsilon}^W$ . To estimate the DME using this strategy,  $\varepsilon$  would need to be extremely small (e.g., one day) to avoid the influence of behavioral responses. However, we do not know the exact date when heirs received their inheritances (only the date when the decedents passed away), and we only observe their wealth on December 31 of each year. Comparing wealth distributions in the years before and after inheritance is clearly a too long time span to identify the DME because behavioral responses and changes in macroeconomic conditions may confound the estimates.

Instead, we will estimate the DME by comparing inequality in the wealth distribution one year prior to the inheritance with a measure of wealth inequality that is obtained by adding the value of the inheritance (received in year  $T$ ) to each heir's wealth in the year before the inheritance. In terms of notation, we will estimate DME as follows:

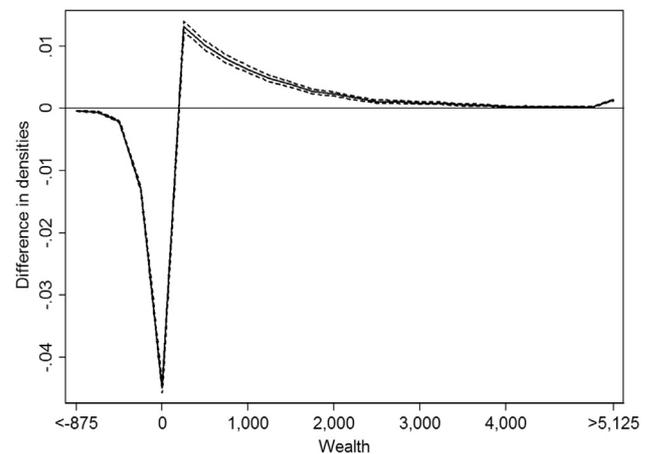
$$DME = D_{T-1}^{W+I} - D_{T-1}^W, \tag{1}$$

where  $D_{T-1}^W$  is the measure of wealth distribution in the year prior to the inheritance, and  $D_{T-1}^{W+I}$  is the same distributional measure that is calculated for the distribution of the sum of wealth (in  $T - 1$ ) and the inheritance  $I$ .

To examine the statistical robustness of the effect, we compute standard errors by bootstrapping the estimates using 1000 repetitions. The standard errors are typically very small, reflecting both that the DMEs are mechanical in nature, without any stochastic element, and the large size of the dataset.

#### 3.1.1. Estimation results: direct mechanical effect

We start by presenting a non-parametric estimation of the DME, which evaluates how the density distribution of wealth changes as a consequence of inheritances. Fig. 2 shows how the wealth distribution changes at different wealth levels when we add each heir's inheritance to his or her pre-inheritance wealth. Clearly, a pronounced drop in



**Fig. 2.** Non-parametrical illustration of the DME on the wealth distribution. The graph (solid) displays the difference in densities (using bins of SEK 250,000) between the distributions in  $T - 1$  of wealth and of wealth plus inheritances, i.e.,  $D_{T-1}^{W+I} - D_{T-1}^W$ . The estimates are based on data on 475,120 heirs (2002–2004 cohorts). The confidence bands (dashed) are based on bootstrapped standard errors (1000 repetitions). Wealth (SEK 1000) is presented in 2003 constant prices.

**Table 2**  
DME on wealth inequality.

Outcome	(1)	(2)	(3)	(4)	(5)
	Gini	P90/P50	Top 10%	Bottom 50%	P75–P25
<i>Panel A: analysis sample</i>					
Inheritance effect	−0.056*** (0.0004)	−1.122*** (0.014)	−0.036*** (0.0004)	0.035*** (0.0004)	63,822*** (995)
Mean of outcome	0.804	6.665	0.559	−0.015	767,262
<i>T</i> − 1					
Effect in %	−7	−17	−6	.	8
<i>Panel B: children only sample</i>					
Inheritance effect	−0.062*** (0.001)	−1.303*** (0.023)	−0.041*** (0.001)	0.038*** (0.001)	87,607*** (1416)
Mean of outcome	0.823	6.913	0.577	−0.024	773,970
<i>T</i> − 1					
Effect in %	−8	−19	−7	.	11

Notes: The estimates in panel A are based on data on 475,120 heirs (2002–2004 cohorts) and estimates in panel B are based on data on 278,781 children heirs (2002–2004 cohorts). Bootstrapped standard errors are presented in parentheses (1000 repetitions). \* significant at the 10% level, \*\* significant at the 5% level, \*\*\* significant at the 1% level. *Effect in %* is calculated as (*Inheritance effect* / *Mean of outcome T* − 1) × 100.

density occurs around zero wealth, and a sizable increase in density occurs at moderate wealth levels. Thus, heirs with zero (or almost zero) wealth move up in the distribution after having received inheritances. By contrast, no changes appear at very low (negative) and very high wealth levels. In these segments, the densities are similar both before and after inheritance, and the differences in the graph are accordingly quite close to the zero line. In other words, adding inheritances to the heirs' pre-inheritance wealth has the largest influence, quantitatively, on the middle parts of the wealth distribution, whereas the tails are nearly unaffected.

We now shift focus to estimate the DME on unidimensional measures of wealth inequality. We seek to quantify the distributional effects of inheritance in terms of standard measures of inequality, which, in turn, facilitates comparisons with other factors and events that affect the wealth distribution.

Panel A of Table 2 presents the DME on five unidimensional measures of inequality that were discussed in Section 2.4.<sup>17</sup> The estimated effects with respect to these measures mirror the pattern displayed in Fig. 2. First, we see that the relative inequality decreases. The Gini coefficient falls from 0.804 to 0.748 (averaged over the three inheritance cohorts), corresponding to a reduction of 7% – a substantial equalization effect. For example, this drop in the Gini coefficient is larger than that following the dotcom bubble in 2000, when stock prices fell sharply, affecting primarily stockholders (who are typically in the top of the distribution).

Similar results, showing an equalizing effect, are found for the other measures of relative inequality. The wealth percentile ratio P90/P50 falls quite substantially—by approximately 17%. The wealth share of the top decile also falls, from 55.9 to 52.3% (a 7% drop), while the wealth share of the bottom half of the distribution actually increases from minus 1.5% to plus 2%.

Interestingly, the measure of absolute dispersion, the wealth percentile gap P75–P25, increases by 8%, which confirms the pattern of a high correlation of wealth across generations, in general, and between the heirs' wealth and inheritance amounts in particular.

In summary, the results with respect to the DME indicate that inheritances equalize the wealth distribution of heirs, an effect that is consistent across both non-parametric estimation of the change in distribution and a range of well-known wealth inequality measures. In addition, the data confirm the conventionally held view that richer

**Table 3**  
Robustness tests and additional results.

Outcome	(1)	(2)	(3)	(4)	(5)
	Gini	P90/P50	Top 10%	Bottom 50%	P75–P25
<i>Panel A: excluding young heirs</i>					
Inheritance effect	−0.048***	−0.712***	−0.030***	0.030***	54,562***
Effect %	−6.3	−12.7	−5.7	.	−6.5
<i>Panel B: including minors</i>					
Inheritance effect	−0.057***	−1.241***	−0.037***	0.035***	66,597***
Effect %	−7.1	−17.9	−6.5	.	8.9
<i>Panel C: adding consumer durables, approximation</i>					
Inheritance effect	−0.047***	−0.847***	−0.030***	0.029***	55,480***
Effect %	−6.1	−13.8	−5.6	.	6.4
<i>Panel D: adding consumer durables, car values</i>					
Inheritance effect	−0.051***	−0.890***	−0.032***	0.031***	58,013***
Effect %	−6.5	−14.6	−5.968	.	7.3
<i>Panel E: market value adjustment of inheritances</i>					
Inheritance effect	−0.065***	−1.310***	−0.041***	0.040***	91,070***
Effect %	−8.1	−19.6	−7.3	.	11.9
<i>Panel F: financial assets</i>					
Inheritance effect	−0.056***	−3.845***	−0.060***	0.027***	57,172***
Effect %	−7.1	−35.6	−9.5	.	26.7
<i>Panel G: real assets</i>					
Inheritance effect	−0.017***	−0.258***	−0.012***	0.013***	33,139***
Effect %	−2.4	−5.1	−2.5	.	4.4

Notes: The estimates in Panel A are based on data on 404,852 heirs (2002–2004 cohorts). The estimates in Panel B are based on data on 484,725 heirs (2002–2004 cohorts). The estimates in panels C–G are based on data on 475,120 heirs (2002–2004 cohorts). Bootstrapped standard errors are presented in parentheses (1000 repetitions). \* significant at the 10% level, \*\* significant at the 5% level, \*\*\* significant at the 1% level. *Effect in %* is calculated as (*Inheritance effect* / *Mean of outcome T* − 1) × 100.

heirs inherit more than poorer heirs do, as indicated by the increased absolute dispersion of wealth.

Our results so far show the effect of inheritances on the wealth distribution among all heirs, not only the children of the decedents. To facilitate comparisons with previous studies focusing on children heirs, and to rule out the possibility that our results are driven by including all family and non-family heirs, panel B of Table 2 presents the DME estimates for a sample consisting only of the decedents' children. The point estimates indicate a slightly larger equalizing effect of inheritances and a larger increase in the absolute dispersion among the children-heirs, but the differences between the two samples are small. We, thus, conclude that the choice of including or excluding heirs other than the children of the decedents is not important for our main conclusion that inheritances decrease relative inequality and increase absolute dispersion.

In Table 3, we present results from several additional robustness tests. We show that the equalizing effects are more pronounced among the younger (and less wealthy) heirs, but still important across all ages and that our results are robust to the inclusion of heirs younger than 18 years, at the time of the inheritance (see panels A and B, and Online Appendix B.2.1 for details).<sup>18</sup> Moreover, we perform several tests intended to assess how sensitive our results are to alternative measurements of wealth and inheritance measures. These tests show first, that the underreporting of consumer durables in our main wealth measures and, second, that using inheritances at market values (rather than at tax values as recorded in the data), have a minimal impact on our results (see panels C–E, and Online Appendices B.2.2 and B.2.3 for details). Finally, we dig deeper into how inheritance of financial and real assets affect inequality in the distributions of financial and real assets (see panels F and G, and Online Appendix B.2.4 for details). Since financial

<sup>17</sup> In Online Appendix B, Table B2 (Panel 1), it is shown that the DMEs for additional unidimensional (wealth share of top 1%, P99/P50, coefficient of variation (CV) and P1–P99) display patterns that are akin to the DMEs for the five main measures.

<sup>18</sup> The available evidence regarding life-cycle wealth profiles in Sweden confirms that people generally have little wealth before they enter their 40s (see, e.g., for Sweden, Ohlsson et al., 2014), which is also true in our population of heirs.

assets are more liquid than real assets, inheritances containing more real estate will affect consumption possibilities in the short run less than inheritances containing more financial assets. We find that inheritances reduce inequality in both financial and real estate assets, but that the effect is more pronounced for financial assets. This follows, as we show in Fig. B1, from the fact that inheritances typically contain equal amounts of real and financial assets and that a large fraction of heirs own real estate while only relatively few (but rich) had substantial amounts in financial assets.

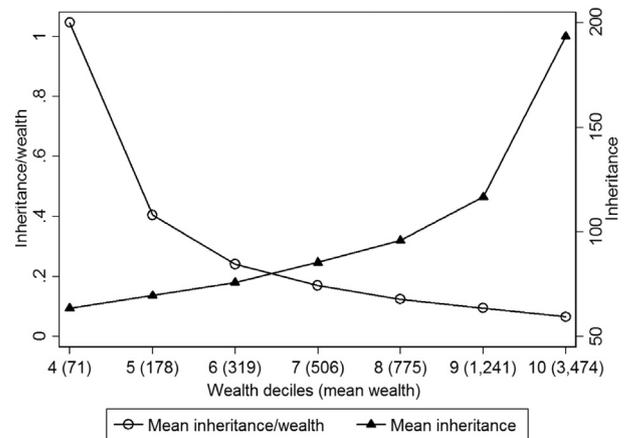
### 3.1.2. How can the equalizing effect be explained?

The result that inheritances lead to lower relative wealth inequality is explained by the distribution of inheritances being more equal than the distribution of wealth among the heirs. If the distribution of wealth of decedents is more equal than the distribution of wealth among heirs and all decedents split their wealth equally between their children and have the same number of children, then the distribution of inheritances will also be more equal than the distribution of wealth among the heirs. These conditions appear to be met in our data. The Gini coefficient for the distribution of wealth among the decedents (in the year before the demise) is 0.76 and the Gini coefficient for the distribution of inheritances (net of taxes) is 0.73, while the Gini of the wealth distribution among the heirs (in the year before inheriting) is 0.80. Because wealth is positively correlated across generations (see, e.g., Charles and Hurst, 2003),<sup>19</sup> wealthier heirs receive larger inheritances in absolute amounts, but because the distribution of inheritances is more equal than the distribution of wealth among heirs, less wealthy heirs will inherit more relative to the wealth they already hold prior to receiving the inheritance.

Fig. 3 shows how the inherited amounts vary with the wealth of heirs. Looking first at absolute amounts (right axis), we see that wealthier heirs inherit more money.<sup>20</sup> For example, heirs in the fourth wealth decile (ranked before inheriting) receive inheritances worth, on average, SEK 64,000, whereas heirs in the top decile inherited, on average, SEK 193,000. Thus, there is a positive association between the heirs' wealth and the amount inherited, which explains why absolute dispersion increases. When looking at the relative importance of inheritances instead, dividing inheritances by the heirs' wealth, the pattern is reversed. Heirs in the fourth wealth decile receive inheritances that are larger than their own wealth, whereas heirs in the top decile receive inheritances worth only one twentieth of their wealth. This pattern explains the decrease in relative wealth inequality among heirs. Relatively poor heirs often inherit amounts that are large relative to their own wealth, while this is typically not the case for richer heirs.

The equalizing effect can be explained solely by the distribution of wealth among the decedents being more equal than the distribution of wealth among the heirs. Any factor affecting wealth accumulation processes among the donor generation and the heir generation may thus affect how inheritances affect the wealth distribution among heirs.<sup>21</sup> Still, inheritances appears to be more equally distributed than the wealth of the decedents, which then contributes to the equalizing effect we find. Several mechanisms may be responsible for why the distribution of inheritances is more equal than the distribution of wealth among the decedents. Below, we address the importance of five such mechanisms.

First, if wealthier decedents have more children, their estates will be distributed among more lots, causing each child to inherit less than he



**Fig. 3.** Absolute and relative sizes of inheritance by pre-inheritance wealth decile. Wealth (SEK 1000) and inheritance (SEK 1000) are presented in 2003 constant prices for the 2002–2004 cohorts. Wealth deciles 1–3 are omitted because of negative wealth values. Mean wealth and mean inheritance for deciles 1–3 are SEK–115,000 and SEK 53,000, respectively.

or she would have done had there been fewer children.<sup>22</sup> However, we find no support for this mechanism. In particular, richer decedents do not have more children than less wealthy decedents and variation in the number of children has no important impact on the results. See panel A in Table 4, and Online Appendix B.3.1 for details.

Second, if wealthier decedents bequeath a disproportionately larger share of their wealth to charities, the heirs would inherit less than they would have done in the absence of charitable bequests. In our data, we see that wealthier decedents indeed bequeath a larger fraction of their estate to charities. This is in line with the literature on charitable contributions at death (see, e.g., Joulfaian, 2001).<sup>23</sup> However, even among the wealthiest decedents, only 2.5% of the estate goes to charity. Moreover, a counterfactual analysis, in which we redistribute the charitable bequests to the heirs, produces DMEs that are essentially identical to the main ones. We are therefore confident that charitable bequests among the rich are not the driver behind the finding that inheritances lead to lower relative inequality. See panel B in Table 4, and Online Appendix B.3.2 for details.

Third, if wealthier decedents circumvent the default succession rules by writing wills stating that part of their wealth should go to individuals outside the succession order, each heir would inherit less than he or she would have done in the case of intestacy. We address the relevance of this mechanism by calculating the hypothetical inheritance each child would receive in the absence of wills. The DMEs from this counterfactual exercise are largely similar to the main results, suggesting that the equalizing effect cannot be explained by richer decedents' preferences for distributing their wealth among more heirs. The results also suggest that the limited freedom to testate in the Swedish and Roman inheritance law tradition (Pestieau, 2003) is not the driver of the equalizing effect. See panel C in Table 4, and Online Appendix B.3.3 for details.

Fourth, intergenerational transfers consist of both inheritances at death and gifts that the decedents give to their heirs during their lifetime, i.e., inter vivos. If substantial amounts were transferred during the years just prior to the inheritance, the interpretation of our results

<sup>19</sup> The correlation between donors' wealth and heirs' wealth (both measured in T-1) is 0.2 in the Analysis sample and 0.4 in the Children sample. We also illustrate the positive relationship between heirs' wealth and decedents' estate wealth in Figure B2.

<sup>20</sup> The first three deciles are omitted because wealth is negative, which would confound the illustration of inheritance to wealth ratios.

<sup>21</sup> Fundamentally, this boils down to factors affecting disposable income and savings, like income growth and the design of tax and transfer systems.

<sup>22</sup> A standard implication of any model of intergenerational transfers is that the degree of equalization increases with the number of children (see, e.g., Stiglitz, 1969; Atkinson and Harrison, 1978), and, if wealthy decedents have more children, inheritances seemingly have an equalizing effect.

<sup>23</sup> A growing stream of literature is studying end of life charitable giving (see e.g., James, 2009 and Meer and Rosen, 2013).

**Table 4**  
Counterfactual tests.

Outcome	(1)	(2)	(3)	(4)	(5)
	Gini	P90/P50	Top 10%	Bottom 50%	P75–P25
<i>Panel A: imposing equal number of children per estate</i>					
Inheritance effect	−0.059***	−1.135***	−0.038***	0.037***	62,487***
Effect %	−7.5	−17.9	−6.8	.	7.2
<i>Panel B: distributing charitable bequests among heirs</i>					
Inheritance effect	−0.057***	−1.128***	−0.036***	0.035***	64,948***
Effect %	−7.1	−16.9	−6.5	.	8.5
<i>Panel C: ignoring wills</i>					
Inheritance effect	−0.058***	−1.306***	−0.031***	0.038***	91,405***
Effect %	−7.1	−18.9	−5.3	.	11.8
<i>Panel D: gift adj. 1: observed gifts</i>					
Inheritance effect	−0.058***	−1.130***	−0.037***	0.036***	66,925***
Effect %	−7.2	−16.9	−6.5	.	8.8
<i>Panel E: gift adj. 2: 20%</i>					
Inheritance effect	−0.075***	−1.442***	−0.047***	0.046***	82,274***
Effect %	−9.2	−20.6	−8.2	.	11.0
<i>Panel F: gift adj. 3: 50%</i>					
Inheritance effect	−0.111***	−1.988***	−0.065***	0.068***	100,324***
Effect %	−13.0	−26.4	−11.1	.	13.7
<i>Panel G: gift adj. 4: imputed</i>					
Inheritance effect	−0.102***	−2.116***	−0.067***	0.070***	76,129***
Effect %	−12.0	−27.6	−11.3	.	10.1

Notes: Bootstrapped standard errors are presented in parentheses (1000 repetitions). \* significant at the 10% level, \*\* significant at the 5% level, \*\*\* significant at the 1% level. *Effect in %* is calculated as (*Inheritance effect* / *Mean of outcome T − 1*) × 100. The estimates in Panel A are based on the Children sample, 278,781 observations (2002–2004 cohorts). The estimates in Panel B are based on Analysis sample, 475,120 heirs (2002–2004 cohorts). The estimates in Panel C are based on the Children sample, 278,781 observations (2002–2004 cohorts). The estimates in panels D–G are based on the Analysis sample, 475,120 heirs (2002–2004 cohorts).

could be misleading. If richer parents were more likely to transfer wealth to their children in the years before the demise, the DMEs would show more equalization than if these transfers would instead take place as inheritances. We conduct several tests, using both data on reported taxable gifts and by assuming that the gift giving patterns in our sample are similar to those in other data sources (Ohlsson et al., 2014; Piketty and Zucman, 2015). We find that decedents with smaller estates make smaller gifts in absolute terms, but that they give away larger shares of their wealth. If we add the value of gifts to the inherited amounts, we find slightly larger equalizing effects. This suggests that the equalizing effects are not much affected by inter vivos gifts. See panels D–G in Table 4, and Online Appendix B.3.4 for details.

Fifth, the inheritance law states that the heirs do not inherit the decedent's debts. If the decedent has negative net wealth, the heirs will inherit zero. This feature of the inheritance law makes the inheritance distribution more equal than the wealth distribution of the decedents. If we replace all negative wealth values with zeros and calculate the Gini coefficient for the wealth distribution of the decedents (in the year before the demise), we obtain a value of 0.73, which is akin to the Gini for the inheritance distribution but lower than the Gini for decedent wealth including negative values, which is 0.76. It is hence clear that this part of the inheritance law contributes to the equalizing effects that we find.

Out of the five mechanisms discussed above, only the last one appears to be quantitatively important.

Another possible explanation for the result is methodological and concerns the identification strategy. If heirs have adjusted their savings in the years prior to inheritance because they expect to receive inheritances, potentially important parts of the total wealth response to inheritances may be overlooked with the strategy. Heirs expecting large inheritances are likely to save less than heirs expecting a small inheritance. As such, the pre-inheritance wealth distribution will be more

compressed than in a world in which heirs do not adjust savings decisions based on their inheritance-related expectations. Consequently, the total effect of inheritances—including both pre-inheritance and post-inheritance responses—might be more equalizing than what our estimates suggest. Quantifying expectation responses to inheritances is difficult, and only a few studies have attempted to do so (Wolff, 2015; Elinder et al., 2012).<sup>24</sup> We conduct tests designed to assess how expectations about future inheritances may influence heirs' pre-inheritance wealth levels. A first test is based on the idea that if decedents (in the years before the demise) suddenly become richer (poorer) and heirs adjust their savings in response to changes in the expected size of inheritances, we expect that the heirs will respond by dissaving (saving) an offsetting amount of wealth. In a second test, we exploit the idea that heirs may respond more strongly to changes in the decedent's wealth in the years before inheritance if the decedent passes away as a result of a terminal illness rather than passing away suddenly. To investigate this idea more carefully, we use data from the Cause of Death register to identify heir-decedent pairs in which the decedent has passed away suddenly. The classification of sudden deaths (natural and unnatural) follows the classification in Andersen and Nielsen (2011). Neither of the tests provide evidence of responses in the heirs' wealth prior to inheritance. Altogether, the concern that heirs' saving behaviors depend on their inheritance expectations may be plausible, but we find little evidence in our data—or in the previous literature—that these behaviors will confound our main findings. While we clearly cannot rule out that such behavioral effects exist, they do not seem to matter much empirically. See Online Appendix B.3.5 for details.

### 3.2. The behavior-adjusted inheritance effect

In this section, we estimate the BAE, which captures not only the DME but also how inheritances alter other determinants of wealth accumulation, such as labor supply, consumption, savings and investment decisions.<sup>25</sup> For example, if heirs immediately consume a substantial fraction of the inheritance, the DME may not be informative about how the wealth distribution actually evolves after inheritances are received. Following the notation used above, the BAE can, ceteris paribus, be formulated as follows:

$$BAE = D_{Post}^W - D_{Pre}^W \quad (2)$$

where  $D_{Pre}^W$  and  $D_{Post}^W$  denote measures of wealth distribution in the period before and after inheritance.

When empirically estimating the BAE on wealth inequality (and mobility), several challenges arise related to concerns about the ceteris paribus condition not being fulfilled. To illustrate the two most prominent challenges, consider first a strategy that compares the wealth distribution of heirs before and after the receipt of inheritance. The difference between the two distributions may be caused by inheriting

<sup>24</sup> Wolff (2015, Chapter 3) presents simulation evidence on the extent of saving responses to expectations about future inheritances and find these expectations to be quantitatively unimportant with regard to saving behaviors. Moreover, Elinder et al. (2012) study the impact of inheritance on the labor income of heirs and present evidence that heirs have adjusted (lowered) their labor incomes in response to inheritances several years before receiving them, suggesting the presence of inheritance expectations. However, the authors provide no estimates of the magnitude or importance of such expectation responses. Additionally, Dynan et al. (2002) and Kopczuk and Lupton (2007) study those who intend to leave bequests and their responsiveness in terms of wealth accumulation to the possibility of bequeathing their wealth. These studies find that, although the donors have bequest motives, a confiscatory inheritance tax would not change their savings behaviors much, perhaps with the exception of the wealthiest groups. Even at the donor level, it is not clear that behavioral responses to inheritances will be important enough to influence our analysis.

<sup>25</sup> There is a small but growing literature on the consequences of inheritances for economic outcomes of individuals, e.g., consumption (e.g. Weil, 1994), labor supply (e.g. Joulfaian and Wilhelm, 1994; Brown et al., 2010; Elinder et al., 2012), investment decisions (Andersen and Nielsen, 2011), and health (e.g. Erixson, 2017).

only, though a singular source is unlikely. For example, macroeconomic events, such as housing market downturns, tend to slash middle-class wealth and thus increase wealth inequality, whereas financial market crashes primarily hit the wealthy and tend to make the wealth distribution more equal (Wolff, 2013; Lundberg and Waldenström, 2018). Second, age-wealth profiles generally imply that, within a birth cohort, wealth becomes more equally distributed with age (Paglin, 1975). Therefore, a simple before-after analysis may yield biased estimates of the effects of inheritances on the wealth distribution.

This problem can be solved by comparing the before-after change in the wealth distribution of the cohort of heirs who inherit in a given year with the same before-after change of cohorts that are identical, except that they inherit one or two years later. In our case, we will compare the development of inequality in wealth from 1999 to 2007 across the three cohorts that inherited sequentially over the 2002–2004 period. The counterfactual is, thus, the development of inequality in the cohorts inheriting one or two years later. In particular, we estimate the BAE on unidimensional measures of inequality, using the following empirical model:

$$D_{c,y}^W = \delta \cdot PostInheritance_{c,y} + \lambda_y + \lambda_c + \varepsilon_{c,y}. \quad (3)$$

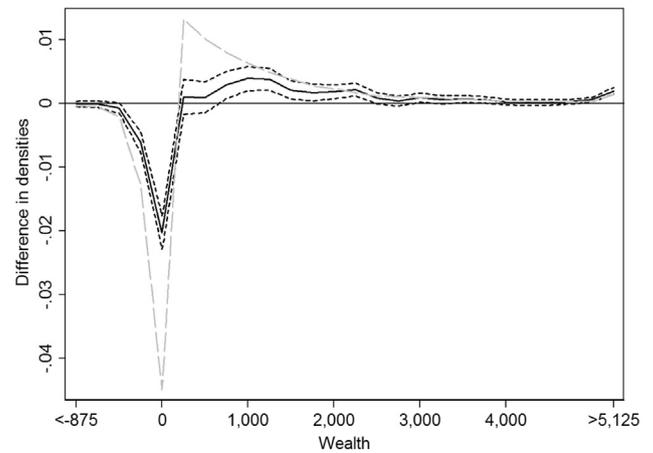
In Eq. (3),  $D_{c,y}^W$  denotes the wealth inequality that varies across cohort  $c$  and calendar year  $y$ .  $PostInheritance$  is a cohort-specific indicator variable, which equals one from the year of the inheritance and onwards. We also include year and cohort fixed effects, captured by  $\lambda_y$  and  $\lambda_c$ , respectively, and  $\varepsilon_{c,y}$  is a random error term. The estimation model is essentially a difference-in-differences estimator, where the identifying assumption is that the outcome would have evolved similarly for the inheriting cohort and the “to-inherit” cohort(s) in the absence of inheritance (i.e., a parallel trends assumption). While this assumption cannot be explicitly tested, it is possible to obtain indirect evidence of whether it holds by studying the outcome trends for the groups in the pre-treatment period, i.e., before inheritance. In the next section, we investigate the validity of the assumption and show that it appears to hold.

### 3.2.1. Estimation results: behavior-adjusted effect

Similar to the DME analysis, we start the BAE analysis with a non-parametrical, graphical illustration. The estimated effect of inheritance, by comparing pre- and post-distributions, may be biased by macroeconomic and demographic (aging) influences; to account for such potential confounders, we compare the wealth distribution changes of the 2002 and 2004 inheritance cohorts between 2001 and 2003, i.e., when the 2002 cohort inherits, and the 2004 cohort does not. Because both cohorts experience the same macro environment and aging process, the differences in wealth distributions effectively only reflect the inheritances of the 2002 cohort.<sup>26</sup> Fig. 4 shows the results. An initial observation is that the pattern resembles the one seen for the DME in Fig. 2 (and reproduced here: dashed line in grey); inheritances positively affect a substantial mass of heirs from the bottom and the middle of the distribution. That said, the size of the BAE is apparently smaller than the DME.

Next, we turn to analyzing the BAE on unidimensional wealth inequality and absolute dispersion. In contrast to the graphical analysis, we now use the 2002, 2003 and 2004 cohorts simultaneously and

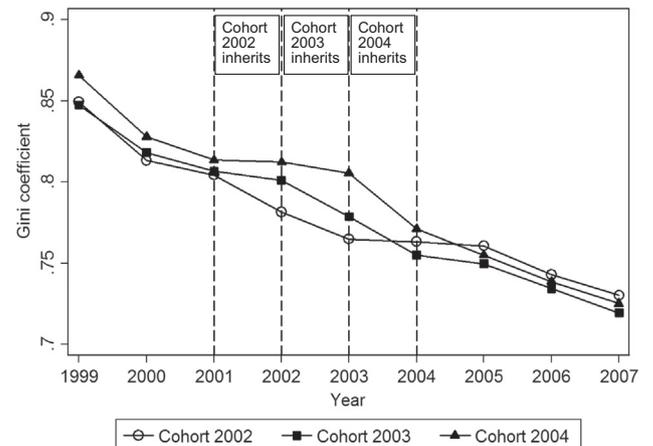
<sup>26</sup> While this comparison effectively removes biases that stem from aging and changing macroeconomic conditions, the estimated change may still be biased if the 2002 and 2004 cohorts are affected differently by macroeconomic events or aging. We cannot graphically illustrate the differences in such effects during the treatment years, but we can show differences in the evolution of the wealth distributions of the two cohorts between 1999 and 2001, i.e., when neither of the cohorts have inherited. The results of this placebo test are presented in Online Appendix B.4. Fig. B5 shows that the changes in the wealth distributions of the two cohorts between 1999 and 2001 are nearly identical. As such, we conclude that cohort-specific macroeconomic effects do not appear to confound the inheritance effect presented in Fig. 4.



**Fig. 4.** Non-parametrical illustration of the BAE on the wealth distribution for the 2002 and 2004 cohorts. The graph (solid) displays the difference in densities (using bins of SEK 250,000) of the wealth distributions in  $T - 1$  (2001) and  $T + 1$  (2003) for the 2002 cohort and that of the wealth distributions in  $T - 3$  (2001) and  $T - 1$  (2003) for the 2004 cohort. The estimates are based on data on 314,733 heirs (165,641 [2002 cohort] and 149,092 [2004 cohort]). The confidence bands (dashed) are based on bootstrapped standard errors (1000 repetitions). The grey graph (dashed) is a reproduction of the non-parametrical illustration of the DME from Fig. 2 (excluding confidence bands). Wealth (SEK 1000) is presented in 2003 constant prices.

exploit the full wealth register data from 1999 to 2007. Therefore, the estimated inheritance effect can capture the average effect up to five years after inheriting, but in practice, most of the variation used in the estimations of the effect comes from the first two years after inheriting, which is why it is safer to say that we capture the effect up to two years after inheriting. As noted in the previous section, the identification strategy assumes that wealth inequality would evolve similarly for all cohorts had they not inherited.

Fig. 5 depicts the evolution of the Gini coefficient for the three cohorts over the entire period. Until 2001, i.e., the year before the first cohort inherits, a near-identical development of the Gini coefficient occurs for all three cohorts, strongly suggesting that the parallel trends assumption is fulfilled. The Gini coefficients fall from approximately 0.85 in 1999 to 0.82 in 2000 and 0.81 in 2001. In 2002, the 2002 cohort inherits, and we see an immediate and sharp drop in the Gini coefficient to 0.78, falling further in 2003 when the heirs of the decedents who passed away in late 2002 received their inheritances. By contrast, the Gini coefficients of the two non-inheriting cohorts remain virtually unchanged in 2002. Starting in 2003, when the 2003 cohort inherits,



**Fig. 5.** Development of the Gini coefficient by inheritance cohort. The points on the graphs indicate the Gini coefficients calculated for the distribution of wealth as of December 31 of the respective year.

the Gini coefficients of that cohort drop over the next two years. This pattern is repeated again for the 2004 cohort. Between 2005 and 2007, when all the cohorts have inherited, the Gini coefficients return to a common level and development. As clearly shown in Fig. 5, changes in wealth inequality differ across the cohorts *only in the two years when they inherit*. This strikingly consistent pattern offers strong evidence that the equalizing effect of inheritances on the wealth distribution persist for at least a few years.

Table 5 reports the estimation results of the BAE on the five inequality and dispersion measures generated by the difference-in-differences estimator (Eq. (3)). The coefficient estimate in the first column shows that the inheritance effect causes a reduction in the Gini coefficient by 0.037 points, which is equivalent to a drop of 4.6% (when compared with the baseline of 0.804). In Online Appendix B.4.2, Table B5, we show that the BAEs are robust in the dimensions as the DMEs.

The estimates of the inheritance effects on the other relative dispersion measures confirm what we have observed already in Figs. 4 and 5, and they are qualitatively similar to the DMEs. The P90/P50 decreases by 10.5%, and the share of total wealth held by the wealthiest decile falls by 5%. Notably, the poorest half increases their share of total wealth from minus 1.6% to just above zero. Finally, the estimated effect of inheritances on the distance between the 75th and the 25th<sup>h</sup> wealth percentiles indicates that wealth dispersion increases as a consequence of inheritances. Taken together, the results confirm the patterns we found when we estimated the DME, which was that relative inequality decreases while absolute dispersion increases, suggesting that behavioral responses to inheritances do not mute the equalization effect, at least not in the short-run.

To be able to firmly assess whether the equalizing effect remains in a longer perspective, we would need more inheritance cohorts that inherit in later years and could serve as longer-run counterfactuals for the cohorts who inherit early. In Online Appendix B.4.3 Fig. B6, we use a slightly different dataset in an attempt to investigate whether the equalizing effects are still present five years after inheriting. The results suggest that the equalizing effect is present at least up to five years after inheriting. Unfortunately, data restrictions imply that we cannot say whether the effect decreases or increases over a period of more than five years.

That said, the equalizing effects appear to be smaller when accounting for the behavioral adjustments of the wealth holdings. Therefore, we continue by investigating some possible explanations for this finding in the next section.

### 3.2.2. Potential explanations for why is the behavior-adjusted effect is smaller than the direct mechanical effect?

When comparing the two inheritance effects on wealth inequality, we see that the BAE is smaller than the DME. In the case of Gini coefficients, the BAE is 5%, and the DME is 7%. We discuss two possibilities for this discrepancy. The first relates to behavioral responses among the heirs, which may dilute the equalizing effect. The second relates to

methodological differences between the DME and BAE. The task to separate the relative importance of the two explanations is, however, beyond the scope of this paper.

Why might the equalizing effect of inheritances be less pronounced when behavioral responses are accounted for? Departing from a standard framework for wealth accumulation, several possible explanations are consistent with such a pattern.<sup>27</sup> Compared with wealthier heirs, less wealthy heirs have a higher marginal propensity to consume their inheritances (see, e.g., *Drue Dahl and Martinello, 2017*). The second explanation is that wealthier heirs receive higher returns on their savings than poorer heirs do (*Andersen and Nielsen, 2011*). Both of these explanations would lead to increased wealth inequality and, in turn, mitigate the equalizing direct mechanical effect.<sup>28</sup> However, without data on consumption, we cannot credibly assess the importance of these two explanations for our findings.

The difference between the DMEs and the BAEs could potentially also result from differences in the estimation methods. A key difference between the two estimation methods is that the DME uses wealth data in the year before inheriting and data on the inheritance, while the estimation of BME is based only on wealth data, but for several years. A potential concern here is discrepancies between how wealth and inheritances are measured. While the wealth data are recorded at market values, the data essentially lack consumer durables. The inheritances, on the other hand, include durables but are recorded at tax values. As discussed in Section 2.4, for some asset types, most notably stocks and real estate, the tax value is lower than the market value. However, in Online Appendices B.2.2 and B.4.2, we show that the DMEs and the BAEs are not altered much when we attempt to correct for the underreporting of consumer durables. Moreover, in Online Appendix B.2.3, we showed that the DMEs are not altered when we attempt to adjust inheritances to market values.

We, therefore, find no indications that the differences in the DMEs and BAEs stem from these types of measurement errors. However, we cannot rule out that the differences between the DMEs and BAEs are the result of any difference in how the effects are estimated.

## 4. Inheritance and wealth mobility

Another possible consequence of the effects of intergenerational transfers is that they may influence the level of wealth mobility among the heirs. We are interested in mobility effects for two reasons. First, the normative interpretation of the inequality effects depends on how mobility is affected. Inheritances decrease relative inequality, but do inheritances also increase the chances of the poor to increase their wealth rank? Second, do inheritances set off mobility processes? If receiving inheritances makes people behave differently, perhaps taking more risk or changing their activity in the labor market, inheritances may affect wealth mobility long after the receipt. Even though our previous analysis indicated that behavioral effects exist, mainly working to mute the distributional consequences, perhaps the effect on mobility will still be more evident in this respect? This section presents an analysis—to the best of our knowledge, the first of its kind—on how inheritances influence wealth mobility.

**Table 5**  
BAE on wealth inequality.

Outcome	(1)	(2)	(3)	(4)	(5)
	Gini	P90/P50	Top 10%	Bottom 50%	P75–P25
Inheritance effect ( $\delta$ )	−0.037*** (0.008)	−0.701*** (0.184)	−0.028*** (0.004)	0.020*** (0.005)	77,386*** (7044)
Mean of outcome $T - 1$	0.804	6.665	0.558	−0.016	768,205
Effect in %	−5	−11	−5	−	10

Notes: The estimates are based on 24 observations (3 cohorts [2002–2004] over 8 years) using data on 475,120 heirs. Standard errors appear in parentheses. \* significant at the 10% level, \*\* significant at the 5% level, \*\*\* significant at the 1% level.  $\delta$  is the coefficient of *PostInheritance* in Eq. (3). Effect in % is calculated as (*Inheritance effect* ( $\delta$ ) / *Mean of outcome*  $T - 1$ )  $\times$  100.

<sup>27</sup> A simple process for wealth accumulation (see, e.g., *Davies and Shorrocks, 2000*) would be one that describes the next period's wealth as a function of past wealth plus net income savings (which could depend on inheritances for labor supply reasons) and inherited wealth:  $W_{t+1} = W_t + (s - c)Y_t(I) + (s - c)I_t$ . In this framework, wealth accumulation depends on the rates of saving  $s$  and consumption  $c$  and on potential labor supply effects by inheriting  $Y'$  over and above the inheritances.

<sup>28</sup> In addition, labor supply, and thus labor earnings, may also change upon the receipt of inheritances if heirs decide to work less, retire earlier than planned, or use inheritances to start a new venture (see for example, *Elinder et al., 2012; Brown et al., 2010; Holtz-Eakin et al., 1994*).

**Table 6**  
DME on wealth mobility.

Outcome	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Shorrocks-Prais	Probability of leaving <i>n</i> th quintile after inheriting					Spearman's rank correlation
		1st	2nd	3rd	4th	5th	
Inheritance effect	0.113*** (0.001)	0.101*** (0.001)	0.149*** (0.001)	0.103*** (0.001)	0.069*** (0.001)	0.028*** (0.001)	−0.023*** (0.0002)
Mean in $T - 1$	0.259	0.168	0.253	0.274	0.234	0.110	0.929
Effect in %	43	60	60	38	30	26	−3

Notes: The estimates provide the difference between the mobility measure for the transition period from  $T - 2$  to  $T - 1$  (with the inheritance) and the mobility measure for the transition period from  $T - 2$  to  $T - 1$  (without the inheritance). The estimates are based on data on 475,120 heirs (2002–2004 cohorts). Bootstrapped standard errors are presented in parentheses (1000 repetitions). \* significant at the 10% level, \*\* significant at the 5% level, \*\*\* significant at the 1% level. Effect in % is calculated as (Inheritance effect / Mean of outcome  $T - 1$ )  $\times$  100.

Our focus is on intragenerational wealth mobility, which means the rate at which heirs change wealth ranks in their distribution.<sup>29</sup> There are several different ways to empirically measure intragenerational wealth mobility as discussed by Burkhauser and Couch (2009) and Jäntti and Jenkins (2015). We show results using one of the most common methods, which involves calculating transition probability matrices in the wealth distribution for heirs before and after inheritance. By comparing transition probabilities across quintiles, the matrix shows whether actual mobility patterns at the bottom, the middle and the top of the distribution differ. We then convert these matrices into a unidimensional metric, the Shorrocks-Prais mobility index (Prais, 1955; Shorrocks, 1978), which is an index centered on the diagonal elements in the matrices and ranges from 0 (perfect immobility) to 1 (perfect mobility).<sup>30</sup> For robustness purposes, we also examine the change in Spearman rank correlation coefficients between the same distributions, i.e., heirs' wealth before and after receiving an inheritance. While the difference in Spearman correlations is not a direct measure of mobility, it imposes less structure and relies on fewer assumptions than the Shorrocks-Prais index.

The DME for mobility is estimated by computing two transition matrices, one measuring the individual transitions from  $T - 2$  to  $T - 1$  (with the inheritance) and the mobility measure for the transition period from  $T - 2$  to  $T - 1$  (without the inheritance). Table 6 shows that the Shorrocks-Prais index increases by 43% when adding inheritances, which means that mobility increases substantially as a result of inheriting. When evaluating leaving probabilities across wealth quintiles (columns 2 through 6), we see that the mobility effect is larger among heirs in the lower part of the wealth distribution than among the heirs in the top. As a sign of robustness of this effect, the last column of the table shows that inheriting wealth also leads to a significant decrease in the rate of change in Spearman rank correlations across years. Such a decrease reflects a higher degree of rank movements along the wealth distribution when inheriting, which is in line with higher intragenerational mobility.

We also estimate the DME on mobility for the Children sample. The results, reported in Online Appendix B.5.2, display a similar pattern to those for the full sample.

To estimate the BAE for mobility, we implement the same approach as in the inequality analysis. In Fig. 6, we depict the evolution of Shorrocks-Prais mobility indices for wealth transitions around the year of inheritance (i.e., from  $W_{pre}$  to  $W_{post}$ ). The parallel trends assumption appears to hold, judging from the similar levels of wealth mobility in the pre-inheritance transition periods. Despite an overall rise in mobility from 2001 to 2002, the 2002 inheritance cohort exhibits an even

higher mobility increase, from 0.23 to 0.32, than the two other cohorts (which increase from 0.23 to 0.28). One year later, the 2003 cohort experiences a similarly large mobility increase, and, another year later, the 2004 cohort experiences the same relatively large increase in mobility (the mobility increase is marginal in absolute terms, but, because the other two cohorts experience substantial decreases in the same period, the effect can be stated as a relative increase).

To be more precise in determining the magnitude of the BAE, we estimate the effect using the difference-in-differences model of Eq. (3).<sup>31</sup> The results in Table 7 show that overall mobility increases by 19% (a treatment effect of 0.048 compared with the average pre-inheritance Shorrocks-Prais index of 0.260). Although significant, this effect is less than half the DME reported in Table 6. When examining leaving probabilities across wealth quintiles (columns 2–6), almost no difference in mobility is found across the distribution, with mobility increases between 13 and 21% depending on the part of the distribution that is considered. The change in Spearman rank correlations exhibits once again a similar pattern as the mobility index, showing a decrease in correlation in the periods after inheritances are received, and the effect is also smaller than in the DME analysis.

We also estimate the BAE on mobility for the Children sample. The results, reported in Online Appendix B.5.2, display a similar pattern to those for the full sample.

In Online Appendix B.5.3, we attempt to see whether the mobility effect is persistent up to five years after inheriting. That analysis suggests, however, that the mobility effect is short-lived; it seems to last only two to three years.

Two important messages emanate from the mobility analysis presented here. The first is that inheritances substantially increase wealth mobility. In particular, many of the heirs who were among the poorest before inheriting rise in wealth rank. The second message is that inheritances set off increased mobility in the first years after inheriting, but that effect does not seem to be persistent in the longer run.

## 5. Inheritance taxation and wealth inequality

In this section, we present the first empirical analysis of inheritance taxation on wealth inequality using individual-level register data.<sup>32</sup> The distributional consequences of taxation on intergenerational transfers have received relatively little attention in the previous literature. Theoretical models that address this issue implement diverse analytical approaches, but most of them predict that inheritance (or estate) taxes increase wealth inequality (e.g., Stiglitz, 1978; Becker and Tomes, 1979; Atkinson, 1980; Davies, 1986).<sup>33</sup> While these models typically focus

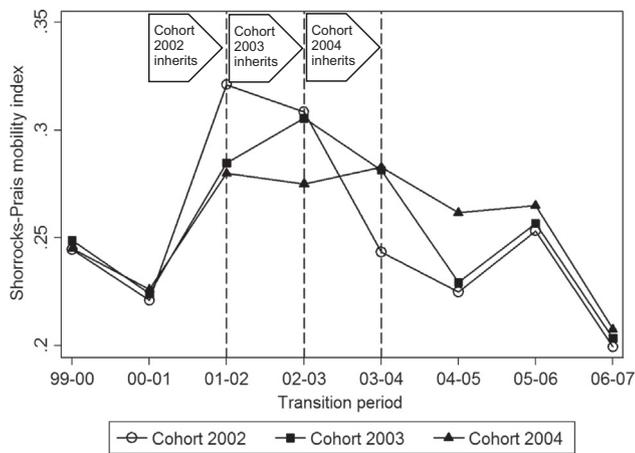
<sup>29</sup> Another mobility dimension concerns the role of family background, i.e., the degree of intergenerational mobility. While most such previous studies of Sweden have focused on incomes or other socio-economic outcomes (see, e.g., Björklund and Jäntti, 1997 or Clark, 2014), Ademon et al. (2018) study how inheritance affects intergenerational wealth mobility patterns.

<sup>30</sup> For an  $n \times n$  matrix  $M$ , the Shorrocks-Prais mobility index is defined as  $(n - \text{trace}(M)) / (n - 1)$ . In the estimations of the main results, we let  $n=5$ . However, we also test the robustness of the main results by letting  $n=10$  and the estimates with respect to the Shorrocks-Prais index are qualitatively and quantitatively unaffected by this, see Online Appendix B.5.1.

<sup>31</sup> Rather than controlling for year fixed effects, we now include transition period fixed effects.

<sup>32</sup> Empirical findings of the distributional consequences of transfer taxation are quite scarce. In calibration studies that use statistical parameters based on U.S. data, Castaneda et al. (2003), Cagetti and DeNardi (2009) and Benhabib et al. (2011) conclude that abolishing the estate tax would lead to increases in wealth inequality, with the exact size depending on specific modeling assumptions.

<sup>33</sup> For overviews of central issues related to the taxation of intergenerational transfers, see Davies (1986), Cremer and Pestieau (2011) and Kopczuk (2013).



**Fig. 6.** Evolution of wealth mobility (Shorrocks-Prais Mobility Index). The points in the graph indicate the Shorrocks-Prais mobility index, as calculated for transition matrices with two-year transitions in the wealth status of heirs.

on general equilibrium and long-term consequences of inheritance taxation, our analysis instead examines short-term consequences that are associated with the repeal of Sweden's inheritance tax.

We begin by examining how the DMEs change due to the tax payments by the heirs. To estimate the effect of the tax, we calculate the difference between the DMEs using inheritances net-of-inheritance-tax payments (as in Table 2) and DMEs using inheritances before tax payments. The estimated effects are economically relevant as the repeal was effectively unexpected, announced just a few months before the repeal actually occurred. However, it should be noted that our analysis is limited by being mechanical and short-term. It does not account for any behavioral adjustments to inheritance taxation that donors or heirs may make over the longer run.

The results are reported in Table 8 and should be interpreted as the effect of a repeal of the inheritance tax on wealth inequality. The tax repeal effect suggests that the inheritance tax increases relative inequality but decreases absolute dispersion. However, the magnitudes of these effects are very small. For example, the Gini coefficient falls by an additional 0.002 points due to the tax repeal. This relatively small effect is reasonable, given the rather small amounts of inheritance and gift tax payments in the early 2000s.

To explain what causes the disequalizing effect of the inheritance tax, Fig. 7 displays the average level of inheritance and gift tax payments by the heirs' pre-inheritance wealth levels. Wealthier heirs pay more in taxes in absolute terms but less relative to their initial wealth. This finding implies that, for the wealthiest heirs, both their inheritances and inheritance taxes are relatively insignificant in relation to their pre-inheritance wealth, while both inheritances and tax payments are substantial relative to the pre-inheritance wealth of the less wealthy. We thus interpret the results of the test as evidence that the equalizing effect of inheritances would have been slightly stronger without the inheritance tax.

**Table 7**  
BAE on wealth mobility.

Outcome	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Shorrocks-Prais	Probability of leaving <i>n</i> th quintile after inheriting					Spearman's rank correlation
		1st	2nd	3rd	4th	5th	
Inheritance effect ( $\delta$ )	0.048** (0.016)	0.022*** (0.007)	0.054*** (0.015)	0.054** (0.019)	0.042** (0.016)	0.020** (0.007)	-0.016** (0.006)
Mean in $T - 1$	0.260	0.170	0.255	0.274	0.233	0.109	0.929
Effect in %	19	13	21	20	18	18	-2

Notes: The estimates are based on 21 observations (3 cohorts [2002–2004] over 7 transition periods) using data on 475,120 heirs.  $\delta$  is the *PostInheritance* coefficient in Eq. (4). \* significant at the 10% level, \*\* significant at the 5% level, \*\*\* significant at the 1% level. *Effect in %* is calculated as (*Inheritance effect* ( $\delta$ ) / *Mean of outcome*  $T - 1$ )  $\times$  100.

**Table 8**  
Effect of inheritance tax repeal on wealth inequality.

Outcome	(1)	(2)	(5)	(6)	(8)
	Gini	P90/P50	Top 10%	Bottom 50%	P75–P25
Tax repeal effect	-0.002*** (0.00006)	-0.024*** (0.004)	-0.001*** (0.0001)	0.001*** (0.00002)	12,382*** (417)
Mean of outcome $T - 1$	0.804	6.665	0.559	-0.015	767,262
Effect in %	-0.2	-0.4	-0.2	-	1.6

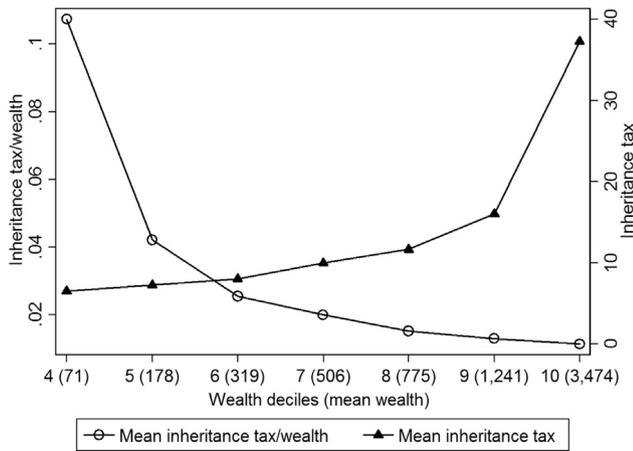
Notes: Estimates show the estimated differences between the DMEs obtained with net-of-tax inheritances (as in Table 2) and DMEs obtained with gross inheritances. The estimates are based on data on 475,120 heirs (2002–2004 cohorts). Bootstrapped standard errors are presented in parentheses (1000 repetitions). *Effect in %* is calculated as (*Tax repeal effect* / *Mean of outcome*  $T - 1$ )  $\times$  100. Standard errors are presented in parentheses. \* significant at the 10% level, \*\* significant at the 5% level, \*\*\* significant at the 1% level.

The analysis has hitherto only considered the tax payments and not the possible uses of the tax revenues. To facilitate the interpretation of our results and put them into perspective, we show the possible redistributive role that the tax receipts can play. Second, we examine whether our results reflect the specific structure of the Swedish inheritance tax institutions of the early 2000s by assessing what would have happened if a confiscatory tax had been levied instead. Table 9 reports DME estimations under these extensions.

In Panel A, we show DMEs under the hypothetical scenario, that the actual inheritance tax revenues are redistributed as lump sum transfers according to three alternative redistributive schemes: giving to all heirs, giving to heirs with below-median wealth and giving to heirs with wealth in the bottom quartile of the wealth distribution. The results indicate that redistribution can strongly counteract the disequalizing effect of the inheritance tax found in Table 8. When the revenues are redistributed among all heirs, the equalizing effect of the inheritances increases (instead of decreases, as it did when we only considered tax payments). Directing revenues to heirs in the bottom half or the bottom quartile of the wealth distribution leads to further equalization. Under all three redistribution schemes, the relative inequality falls more than in the baseline case. The absolute dispersion is also reduced as a consequence of redistributing tax revenues.

In Panel B of Table 9, we simulate the redistribution effects under a fully confiscatory tax to determine how much the results are due to the specific institutional structure of the Swedish inheritance tax in the 2000s. Of course, the case of an imagined 100% inheritance tax would most likely have implications for wealth accumulation and the amount of inherited wealth. However, we prefer this scenario for two reasons. First, it represents an upper level for the redistributive impact of inheritance taxation, and milder variants will thus lead to outcomes within this case and the baseline cases. Second, it reflects an interesting counterfactual to our main analysis, namely, the case of literally “no inheritance”, whereas our baseline analysis compares the treatment of inheriting with an “inheriting later” counterfactual.

Panel B of Table 9 reports the results from this exercise under the same three redistributive schemes as in Panel A. Redistributing the revenues from a confiscatory tax clearly has a sizable impact on the



**Fig. 7.** Absolute and relative inheritance tax payments by pre-inheritance wealth decile. Wealth (SEK 1000) and inheritance tax (SEK 1000) are presented in 2003 constant prices. Wealth deciles 1–3 are omitted because of negative values for wealth.

distribution: giving to everyone almost doubles the equalizing effect of inheritance, from the baseline of  $-7\%$  to  $-13\%$ . When applying the directed redistributive schemes, the equalizing effect grows even more, reducing the Gini coefficient by up to almost 22%.

In summary, inheritance taxation alone does not seem to equalize wealth; instead, it slightly reverses the equalizing impact of inheritances. However, when inheritance tax revenues are also considered and used for redistributive purposes, the total effect may be increased equality.

**6. Concluding discussion**

Our findings of an equalizing impact of inherited wealth have implications for our understanding of the intergenerational transmission of resources and for economic inequality in general.

First, if the poor tend to consume new wealth and the rich are more likely to save it, then the theory predicts the transmission impact to be one of disequalization, as noted by Scholz (2003). Our results are consistent with such behavioral responses, shown by the difference between the larger DMEs and smaller BAEs. However, these responses are not quantitatively large enough to balance the main equalizing impact, and the equalizing impact persists at least a few years after the inheritance treatment.

Second, historical circumstances and the institutional context of Sweden may have specific bearing on the detected patterns. Inequality in marketable wealth in a country with an extensive welfare state is

not necessarily directly comparable to inequality in countries in which people are more reliant on their own savings. However, since Sweden is no longer exceptional in terms of tax revenues as share of GDP (ranked seventh in 2014), our results could be well generalized to many other countries. It should be noted, though, that a major part of the inherited wealth analyzed was generated during the 1960s, 1970s and 1980s, a period in the Swedish history with peaking egalitarian welfare-state policies and relatively compressed income and wealth distributions. The years thereafter saw both liberalized policies and widening gaps. Could it be that these historical trends in inequality and redistribution are reflected in the equalizing impact of inheritance documented in the study, and thus that heirs not only inherited wealth but effectively also the previous, more equal wealth distribution? At this point, we can only speculate, but such an interpretation would be in line with Nybom and Stuhler’s (2014) recent theoretical work on the mechanisms of intergenerational transmission, showing that past institutions and institutional change in a parental generation can have long-lasting effects and eventually affect the offspring generation through the transmission process. On the other hand, our findings are in line with the previous results from Europe, Japan, and the United States, suggesting that inheritances equalize the wealth distribution in many countries.

Moreover, the fact that the inheritance law stipulates that heirs do not inherit any debts the decedent may have upon death also contributes to the equalizing effects of inheritances that we find. The Swedish inheritance law is, however, not unique in this feature. In most countries, debts are not passed on to the heirs and even in countries where they are (e.g., Spain and Japan), the heir can refuse the inheritance.

Third, our focus on the inequality of personal wealth leaves out other relevant distributional dimensions. One closely related outcome is lifetime resources which is the sum of lifetime earnings and all gifts and bequests. Lifetime earnings are more evenly distributed and much larger than the sum of gifts and bequests, and this could make the distributional consequences of inheritances markedly different from what we observe (although early simulation studies by Blinder (1973) and Davies (1982) do not indicate such marked differences). From a more general perspective, investigating how inheritances affect other aspects of inequality, such as income, leisure, consumption and health, would be interesting.

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**Appendix A. Supplementary material**

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jpubeco.2018.06.012>.

**References**

Adermon, Adrian, Lindahl, Mikael, Waldenström, Daniel, 2018. Intergenerational wealth mobility and the role of inheritance: evidence from multiple generations. *Econ. J.* (forthcoming).

**Table 9**

DME if tax revenues are redistributed to decrease inequality.

Outcome	(1)	(2)	(3)	(4)	(5)
	Gini	P90/P50	Top 10%	Bottom 50%	P75–P25
Baseline DME	-0.056***	-1.122***	-0.036***	0.035***	63,822***
<i>Group receiving transfer</i>					
<i>A: Redistributing actual tax revenues</i>					
All	-0.068***	-1.276***	-0.043***	0.042***	63,884***
Below median W	-0.076***	-1.245***	-0.044***	0.049***	41,915***
Lowest W quartile	-0.079***	-1.155***	-0.044***	0.050***	44,929***
<i>B: Redistributing confiscatory inheritance tax revenues</i>					
All	-0.109***	-1.625***	-0.062***	0.070***	0
Below median W	-0.175***	-2.032***	-0.076***	0.128***	-195,147***
Lowest W quartile	-0.164***	-1.827***	-0.069***	0.121***	-174,885***
Mean of outcome in T – 1	0.804	6.665	0.559	-0.015	767,262

Notes: Estimates are based on 475,120 heirs. Bootstrapped standard errors are presented in parentheses (1000 repetitions). \* significant at the 10% level, \*\* significant at the 5% level, \*\*\* significant at the 1% level.

- Andersen, Steffen, Nielsen, Kasper Meisner, 2011. Participation constraints in the stock market: evidence from unexpected inheritance due to sudden death. *Rev. Financ. Stud.* 24, 1667–1697.
- Atkinson, Anthony B., 1971. The distribution of wealth and the individual life-cycle. *Oxf. Econ. Pap.* 23, 239–254.
- Atkinson, Anthony B., 1980. Inheritance and the redistribution of wealth. In: Hughes, Gordon A., Heal, George (Eds.), *Public Policy and the Tax System*. Allen & Unwin, London.
- Atkinson, Anthony B., Harrison, Allan J., 1978. *The Distribution of Personal Wealth in Britain*. Cambridge University Press, Cambridge.
- Becker, Gary S., Tomes, Nigel, 1979. An equilibrium theory of the distribution of income and intergenerational mobility. *J. Polit. Econ.* 87, 1153–1189.
- Benhabib, Jess, Bisin, Alberto, Zhu, Shenghao, 2011. The distribution of wealth and fiscal policy in economies with finitely lived agents. *Econometrica* 79, 123–157.
- Bernheim, B. Douglas, Shleifer, Andrei, Summers, Lawrence H., 1985. The strategic bequest motive. *J. Polit. Econ.* 93, 1045–1077.
- Björklund, Anders, Jäntti, Markus, 1997. Intergenerational income mobility in Sweden compared to the United States. *Am. Econ. Rev.* 87, 1009–1018.
- Blinder, Alan S., 1973. A model of inherited wealth. *Q. J. Econ.* 87, 608–626.
- Bönke, Timm, von Werder, Marten, Westermeier, Christian, 2017. How inheritances shape wealth distributions: an international comparison. *Econ. Lett.* 159, 217–220.
- Boserup, Simon, Kopczuk, Wojciech, Kreiner, Claus Thustrup, 2016. The role of bequests in shaping wealth inequality: evidence from Danish wealth records. *Am. Econ. Rev.* 106, 656–661.
- Bricker, Jesse, Henriques, Alice, Krimmel, Jacob, et al., 2015. Measuring income and wealth at the top using administrative and survey data. *Finance and Economics Discussion Series 2015*. Board of Governors of the Federal Reserve System, pp. 2015–2030.
- Brown, Jeffrey R., Coile, Courtney C., Weisbenner, Scott J., 2010. The effect of inheritance receipt on retirement. *Rev. Econ. Stat.* 92, 425–434.
- Burkhauser, Richard V., Couch, Kenneth A., 2009. Intragenerational inequality and intertemporal mobility. In: Salverda, Wiemer, Nolan, Brian, Smeeding, Timothy M. (Eds.), *The Oxford Handbook of Economic Inequality*. Oxford University Press, Oxford.
- Cagett, Marco, De Nardi, Mariacristina, 2009. Estate taxation, entrepreneurship, and wealth. *Am. Econ. Rev.* 99, 85–111.
- Castañeda, Ana, Díaz-Giménez, Javier, Ríos-Rull, Jose-Victor, 2003. Accounting for the U.S. earnings and wealth inequality. *J. Polit. Econ.* 111, 818–857.
- Charles, Kerwin Kofi, Hurst, Erik, 2003. The correlation of wealth across generations. *J. Polit. Econ.* 111, 1155–1182.
- Clark, Gregory, 2014. *The Son Also Rises. Surnames and the History of Social Mobility*. Princeton University Press, Princeton and Oxford.
- Cowell, Frank, Frank, Cowell, et al., 2013. UK wealth inequality in international context. In: Hills, John, Bastagli, Francesca (Eds.), *Wealth in the UK: Distribution, Accumulation, and Policy*. Oxford University Press, Oxford.
- Cox, Donald, 1987. Motives for private income transfers. *J. Polit. Econ.* 95, 508–546.
- Crawford, Rowena, Hood, Andrew, 2016. Lifetime receipt of inheritances and the distribution of wealth in England. *Fisc. Stud.* 37, 55–75.
- Cremer, Helmuth, Pestieau, Pierre, 2011. Wealth and wealth transfer taxation: a survey. In: Albi, Emilio, Martinez-Vazquez, Jorge (Eds.), *The Elgar Guide to Tax Systems*. Edward Elgar Publishing House, Northampton, MA, p. 2011.
- Davies, James B., 1982. The relative impact of inheritance and other factors on economic inequality. *Q. J. Econ.* 97, 471–498.
- Davies, James B., 1986. Does redistribution reduce inequality? *J. Labor Econ.* 4, 538–559.
- Davies, James B., Kuhn, Peter J., 1991. A dynamic model of redistribution, inheritance, and inequality. *Can. J. Econ.* 24, 324–344.
- Davies, James B., Shorrocks, Anthony F., 1978. Assessing the quantitative importance of inheritance in the distribution of wealth. *Oxf. Econ. Pap.* 30, 138–149.
- Davies, James B., Shorrocks, Anthony F., 2000. The distribution of wealth. In: Atkinson, Anthony B., Bourguignon, François (Eds.), *Handbook of Income Distribution*. vol. 1. North-Holland, Amsterdam, p. 2000.
- De Nardi, Mariacristina, 2004. Wealth inequality and intergenerational links. *Rev. Econ. Stud.* 71, 743–768.
- Druehl, Jeppe, Martinello, Alessandro, 2017. *Long-run Saving Dynamics: Evidence From Unexpected Inheritances*. Lund University Working Paper.
- Dynan, Karen E., Skinner, Jonathan, Zeldes, Stephen P., 2002. The importance of bequests and life-cycle saving in capital accumulation: a new answer. *Am. Econ. Rev.* 92, 274–278.
- Elinder, Mikael, Erixson, Oscar, Ohlsson, Henry, 2012. The impact of inheritances on heirs' labor and capital income. *BE J. Econ. Anal. Policy* 12. <https://doi.org/10.1515/1935-1682.3324>.
- Elinder, Mikael, Erixson, Oscar, Escobar, Sebastian, Ohlsson, Henry, 2014. *Estates, Bequests, and Inheritances in Sweden: A Look Into the Belinda Databases*. 2014. UCFS Working Paper.
- Erixson, Oscar, 2017. Health responses to a wealth shock: evidence from a Swedish tax reform. *J. Popul. Econ.* 30, 1281–1336.
- Gokhale, Jagadeesh, Kotlikoff, Laurence J., Sefton, James, Weale, Martin, 2001. Simulating the transmission of wealth inequality via bequests. *J. Public Econ.* 79, 93–128.
- Greenwood, Daphne T., Wolff, Edward N., 1992. Changes in wealth in the United States, 1962–1983: savings, capital gains, inheritance, and lifetime transfers. *J. Popul. Econ.* 5, 261–288.
- Henrekson, Magnus, Waldenström, Daniel, 2016. Inheritance taxation in Sweden, 1885–2004: the role of ideology, family firms and tax avoidance. *Econ. Hist. Rev.* 69, 1228–1254.
- Holtz-Eakin, Douglas, Joulfaian, David, Rosen, Harvey S., 1994. Sticking it out: entrepreneurial survival and liquidity constraints. *J. Polit. Econ.* 102, 53–75.
- Horioka, Charles Y., 2009. Do bequests increase or decrease wealth inequalities? *Econ. Lett.* 103, 23–25.
- James, Russell N., 2009. Health, wealth, and charitable estate planning: a longitudinal examination of testamentary charitable giving plans. *Nonprofit Volunt. Sect. Q.* 38, 1026–1043.
- Jäntti, Markus, Jenkins, Stephen P., 2015. Income mobility. In: Atkinson, Anthony B., Bourguignon, François (Eds.), *Handbook in Income Distribution*. Elsevier, Amsterdam.
- Joulfaian, David, 2001. Charitable giving in life and death. In: Gale, William G., Hines Jr., James R., Slemrod, Joel (Eds.), *Rethinking Estate and Gift Taxation*. Brookings Institution, New York.
- Joulfaian, David, Wilhelm, Mark O., 1994. Inheritance and labor supply. *J. Hum. Resour.* 29, 1205–1234.
- Karagiannaki, Eleni, 2015. The impact of inheritance on the distribution of wealth: evidence from Great Britain. *Rev. Income Wealth* 63, 394–408.
- Klevmarck, N. Anders, 2004. On the wealth dynamics of Swedish families, 1984–98. *Rev. Income Wealth* 50 (469–449).
- Kopczuk, Wojciech, 2013. Taxation of intergenerational transfers and wealth. In: Auerbach, Alan, Chetty, Raj, Feldstein, Martin, et al. (Eds.), *Handbook of Public Economics*. vol. 5. Elsevier, Amsterdam.
- Kopczuk, Wojciech, 2015. What do we know about the evolution of top wealth shares in the United States? *J. Econ. Perspect.* 29, 47–66.
- Kopczuk, Wojciech, Lupton, Joseph P., 2007. To leave or not to leave: the distribution of bequest motives. *Rev. Econ. Stud.* 74, 207–235.
- Laitner, John, 1979a. Household bequests, perfect expectations, and the national distribution of wealth. *Econometrica* 47, 1175–1193.
- Laitner, John, 1979b. Household bequest behaviour and the national distribution of wealth. *Rev. Econ. Stud.* 46, 467–483.
- Lundberg, Jacob, Waldenström, Daniel, 2018. Wealth inequality in Sweden: what can we learn from capitalized income tax returns? *Rev. Income Wealth* (in press).
- Meer, Jonathan, Rosen, Harvey S., 2013. Donative behavior at the end of life. *J. Econ. Behav. Organ.* 92, 192–201.
- Nekoei, Arash, Seim, David, June 4, 2018. On the Accumulation of Wealth: The Role of Inheritances (June 4, 2018). Available at SSRN: <https://ssrn.com/abstract=3192778> or <http://dx.doi.org/10.2139/ssrn.3192778>.
- Nybo, Martin, Stuhler, Jan, 2014. *Interpreting Trends in Intergenerational Mobility*. Working Paper Series 3/2014 Stockholm University, Swedish Institute for Social Research.
- Ohlsson, Henry, 2011. The legacy of the Swedish gift and inheritance tax, 1884–2004. *Eur. Rev. Econ. Hist.* 15, 539–569.
- Ohlsson, Henry, Roine, Jesper, Waldenström, Daniel, 2014. Inherited wealth over the path of development: Sweden, 1810–2010. UCFS Working Paper 2014:7. Department of Economics, Uppsala University.
- Organisation for Economic Co-operation and Development, 2013. *OECD Guidelines for Micro Statistics on Household Wealth*. Organisation for Economic Co-operation and Development, Paris.
- Paglin, Morton, 1975. The measurement and trend of inequality: a basic revision. *Am. Econ. Rev.* 65, 598–609.
- Pestieau, P., 2003. The role of gift and estate transfers in the United States and in Europe. In: Munnell, Alicia, Sundén, Annika (Eds.), *Death and Dollars*. Brookings Institution, New York, p. 2003.
- Piketty, Thomas, 2011. On the long-run evolution of inheritance: France 1820–2050. *Q. J. Econ.* 126, 1071–1131.
- Piketty, Thomas, Zucman, Gabriel, 2015. Wealth and inheritance in the long run. In: Atkinson, Anthony B., Bourguignon, François (Eds.), *Handbook of Income Distribution*. vol. 2. North-Holland, Amsterdam.
- Prais, S.J., 1955. Measuring social mobility. *J. R. Stat. Soc. Ser. A* 118, 56–66.
- Roine, Jesper, Waldenström, Daniel, 2009. Wealth concentration over the path of development: Sweden, 1873–2006. *Scand. J. Econ.* 111, 151–187.
- Roine, Jesper, Waldenström, Daniel, 2015. Long-run trends in the distribution of income and wealth. In: Atkinson, Anthony B., Bourguignon, François (Eds.), *Handbook in Income Distribution*. Elsevier, Amsterdam.
- Saez, Emmanuel, Zucman, Gabriel, 2016. Wealth inequality in the United States since 1913: evidence from capitalized income tax data. *Q. J. Econ.* 103, 519–578.
- Scholz, John Karl, 2003. Comment on Wolff. In: Munnell, Alicia, Sundén, Annika (Eds.), *Death and Dollars*. Brookings Institution, New York, p. 2003.
- Shorrocks, Anthony F., 1978. The measurement of mobility. *Econometrica* 46, 1013–1024.
- Sierminska, Eva, Brandolini, Andrea, Smeeding, Timothy M., 2006. *The Luxembourg wealth study—a cross-country comparable database for household wealth research*. *J. Econ. Inequal.* 4, 375–383.
- Stiglitz, Joseph E., 1969. The effects of income, wealth, and capital gains taxation on risk-taking. *Q. J. Econ.* 83, 263–283.
- Stiglitz, Joseph E., 1978. Notes on estate taxes, redistribution, and the concept of balanced growth path incidence. *J. Polit. Econ.* 86, 137–150.
- Waldenström, Daniel, 2016. *The National Wealth of Sweden, 1810–2014*. *Scand. Econ. Hist. Rev.* 64, 36–54.
- Weil, David, 1994. The saving of the elderly in micro and macro data. *Q. J. Econ.* 109, 55–81.
- Wolff, Edward N., 2002. Inheritances and wealth inequality, 1989–1998. *Am. Econ. Rev.* 92, 260–264.
- Wolff, Edward N., 2003. *The impact of gifts and bequests on the distribution of wealth*. In: Munnell, Alicia, Sundén, Annika (Eds.), *Death and Dollars*. Brookings Institution, New York.
- Wolff, Edward N., 2013. The asset price meltdown, rising leverage, and the wealth of the middle class. *J. Econ. Issues* 47, 333–342.
- Wolff, Edward N., 2015. *Inheriting Wealth in America. Future Boom or Bust?* Oxford University Press, Oxford.
- Wolff, Edward N., Gittleman, Maury, 2014. Inheritances and the distribution of wealth or whatever happened to the great inheritance boom? *J. Econ. Inequal.* 12, 439–468.