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Mikael Elinder
Oscar Erixson
Daniel Waldenström

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of Labor

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Mikael Elinder
Uppsala University, UCFS and IFN

Oscar Erixson
Uppsala University, UCFS and IFN

Daniel Waldenström
Uppsala University, UCFS, UCLS, CEPR, IZA and IFN

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IZA

P.O. Box 7240
53072 Bonn
Germany

Phone: +49-228-3894-0
Fax: +49-228-3894-180
E-mail: iza@iza.org

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ABSTRACT

Inheritance and Wealth Inequality: Evidence from Population Registers*

We use new population-wide register data on inheritances and wealth in Sweden to estimate the causal impact of inheritances on wealth inequality. We find that inheritances reduce relative wealth inequality (e.g., the Gini coefficient falls by 5–10 percent) but that absolute dispersion increases. 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. In essence, wealthier heirs inherit larger amounts, but less wealthy heirs inherit more relative to their pre-inheritance wealth. We also find that post-inheritance behavioral adjustments mitigate the equalizing effect of inheritances because less wealthy heirs consume larger shares of their inheritances. Moreover, we find that the Swedish inheritance tax reduced the equalizing inheritance effect but that the redistribution of tax revenues could reverse this result. Finally, we show that inheritances increase wealth mobility.

JEL Classification: H24, D63, E21

Keywords: bequests, estates, net worth, inheritance taxation, wealth distribution

Corresponding author:

Daniel Waldenström
Department of Economics
Uppsala University
P.O. Box 513
751 20, Uppsala
Sweden
E-mail: Daniel.Waldenstrom@nek.uu.se

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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.[1] A small but growing body of research has also shown that the importance of inherited wealth has increased recently (Piketty 2011; Ohlsson, Roine and Waldenström 2014). If wealthy children inherit 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 previous literature about whether inheritances increase or decrease wealth inequality. Our contribution lies in estimating the causal effects of inheritances and in characterizing the underlying mechanisms. In addition, we study the impact of inheritances on wealth mobility and the ways in which inheritance taxation influences distributional outcomes. 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, altogether approximately 160,000 decedents, and of all their family and non-family heirs, comprising approximately 470,000 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. Using population-wide, individual-level data on both inheritances and wealth to investigate the effect of inheritances on wealth distribution is a unique contribution to the literature.

Our identification strategy relies on observing inheritances and wealth distributions for different 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, which 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

[1] 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 (2016) document modest increases in the years following the Great Recession.

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 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 comparing pre-inheritance inequality with post-inheritance inequality across the annual inheritance cohorts. Three treatment periods are observed during which heirs inherit sequentially (some receiving zero wealth). Using a standard difference-in-differences estimator, we estimate the impact of inheritances on several measures of inequality. 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 6 percent. 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 share 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 tend 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 percent rather than 6 percent. Examining the mechanisms behind this equality-diluting effect, we find that it stems from less wealthy heirs consuming a larger share

of their inherited wealth than wealthier heirs do.

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.[2] The results indicate that the Swedish inheritance tax *increases* wealth inequality, reflecting that less wealthy heirs pay more in taxes relative to their wealth, while wealthier heirs pay higher inheritance taxes, which 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.

Similar to the causal analysis of inequality, 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 suggests 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 asset values. 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 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 limited 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 examine whether pre-inheritance responses, e.g., heirs adjusting their saving behaviors in response to changed expectations about future inheritances, are quantitatively important and whether they influence our results. 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

[2] Castaneda, Diaz-Gimenez, and Rios-Rull (2003), Cagetti and De Nardi (2009) and Benhabib, Bisin, and Zhu (2011) calibrate dynamic models to evaluate the impact of the U.S. estate tax on income and wealth inequality.

of inherited wealth.[3] 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.[4] More recent research uses individual-level data on people's self-reported wealth and their receipt of gifts and inheritances. In the seminal contributions of Wolff (2002, 2003, 2015) and Wolff and Gittleman (2014), data from the Survey of Consumer Finances are used to estimate how gifts and inheritances influence the distribution of wealth in the United States. A consistent finding in these studies is that inheritances 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 2015), Japan (Horioka 2009), Sweden (Klevmarken 2004) and eight EU countries (Bönke, von Werder and Westermeier 2016). In addition, Boserup, Kopczuk and Kreiner (2016) use Danish individual-level tax register data on the wealth of children (between 45 and 50 years old) whose parents have passed away and find similar equalizing effects.

Although these studies offer several important insights, our exceptionally rich population-wide register panel data, which cover both inheritances and wealth, allow us to offer a more detailed picture of how inheritances influence the distribution of wealth. We can not only credibly identify the causal effects of inheritances on wealth inequality and mobility but also distinguish between mechanical and behavior-adjusted inheritance effects, explain the precise mechanisms that drive these outcomes and estimate the distributional consequences of inheritance taxation.

The remainder of the paper is structured as follows. Section 2 presents the institutional context and the data. Section 3 presents our main findings. Section 4 discusses the role of inheritance taxation, and Section 5 explains how wealth mobility is influenced by inheritances. Section 6 presents the results of all the robustness analyses, and Section 7 discusses some implications of our findings.

[3] See Davies and Shorrocks (2000) and Wolff (2015, chapter 2) for reviews of this literature.

[4] 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, Shleifer and Summers 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 1989; Greenwood and Wolff 1992; De Nardi 2004).

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.

2.1 Inheritance legislation and taxation

In Sweden, when a person passes away, an estate inventory report should be filed with the tax authority, 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 descendants (the decedent's siblings, nephews and nieces), and grandparents and their children (i.e., aunts and uncles).[5] 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, unless the spouse is not the parent of the decedent's children. Common children receive an inheritance from the first deceased parent when the second 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 absence of the will.

Inheritance and gift taxes existed in Sweden until their abolishment in 2004.[6] In the early 2000s, inheritances exceeding SEK 70,000 (approximately USD 10,000) were taxed according to a progressive three-bracket schedule, with marginal tax rates ranging from 10 percent (paid by heirs who inherited amounts roughly between the 70^{th} and the 90^{th} percentiles in the inheritance distribution) to 30 percent in the highest bracket on inheritances over SEK 600,000 (USD 90,000, paid by the approximately the top two percent). 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 Swedish population-wide register called Belinda. It originates from

[5] 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.

[6] The inheritance tax had been criticized for complicating the succession of family firms and for generating unreasonably large tax payments for widows.

the Swedish Tax Agency and contains detailed accounts of the estates of and inheritances from all Swedes who passed away from 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 in Sweden starting in July 2001, but this obligation was suspended when the inheritance tax was abolished in 2005. Although we cannot observe inheritance values for the heirs of decedents who passed away in 2005, we can observe who the decedents and their heirs are. 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 value of the estate and its main components (e.g., non-financial and financial assets, consumer durables, and private insurances), 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 a more 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).

We define heirs as individuals who receive an inheritance through the succession order, are beneficiaries of a will, or are beneficiaries of a life insurance policy. Only heirs of decedents who were not married when they passed away are considered because we want to focus on cases in which a conventional estate division has taken place. Therefore, spousal bequests will

not be considered in the analysis. 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.[7]

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 four inheritance cohorts: 2002, 2003, 2004 and 2005, covering a total of 622,827 heirs. However, the 2005 cohort will only be used when we investigate the role of the inheritance tax.

Wealth data are collected from the wealth register of Statistics Sweden for the 1999–2007 period, i.e., several years before and after the 2002–2004 inheritance years. The wealth register contains detailed individual accounts of real and financial assets and debts, which are all recorded in current market values at year's end, for all individuals in the Swedish population. These data are particularly advantageous because the records come from third-party reports by the tax agency or financial institutions.[8] We focus on private net worth, which is the market value of real and financial assets less all debts, which we observe for all heirs for each year.

Notwithstanding the unique qualities of the inheritance and wealth records, they are not without problems. They stem from tax administrative routines, which may present concerns about avoidance or evasion behaviors with respect to the observed amounts (e.g. Kopczuk 2008 and Eliason and Ohlsson 2008). However, we estimate inheritance effects using both actual inheritance data and third-party reported wealth data, which may suffer less from underreporting problems.

2.3 Descriptive statistics

This study offers the first comprehensive view of the distribution of estates and inheritances in a population-wide register (see Figure 1).[9] First, we observe that the distribution of the dece-

[7] Moreover, to be considered for the analysis, the heir must have an identity number documented in the estate report; otherwise, we cannot link information on wealth (or other economic and demographic characteristics) to the individual. See Appendix A for further details about the selection of the study population.

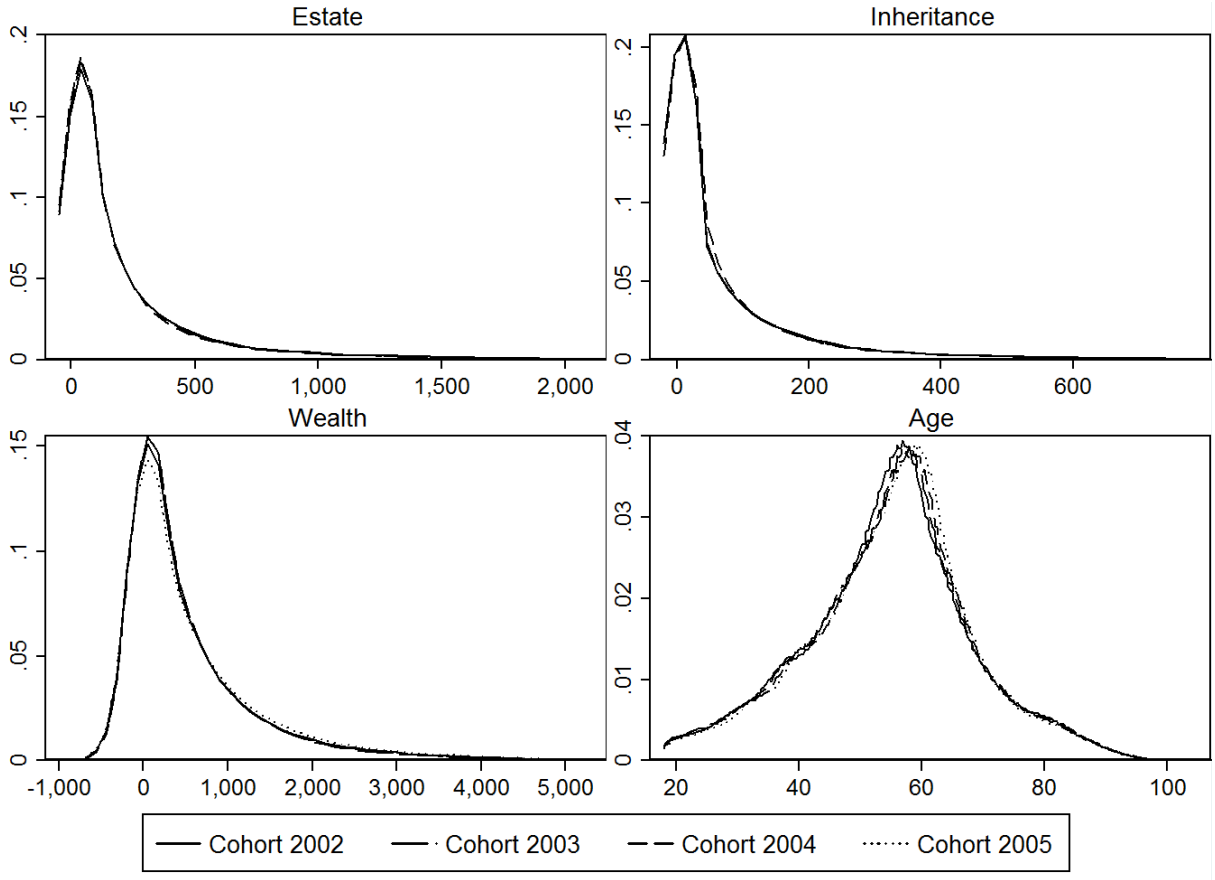
[8] The wealth register has limited information about some assets, especially closely held corporations and funded pension assets. Although this limitation is problematic, these assets are missing in most countries' individual wealth databases; even when observed, they are notoriously difficult to valuate and are not always fully marketable.

[9] See Elinder *et al.* (2015) for a more comprehensive description of Belinda and details on estates and inheritances in Sweden.

dents' estates is highly skewed, as most of the mass is located in the left tail and 17 percent of the estates have zero value. The median value is slightly below SEK 80,000 (approximately USD 12,000), the mean is approximately SEK 230,000 (USD 35,000) and the 99th percentile of estates is approximately SEK 2 million (USD 300,000).[10] The top percentile share accounts for almost 18 percent of the total estate wealth, and the top decile accounts for more than 55 percent, which are levels that are largely 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 39 percent of the heirs inheriting nothing at all; the top tenth of inheritances represent 60 percent 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 highly skewed (with Gini coefficients of approximately 0.8, as examined further in the next section) and nearly identical across the cohorts. Finally, the figure displays the heirs' age distribution. Two-thirds of the heirs are between 50 and 70 years old.

[10] Using the exchange rate at end of 2004.

Figure 1: Graphs of the estate, inheritance, wealth, and age distributions.



Notes: Estates, inheritances and wealth are presented in 2003 constant prices. The distribution graphs of estates and inheritances are calculated for the decedents (161,060) and heirs (472,413) of the 2002–2004 cohorts, while the net worth and age distributions also include the heirs of the 2005 cohort (150,914 heirs). 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.

Table 1 presents additional descriptive statistics. The inheritance cohorts are nearly identical in all dimensions, which is also expected, as they comprise the entire population of inheriting individuals for each year. The average wealth of 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 this dimension.

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

	Inheritance cohort			
	2002	2003	2004	2005
Characteristics of heirs				
Age at inheritance	54.5	54.6	54.9	55.1
Child of the decedent (%)	56.7	57.1	55.6	59.4
Woman (%)	50.7	50.5	50.7	50.6
Married (%)	53.8	53.2	52.7	52.3
Upper secondary or post-graduate degree (%)	24.6	25.4	25.7	26.2
Taxable labor income (USD)	33,239	33,987	34,394	35,484
Wealth $T-1$ (USD)	96,521	89,216	94,466	104,410
Gross inheritance (USD)	12,465	12,603	13,413	n.a.
Net inheritance (USD)	11,031	11,139	11,802	n.a.
Paying inheritance tax (%)	32.9	33.0	34.2	n.a.
Having received taxable gifts (%)	1.9	1.9	2.0	n.a.
Taxable gifts (USD)	405	422	433	n.a.
Characteristics of decedents				
Age	81.6	81.4	81.6	81.6
Woman (%)	64.1	63.2	63.5	63.1
Marital status				
Widow/widower (%)	65.4	64.7	64.7	64.2
Never married (%)	17.5	17.7	17.5	17.3
Divorced (%)	17.0	17.7	17.7	18.5
Number of heirs	2.91	2.92	2.98	2.83
Number of children	1.65	1.66	1.65	1.67
Estate (USD)	33,878	34,257	36,739	n.a.
Number of decedents	55,760	54,641	50,659	53,184
Number of heirs	162,207	159,292	150,914	150,414

Notes: All monetary values are measured in the year prior to the inheritance, and they are expressed in 2003 constant prices using end of 2004 USD/SEK exchange rate. Means of the decedents' characteristics are calculated over the number of decedents.

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 (whenever debts are larger than assets). Therefore, our main analysis uses unidimensional inequality measures that are able to handle negative values, most prominently the Gini coefficient.[11] We

[11] The statistical properties of the Gini coefficient are intact with negative values, but its normative interpretations are less straightforward (e.g., How should the negative shares of a pie be distributed?). For more detailed discussions of inequality measures with negative values, see Cowell (2013) and OECD (2013, Ch. 7).

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 appendix also the range between the 1st and 99th wealth percentiles).

3. The effect of inheriting on wealth inequality

We estimate direct mechanical and behavior-adjusted effects of inheritances on wealth inequality among heirs. Conceptually, the DME is the immediate distributional change that arises from adding the inherited amount to the heirs' pre-inheritance wealth. The BAE also accounts for behavioral responses among heirs, which reflect that receiving an inheritance may influence labor supply, consumption and investment decisions that 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 the full population of 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 (perhaps even zero) or a larger sum.

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 inequality in the wealth distribution in the period just before the heirs inherit to 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 ε, the DME on D^W would be given by $D^W_{T+\varepsilon} - D^W_{T-\varepsilon}$. To estimate DME using this strategy, ε 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 levels in the years before and after inheritance is clearly a too long time span to identify the DME because behav-

ioral 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:

$$DME = D_{T-1}^{W+I} - D_{T-1}^{W}, \quad (1)$$

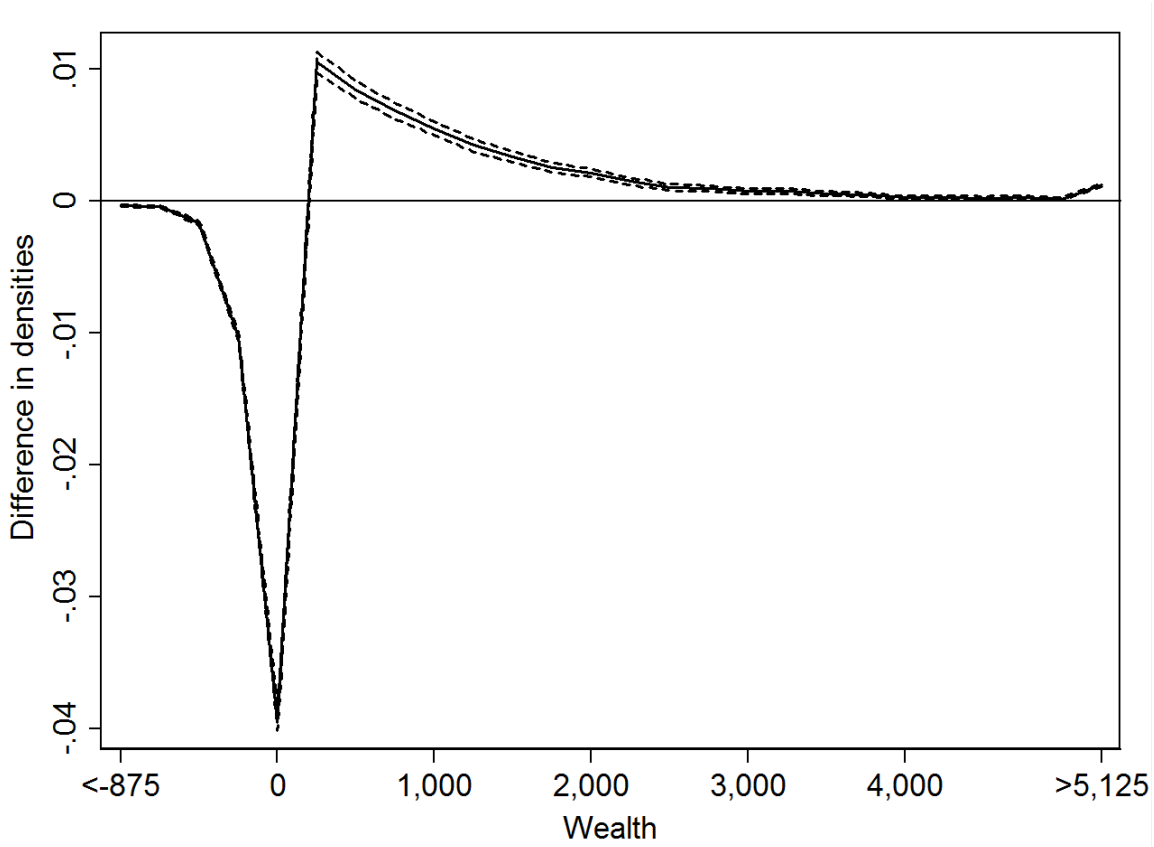
where D_{T-1}^{W} is the measure of wealth distribution in the year prior to the inheritance, and D_{T-1}^{W+I} is the same distributional measure that is calculated for the distribution of the sum of wealth (in $T-1$) and the inheritance I.

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 the DME's mechanical in nature, without any stochastic element, and the large size of the population 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. Figure 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 relatively large drop in density occurs around zero wealth, and a sizable increase in density occurs at moderate wealth levels. Thus, heirs with basically no wealth seemingly 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 essentially the same 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 heirs' pre-inheritance wealth has the quantitatively largest influence on the middle parts of the wealth distribution, whereas the tails are largely unaffected.

Figure 2: Non-parametrical illustration of the DME on the wealth distribution.



Notes: 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 472,413 heirs (2002–2004 cohorts). The confidence bands (dashed) are based on bootstrapped standard errors (1,000 repetitions). Wealth (SEK 1,000) is presented in 2003 constant prices.

We now shift our 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.

Table 2 presents the DME on five unidimensional measures of inequality that are discussed in section 2.4. The estimated effects with respect to these measures mirror the pattern displayed in Figure 2. First, we see that relative inequality decreases. The Gini coefficient falls from 0.802 to 0.754 (averaged over all three inheritance cohorts), corresponding to a reduction of six percent and revealing 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 ine-

quality. The wealth percentile ratio P90/P50 falls quite substantially—by approximately 15 percent. The wealth share of the top decile also falls, from 56 to 52.5 percent, while the wealth share of the bottom half of the distribution actually increases from minus 1.5 percent to plus 1.4 percent.

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

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

Table 2: DME on wealth inequality.

	(1)	(2)	(3)	(4)	(5)
Outcome	Gini	P90/P50	Top 10%	Bottom 50%	P75–P25
Inheritance effect	–0.048***	–0.975***	–0.031***	0.029***	59,948***
	(0.0004)	(0.014)	(0.0003)	(0.0004)	(1,049)
Mean of outcome $T-1$	0.802	6.612	0.556	–0.015	765,304
Effect in %	–6.0	–14.7	–5.6	.	7.8

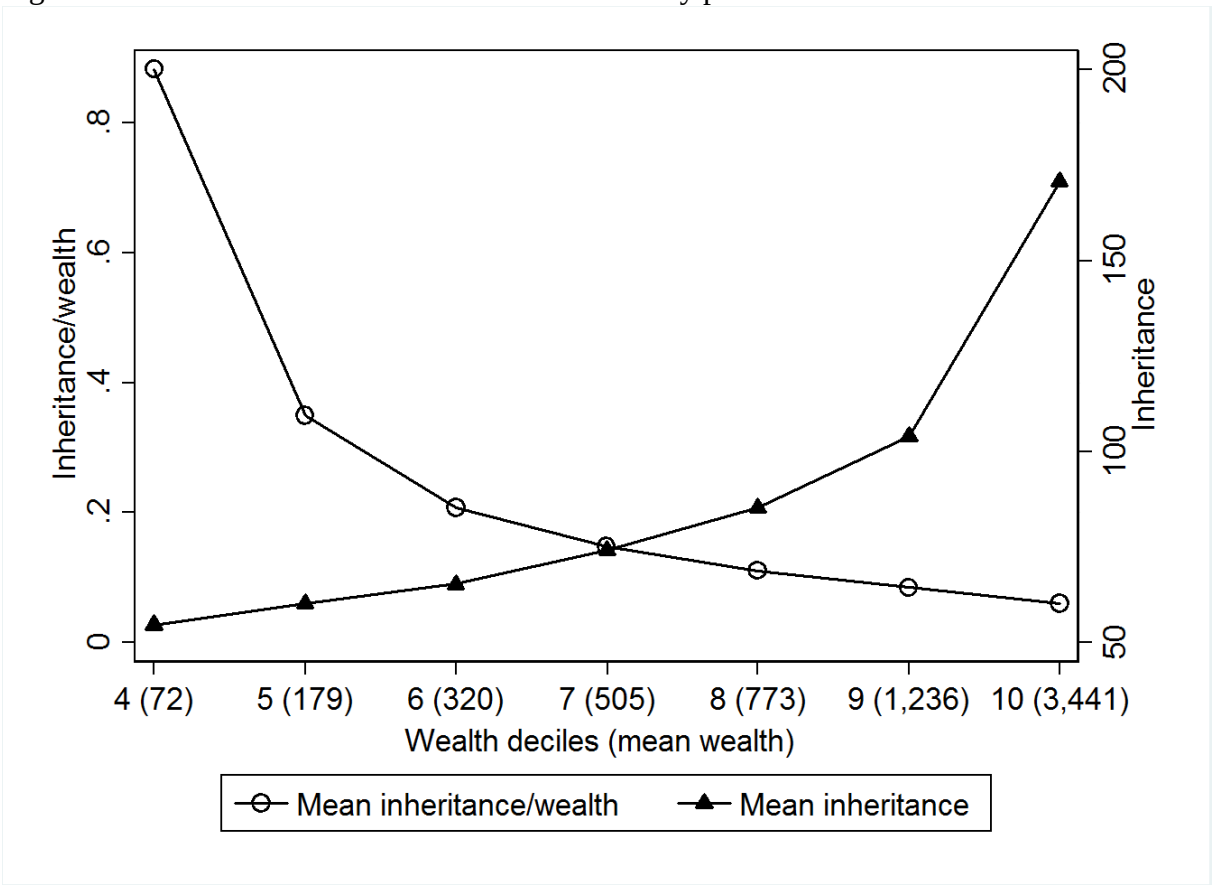
Notes: The estimates provide the difference between the unidimensional measure for the wealth distribution in $T-1$ and the unidimensional measure for the distribution of the sum of wealth in $T-1$ and the inheritance. The estimates are based on data on 472,413 heirs (2002–2004 cohorts). Bootstrapped standard errors are presented in parentheses (1,000 repetitions). * significant at the 10-percent level, ** significant at the 5-percent level, *** significant at the 1=percent level. *Effect in %* is calculated as (*Inheritance effect* / *Mean of outcome* $T-1$*)* × 100.

3.1.2 Why do inheritances reduce wealth inequality?

In this section, we investigate two potential mechanisms that may explain why inheritances reduce wealth inequality. First, compared with wealthier heirs, less wealthy heirs may receive inheritances that are larger relative to their pre-inheritance wealth. Second, wealthier decedents may have more children, each of whom will then receive a smaller inheritance. As will become clear, the reduction in inequality is better explained by less wealthy heirs receiving inheritances that are large relative to their wealth than by the wealthier having more children. The role of inheritance tax will be discussed separately in Section 4.

Figure 3 shows how the inherited amounts vary with wealth of the heirs. Wealthier heirs (in the year before they inherit) receive larger inheritances than heirs who are initially less wealthy. Heirs in the fourth wealth decile (which is the lowest decile for which all heirs have positive wealth) receive inheritances amounting to approximately SEK 60,000 (right axis), on average. Notably, the inherited amounts increase as we move up to higher wealth deciles. In the top decile, the mean inheritance amounts to SEK 187,000. While wealthier heirs receive larger inheritances, Figure 3 also shows that the inherited amount, as a share of wealth (left axis), displays the opposite pattern. Heirs in the fourth wealth decile receive inheritances that effectively double their wealth, whereas heirs in the higher wealth deciles receive inheritances that are smaller relative to their pre-inheritance wealth. In the top decile, the inheritance corresponds to approximately 3 percent of pre-inheritance wealth, on average. Less wealthy receive relatively larger inheritances, which is likely the primary explanation for the equalizing effect of inheritances on the wealth distribution.

Figure 3: Absolute and relative sizes of inheritance by pre-inheritance wealth decile.

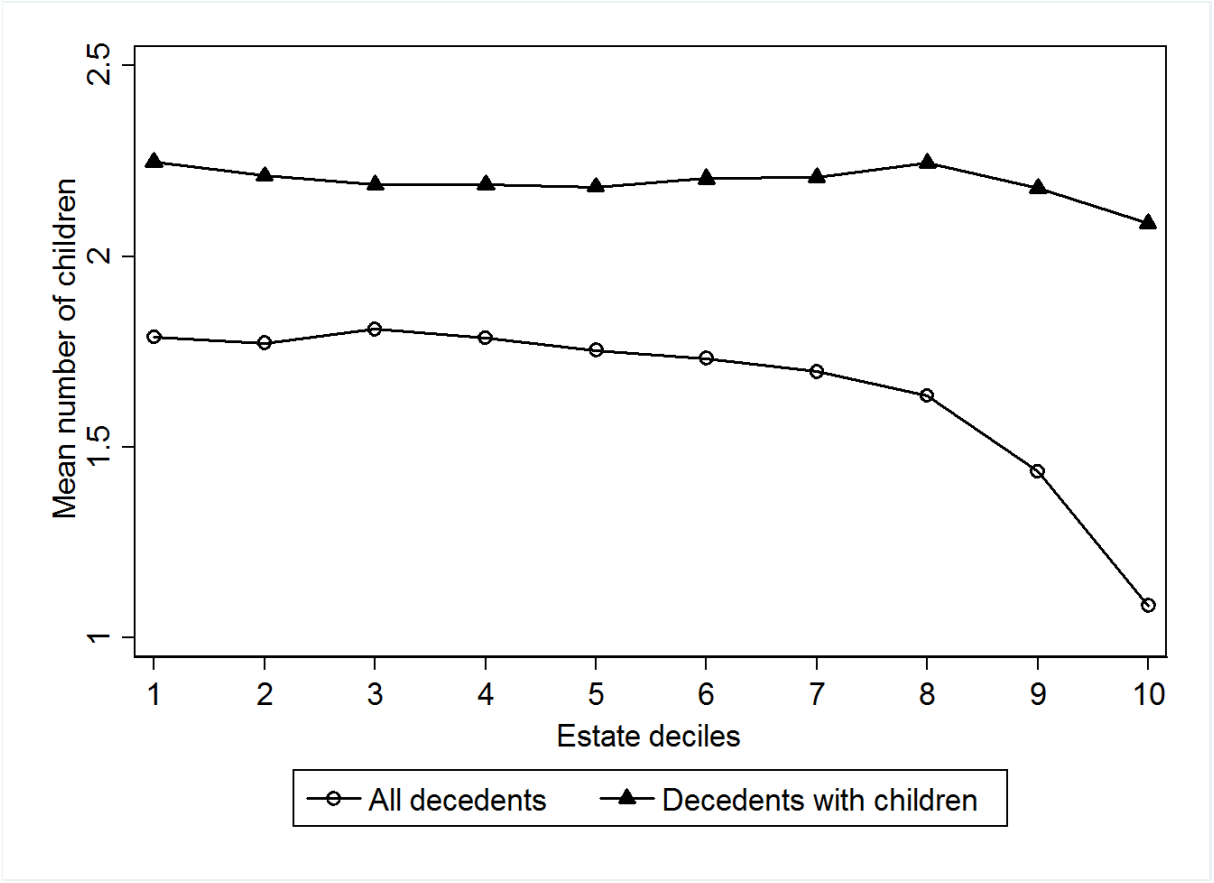


Notes: Wealth (SEK 1,000) and inheritance (SEK 1,000) are presented in 2003 constant prices for the 2002–2004 cohorts. Wealth deciles 1–3 are omitted because of negative wealth values. Mean wealth and mean inheritance for deciles 1–3 are SEK –114,000 and SEK 49,000, respectively.

The second proposed explanation for this equalizing inheritance effect relates to differential fertility patterns across the distribution. A standard implication of any model of intergenerational transfers is that the degree of equalization increases in 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.

Figure 4 depicts the average number of children by the level of the decedents' estate sizes. The graph for all the decedents shows that, in the bottom eight deciles, the average number of children hovers at approximately 1.7, then falling to 1.4 in the ninth estate decile and to just over one in the highest estate decile. Even when only considering the estates of decedents with children, the top estates do not have more children than the overall average. Naturally, a number of factors account for this pattern, but the analysis still offers forceful evidence against the hypothesis that the wealthy, on average, have more children, which thus drives the equalizing effect of inheritances.

Figure 4: Number of children by estate decile.



Notes: "All decedents" refers to the 161,060 decedents in the 2002–2004 cohorts. "Decedents with children" refers to the 121,137 decedents with children (2002–2004 cohorts).

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. 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:

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

where D^{W}_{Pre} and D^{W}_{Post} 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 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, 2016). 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 a cohort that is identical, except that its members inherit a year later. In our case, we will compare wealth distributions from 1999–2007 across the three cohorts that inherited sequentially over the 2002–2004 period. We aim to identify the effect of inheriting in a given year relative to inheriting one or two years later. In particular, we estimate the BAE on unidimensional measures of inequality, using the following empirical model:

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

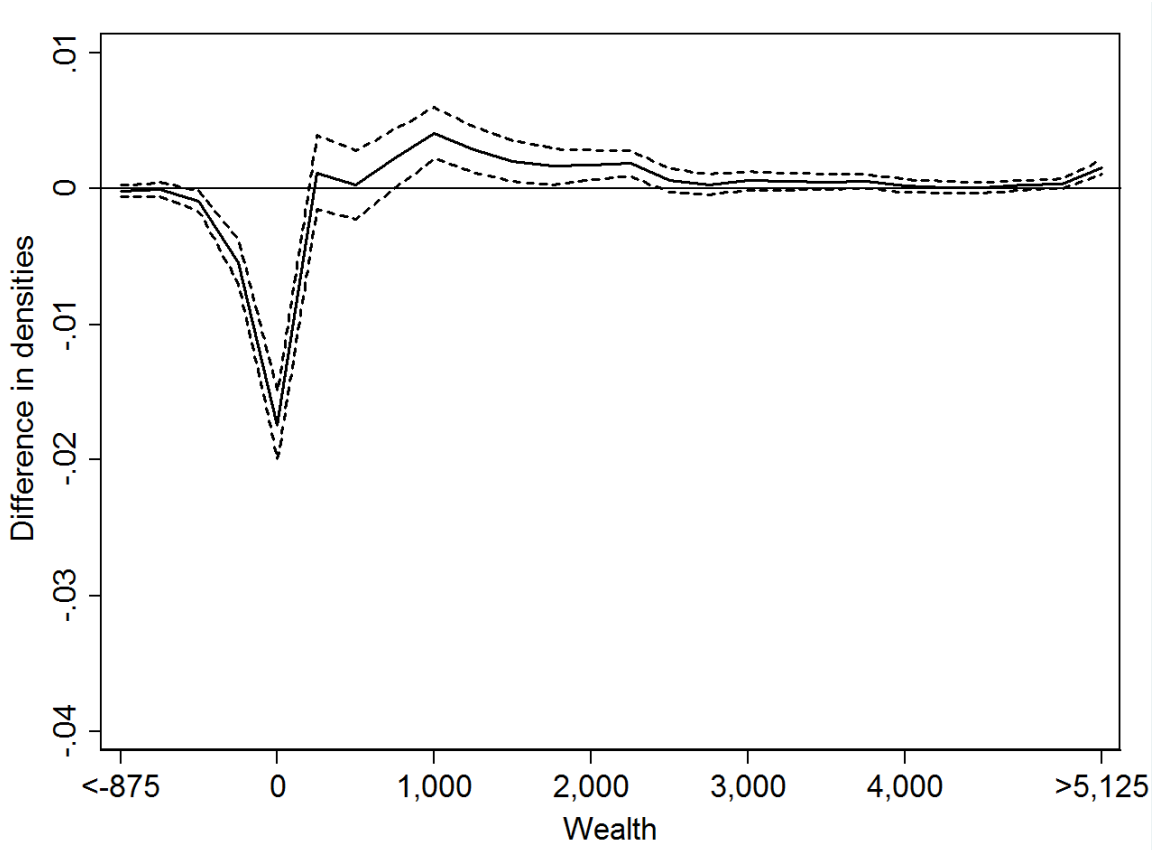
In Equation (3), $D_{c,y}^{W}$ denotes wealth inequality that varies across cohorts c and calendar years y. $PostInheritance$ is a cohort-specific indicator variable, which equals one from the year of the inheritance onwards. We also include year and cohort fixed effects, captured by λ_y and λ_c, respectively, 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 get 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 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 cohort experience the same macro environment and aging process, the differences in wealth distributions effectively only reflect the inheritances of the 2002 cohort.[12] Figure 5 shows the results. A preliminary observation is that the pattern resembles the one seen for the DME in Figure 4; 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 substantially smaller, around half of the one measured for the DME.

[12] While this comparison effectively removes biases that stem from aging and changing macroeconomic condition, 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 Appendix B, Table B1, showing 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 Figure 5.

Figure 5: Non-parametrical illustration of the BAE on the wealth distribution for the 2002 and 2004 cohorts.



Notes: 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 313,121 heirs (162,207 from the 2002 cohort and 150,914 from the 2004 cohort). The confidence bands (dashed) are based on bootstrapped standard errors (1,000 repetitions). Wealth (SEK 1,000) is presented in 2003 constant prices.

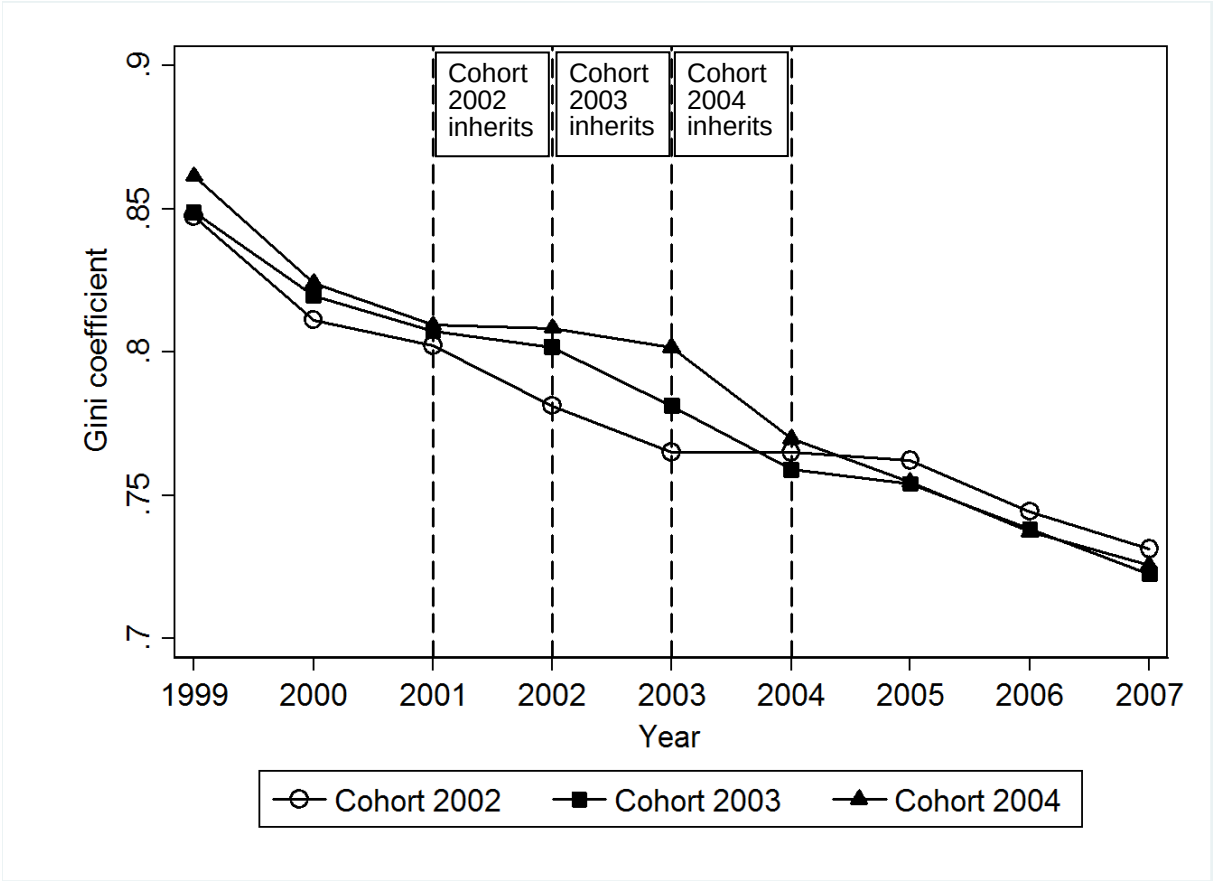
Next, we turn to analyzing the BAE on unidimensional wealth inequality and absolute dispersion. In contrast to the graphical analysis, we now use the 2002, 2003 and 2004 cohorts simultaneously and exploit the full wealth register data from 1999 to 2007. Therefore, the estimated inheritance effect captures the average effect over the five years after inheritance.[13] As noted in the previous section, the identification strategy assumes that wealth inequality would evolve similarly for all cohorts had they not inherited.

Figure 6 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

[13] This is correct under the assumption of homogeneous treatment effects across the cohorts. However, in the estimations, we can only follow the 2003 and 2004 cohorts three and four years after inheritance. Under weaker assumptions, we would estimate a weighted average treatment effect.

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, the Gini coefficients of that cohort drops 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.[14] As clearly shown in Figure 6, changes in wealth inequality differ across the cohorts *only in the two years when they inherit*. This strikingly consistent pattern offers strong evidence of the equalizing effect of inheritances on the wealth distribution.

Figure 6: Development of the Gini coefficient by inheritance cohort.



Notes: The points on the graphs indicate the Gini coefficients calculated for the distribution of wealth as of December 31 of the respective year.

Table 3 reports the estimation results of the BAE on the five inequality and dispersion

[14] The post-inheritance downward trend in the Gini coefficient could, in principle, mean that the equalizing impact of inheritances is reinforced by time, but we cannot separate this effect from other confounding factors that affect inequality trends here.

measures generated by the difference-in-differences estimator (Eq. 3). The coefficient estimate in the first column of Table 2 shows that the inheritance effect causes a reduction in the Gini coefficient by 0.035 points, which is equivalent to a drop of 4.4 percent (when compared with the baseline of 0.802).

The estimates of the inheritance effects on the other relative dispersion measures confirm what we have observed already in Figure 5, and they are qualitatively similar to the DMEs. The P90/P50 decreases by 9 percent, and the share of total wealth held by the wealthiest decile falls by 5 percent. Notably, the poorest half increases their share of total wealth from minus 1.5 percent to just above zero. Finally, the estimated effect of inheritances on the distance between the 75^{th} and the 25^{th} wealth percentiles indicates that wealth dispersion increases as a consequence of inheritances.

Taken together, the results confirm the patterns that we found when we estimated the DME, i.e., that relative inequality decreases while absolute dispersion increases. That said, the equalizing effects are generally 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.

Table 3: BAE on wealth inequality.

	(1)	(2)	(3)	(4)	(5)
Outcome	Gini	P90/P50	Top 10%	Bottom 50%	P75–P25
Inheritance effect (δ)	–0.035***	–0.601***	–0.029***	0.018***	64,998***
	(0.008)	(0.163)	(0.004)	(0.005)	(15,484)
Mean of outcome $T-1$	0.802	6.609	0.556	–0.015	765,926
Effect in %	–4.4	–9.1	–5.2	–	8.5

Notes: The estimates are based on 24 observations (3 cohorts [2002–2004] over 8 years) using data on 472,413 heirs. Standard errors appear in parentheses. * significant at the 10-percent level, ** significant at the 5-percent level, *** significant at the 1-percent level. δ is the coefficient of *PostInheritance* in Equation (4). *Effect in %* is calculated as (*Inheritance effect (δ)* / *Mean of outcome* $T-1$*)* × 100.

3.2.2 Why is the behavior-adjusted effect smaller than the direct mechanical effect?

When comparing the two inheritance effects on wealth inequality, we observed that the BAE is generally smaller than the DME. In the case of Gini coefficients, the BAE is 4.4 percent, and the DME is 6 percent.

Why is the equalizing effect of inheritances generally less pronounced when behavioral re-

sponses are accounted for? Departing from a standard framework for wealth accumulation, several possible explanations are consistent with such a pattern.[15] The first possible explanation is that, compared wealthier heirs, less wealthy heirs have a higher marginal propensity to consume their inheritances (e.g., Kreiner, Lassen and Leth-Petersen 2014; Carroll, Slacalek and Tokuoka 2015). 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.[16]

Although a thorough evaluation of behavioral responses to inheritances is beyond the scope of this paper, we will nevertheless provide some evidence of the importance of these explanations. We calculate *the remaining share of the inheritance* in the year after inheritance, RI_{T+1}, for each decile of the wealth distribution in the year prior to the inheritance ($T-1$). If the first explanation for the discrepancy between DME and BAE is correct, we should expect that heirs with relatively low pre-inheritance wealth will have consumed a larger share of their inheritances than richer heirs have. The second explanation is expected to yield a similar pattern, but RI_{T+1} may be larger than one for the wealthiest heirs. The hypotheses thus posit that RI_{T+1} is increasing in wealth and that RI_{T+1} exceeds one for the top decile(s) if wealthier heirs receive higher returns on their inheritances.

We calculate RI_{T+1} as follows. First, we calculate the mean difference in wealth between the year before and the year after inheritance ($\Delta W = W_{T+1} - W_{T-1}$) for each wealth decile of the 2002 cohort. This difference may be the result of not only the inheritances but also aging and macroeconomic influences. To isolate the inheritance effect, we subtract from ΔW for each wealth decile of the 2002 cohort, a similar difference calculated for the 2004 cohort (which has not yet inherited) over the same calendar years. Doing this effectively removes the counterfactual increase in wealth for each wealth decile of the 2002 cohort. Finally, we relate the mean increase in wealth within the decile to the corresponding mean inheritance within

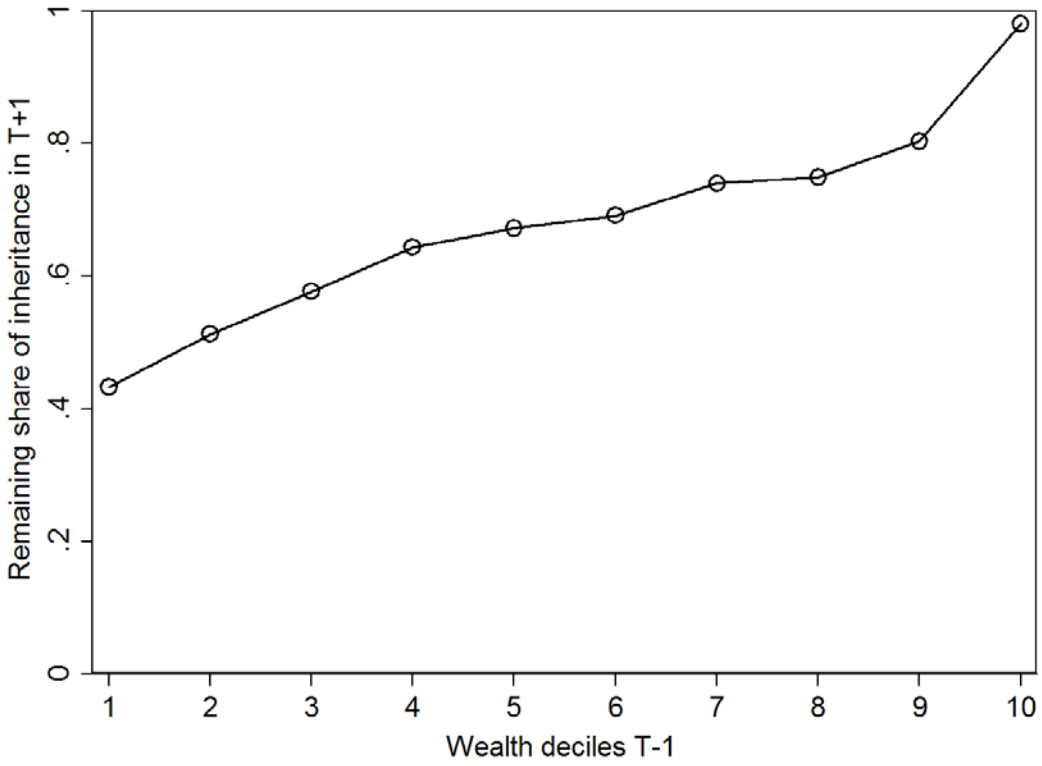
[15] A simple process for wealth accumulation (see, e.g., Davies and Shorrocks 2000) would be one that describes next period's wealth as a function of past wealth plus net income savings (which could depend on inheritances for labor supply reasons) and inherited wealth: $W_{t+1} = W_t + (s-c)Y_t(I) + (s-c)I_t$. 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.

[16] 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 Erixson and Ohlsson 2012, Brown, Coile and Weisbenner 2010; Holtz-Eakin, Joulfaian and Rosen 1994).

the same decile. Unfortunately, this approach is not well suited to explain wealth changes due to inheritances when the inheritances are very low relative to the heirs' initial wealth. For this reason, we remove heirs who inherit less than SEK 1,000 or less than 1 percent of their pre-inheritance wealth from the calculations.

We illustrate the result of this exercise in Figure 7. Notably, the remaining share of the inheritance (RI_{T+1}) increases monotonically from approximately 40 percent among heirs in the lowest decile to approximately 100 percent among heirs in the top decile. Hence, the equalizing BAE is likely smaller than the DME because, compared with wealthier heirs, less wealthy heirs consume larger shares of their inheritances. However, there is no direct indication that those at the top receive disproportionate returns on their inheritances.

Figure 7: Share of inheritance remaining the year after the heir inherits (across wealth deciles).



Note: "Remaining share of inheritances in $T + 1$" refers to RI_{T+1} (see Section 3.2.2 for definition).

4. Inheritance taxation and wealth inequality

In this section, we present the first empirical analysis of inheritance taxation on wealth ine-

quality using individual-level register data.[17] 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 still predict that inheritance (or estate) taxes may increase wealth inequality (e.g., Stiglitz 1978; Becker and Tomes 1979; Atkinson 1980; Davies 1986).[18] While these models typically focus 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. The estimated effects should be interpreted as the effects of an unexpected repeal of the inheritance tax.[19] The actual repeal was effectively unexpected, as it was announced just a few months before the repeal occurred.

We begin by examining how DMEs change if we add gross inheritance instead of net-of-tax inheritance to pre-inheritance wealth. We contrast DMEs using gross and net-of-inheritance tax payments. The results are reported in Panel A of Table 4. 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 Sweden in the early 2000s.

Panel B presents the results from a different test, exploiting the inheritance tax reform in late 2004, which led to the repeal of 2005. Because our dataset includes the cohort of heirs that inherited in 2005 under the no-tax regime, we can examine if the inheritance effect on wealth inequality for this single cohort differs from that of the tax-paying cohorts. An observed difference is interpreted as the BAE of the inheritance tax. This difference is obtained by estimating Equation 3 (see Section 3.2) with the addition of an interaction term for the 2005 cohort ($PostInherit \times$ 2005 cohort). Table 4 reports that the equalizing effect is larger for the 2005 cohort than for the other cohorts, again suggesting that the tax increases inequality. The stronger equalizing effect for the 2005 cohort is apparent in all the outcomes, except the range

[17] 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, Diaz-Gimenez and Rios-Rull (2003), Cagetti and DeNardi (2009) and Benhabib, Bisin and Zhu (2011) conclude that abolishing the estate tax would lead to increases in wealth inequality, with the exact size depending on specific modeling assumptions.

[18] For overviews of central issues related to the taxation of intergenerational transfers, see Davies (1986), Cremer and Pestieau (2011) and Kopczuk (2013).

[19] Hence, they do not reveal that the inheritance amount may be affected by the tax.

measure P75–P25. The results suggest that the inheritance tax leads to higher inequality but lower absolute dispersion.[20]

Table 4: Effect of inheritance tax repeal on wealth inequality.

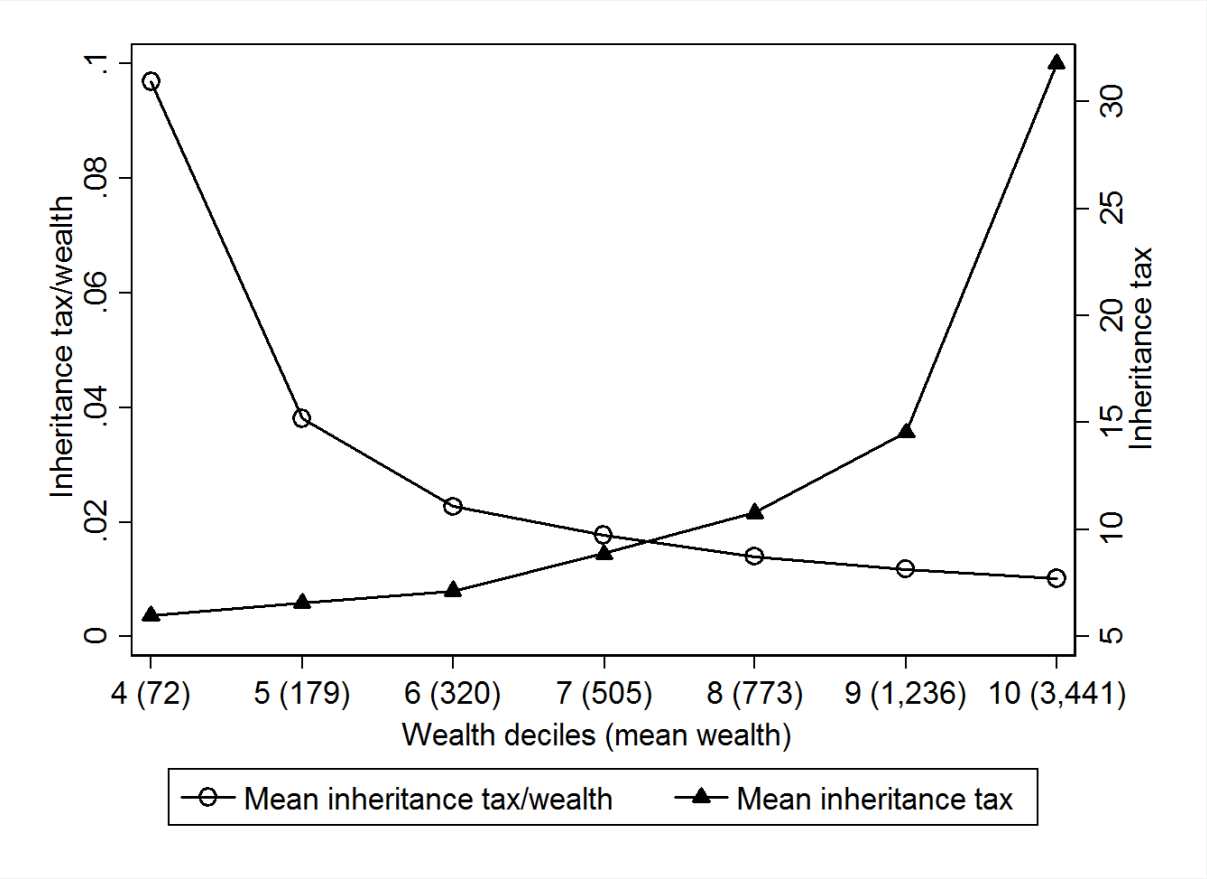
Outcome	(1) Gini	(2) P90/P50	(5) Top 10%	(6) Bottom 50%	(8) P75–P25
			A: DME		
Tax repeal effect	–0.002***	–0.016***	–0.001***	0.001***	10,782***
	(0.00004)	(0.004)	(0.0001)	(0.00002)	(376)
Mean of outcome $T-1$	0.802	6.612	0.556	–0.015	765,304
Effect in %	–0.2	–0.2	–0.2	–	1.4
			B: BAE		
Tax repeal effect	–0.014***	–0.443***	–0.007**	0.009***	47,526***
	(0.005)	(0.101)	(0.003)	(0.003)	(8,413)
Mean of outcome $T-1$	0.799	6.603	0.552	–0.014	794,688
Effect in %	–1.8	–6.7	–1.3	–	6.0

Notes: Panel A: Estimates show (a) the difference between the unidimensional measure for the wealth distribution in $T-1$ and the unidimensional measure for the distribution of the sum of wealth in $T-1$ and the net inheritance and (b) the difference between the unidimensional measure for the wealth distribution in $T-1$ and the unidimensional measure for the distribution of the sum of wealth in $T-1$ and the gross inheritance. The estimates are based on data on 472,413 heirs (2002–2004 cohorts). Bootstrapped standard errors are presented in parentheses (1,000 repetitions). *Panel B*: The estimates are based 32 observations (4 cohorts [2002–2005] over 8 years) using data on 622,827 heirs. *Tax repeal effect* is the coefficient estimate for *PostInheritance* × the 2005 cohort added to Equation (4). *Effect in %* is calculated as (*Tax repeal effect)* / *Mean of outcome* $T-1$*)* × 100. Standard errors are presented in parentheses. * significant at the 10-percent level, ** significant at the 5-percent level, *** significant at the 1-percent level.

To determine what causes the disequalizing effect of the inheritance tax, Figure 8 displays the average level of inheritance and gift tax payments by 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 pre-inheritance wealth of the less wealthy. We thus interpret the results of the two tests as evidence that the equalizing effect of inheriting is actually stronger without the inheritance tax.

[20] While the results presented in Panel A and Panel B are qualitatively similar, the effect is more pronounced in Panel B. Because the results in the two panels are obtained using different types of adjustments to the original methods for estimating the DME and BAE, we are not confident in interpreting the quantitative differences between the estimates in Panel A and Panel B.

Figure 8: Absolute and relative inheritance tax payments by pre-inheritance wealth decile.



Notes: Wealth (SEK 1,000) and inheritance tax (SEK 1,000) are presented in 2003 constant prices. Wealth deciles 1–3 are omitted because of negative values for wealth.

We now extend the analysis in two important respects. First, we address the possible redistributive role that the tax receipts can play. Second, we examine whether our results reflect the specific structure of Swedish inheritance tax institutions of the early 2000s by assessing what would have happened if a confiscatory tax had been levied instead. Table 5 reports DME estimations under these extensions.

In Panel A, we show DMEs when 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 strongly counteracts the disequalizing effect of the inheritance tax found in Table 4. When the revenues are redistributed among all heirs, the equalizing effect of the inheritances increases (instead of decreasing 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, relative inequality falls more than in the baseline case. The abso-

lute dispersion is also reduced as a consequence of redistributing tax revenues.

Table 5: DME if tax revenues are redistributed to decrease inequality

Outcome	(1) Gini	(2) P90/P50	(3) Top 10%	(4) Bottom 50%	(5) P75–P25
Baseline DME	–0.048***	–0.975***	–0.031***	0.029***	59,948***
Group receiving transfer	*A: Redistributing actual tax revenues*				
All	–0.059***	–1.120***	–0.037***	0.036***	59,906***
Below median *W*	–0.066***	–1.087***	–0.039***	0.042***	40,512***
Lowest *W* quartile	–0.069***	–1.005***	–0.039***	0.043***	44,792***
	B: Redistributing confiscatory inheritance tax revenues				
All	–0.097***	–1.452***	–0.055***	0.062***	0
Below median *W*	–0.156***	–1.810***	–0.067***	0.115***	–169,610***
Lowest *W* quartile	–0.149***	–1.236***	–0.061***	0.110***	–159,868***
Mean of outcome in *T-1*	0.802	6.612	0.556	–0.015	765,304

Notes: Estimates are based on differences between the wealth distribution in $T-1$ and the distribution of the sum of inheritances and wealth in $T-1$, using data on 472,413 heirs (All), 236,207 heirs (Below median *W*), and 118,103 heirs (In lowest *W* quartile). Bootstrapped standard errors are presented in parentheses (1,000 repetitions). * significant at the 10-percent level, ** significant at the 5-percent level, *** significant at the 1-percent level.

In Panel B of Table 5, 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. While the Swedish tax was relatively similar to the inheritance and estate taxes of other countries, its top marginal tax rate of 30 percent was relatively low both internationally (Cremer and Pestieau 2011) and historically (Henrekson and Waldenström 2016). Of course, the case of an imagined 100 percent 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 5 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 distribution: giving to everyone almost doubles the equalizing effect of inheritance, from the baseline of –6 percent to –11 percent. When applying the directed redis-

tributive schemes, the equalizing effect grows even more, reducing the Gini coefficient by up to 20 percent.

In sum, 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, an equalization effect results.

5. Inheritance and wealth mobility

While our main results are clear about bequests reducing wealth inequality, they do not reveal whether this effect is associated with heirs changing positions in the wealth distribution or whether bequests are essentially rank-preserving. Because these outcomes are important for both normative and welfare-related interpretations of inheritance, this section presents an analysis—to the best of our knowledge, the first of its kind—on how inheritances influence *wealth mobility*.[21]

Intragenerational wealth mobility can be measured in several ways (Burkhauser, Nolan and Couch 2009; Jäntti and Jenkins 2015), and we choose one of the most standard approaches, which involves comparing 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. To assess the direct mechanical and behavior-adjusted mobility effects, we convert the matrices into the unidimensional Shorrocks-Prais mobility index, ranging from 0 (perfect immobility) to 1 (perfect mobility) (Prais 1955; Shorrocks 1978).[22]

The direct mechanical mobility effect 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 almost 42 percent 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), the mobility effect is

[21] Another mobility dimension concerns the role of family background in a person's wealth outcome, i.e., the degree of intergenerational mobility. For a study of how inheritance affects this kind of mobility, see Adermon, Lindahl and Waldenström (2015).

[22] For an $n \times n$ matrix M, the Shorrocks-Prais mobility index is defined as $\big(n - trace(M)\big)/(n-1)$.

clearly mainly driven by the movements of heirs in the lower part of the wealth distribution rather than by movements of heirs in the top part.

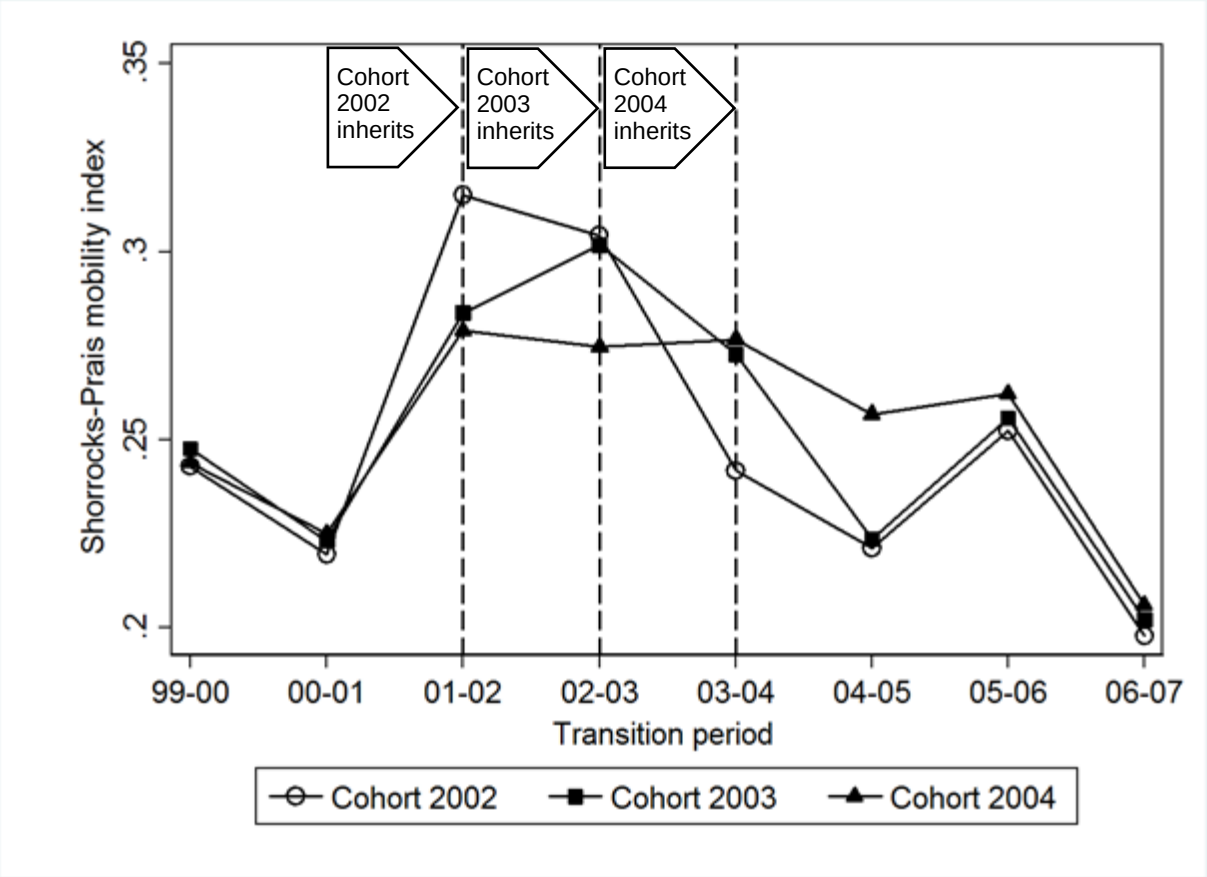
Table 6: DME on wealth mobility.

	(1)	(2)	(3)	(4)	(5)	(6)
	Shorrocks-Prais	Probability of leaving nth quintile after inheriting				
Outcome		1st	2nd	3rd	4th	5th
Inheritance effect	0.108***	0.097***	0.144***	0.098***	0.066***	0.026***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Mean in $T-1$	0.258	0.167	0.252	0.273	0.233	0.109
Effect in %	41.7	58.1	57.0	36.1	28.4	24.1

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 472,413 heirs (2002–2004 cohorts). Bootstrapped standard errors are presented in parentheses (1,000 repetitions). * significant at the 10-percent level, ** significant at the 5-percent level, *** significant at the 1-percent level. Effect in % is calculated as (Inheritance effect / Mean of outcome $T-1$) × 100.

To estimate the behavior-adjusted mobility effect, we implement the same approach that is used in the inequality analysis (Section 3.2). In Figure 9, 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 2001–2002, 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).

Figure 9: Evolution of wealth mobility (Shorrocks-Prais mobility index).



Notes: 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.

To be more precise in determining the magnitude of the behavior-adjusted mobility effect, we estimate the effect using the difference-in-differences model of Equation 3.[23] The results in Table 7 show that overall mobility increases by 16.5 percent (a treatment effect of 0.043 compared with the average pre-inheritance Shorrocks-Prais index of 0.259). Although significant, this effect is less than half the direct mechanical mobility effect 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 from 12 to 20 percent depending on the part of the distribution that is considered.

[23] Rather than controlling for year fixed effects, we now include transition period fixed effects.

Table 7: BAE on wealth mobility.

	(1)	(2)	(3)	(4)	(5)	(6)
	Shorrocks-	Probability of leaving nth quintile after inheriting				
Outcome	Prais	1st	2nd	3rd	4th	5th
Inheritance effect (δ)	0.043**	0.021**	0.050***	0.048**	0.037**	0.018**
	(0.015)	(0.007)	(0.014)	(0.018)	(0.014)	(0.007)
Mean in $T-1$	0.258	0.167	0.252	0.273	0.233	0.109
Effect in %	16.5	12.2	19.5	17.6	15.9	16.8

Notes: The estimates are based 21 observations (3 cohorts [2002–2004] over 7 transition periods) using data on 472,413 heirs. δ is the *PostInheritance* coefficient in Equation (4). *Effect in %* is calculated as (*Inheritance effect* (δ) / *Mean of outcome* $T-1$) × 100.

Two important messages emanate from the mobility analysis presented here. The first is that inheritances substantially increase wealth mobility. The second message is that the mobility patterns confirm the behavioral story in section 3.2.2, which emphasizes how less wealthy heirs consume a larger share of their inheritances and that this greater consumption dampens the equalizing effects of inheritances.

6. Robustness analysis

In this section, we show that our main findings—that inheritances reduce inequality and increase absolute dispersion—are robust across several dimensions. All the robustness results are presented for a larger set of distributional measures. In addition to the five measures that we have presented hitherto, we also show results for the P99/P50 ratio, the wealth share held by the top 1%, the coefficient of variation (CV) and an additional measure of absolute dispersion, P99–P1. We assess the robustness across five dimensions: (1) adjusting our measure of wealth to account for the potential undervaluation of asset values; (2) adjusting for potential *inter vivos* gifts that could be considered part of the inheritance; (3) excluding heirs who are not the decedents' children, (4) examining whether the results are driven by very young and "penniless" heirs; and (5) assessing how expectations about receiving inheritances may affect the interpretation of our results.

Below, we describe each robustness test, discuss the ways in which we conduct each test and assess the robustness. When applicable, we report robustness results by estimating both DMEs and BAEs. The detailed results are presented in Appendix C, Table C1 (DME) and Table C2 (BAE). The results for dimension (5) are reported in Appendix C, Table C3.

6.1 Undervaluation of recorded assets

We add SEK 10,000 plus ten percent of the total value of the assets in each heir's portfolio to their net worth (wealth). We perform this adjustment because consumer durables (i.e., the values of assets such as vehicles, furniture, and machines) are not reported in the Swedish wealth register. In fact, consumer durables are not part of the official personal wealth definition in the United Nations' System of National Accounts, but this exclusion is partly at odds with the economic reality in many households, where these goods can be important, not least in relative terms in less wealthy households. We do not observe the true value of these assets in the registers, but we believe that our adjustment of the wealth levels (although to some extent arbitrary) brings us somewhat closer to the true values of the heirs' marketable wealth.[24] The results (reported in Appendix C, Table C1 and C2, row 2) are largely consistent with our main results. Both for the DME and the BAE, the decrease in the Gini coefficient is slightly lower when the imputed values of durables are added, which is expected because durables are relatively more important in the lower part of the distribution. The impact on the other measures of inequality is also essentially unaffected, both in terms of size and statistical significance, by this adjustment. Therefore, we conclude that our results are robust to the inclusion of consumer durables in the heirs' portfolios.

6.2 Gifts as inheritances in advance

Intergenerational transfers consist of both inheritances at death and gifts that the decedents give to their heirs during lifetime, i.e., *inter vivos*. Some studies have attempted to assess the relative importance of *inter vivos* gifts and have found that they amount to approximately 20 percent of the bequests transferred at death, though they vary substantially over time, countries and studies.[25] While we cannot (and do not attempt to) estimate the distributional effects of all *inter vivos* transfers, if substantial amounts were transferred during the years just prior to the inheritance, our results would be affected, as our empirical strategy does not capture this part of pre-inheritance responses in the wealth distribution. In principle, gifts over a certain threshold were subject to a gift tax at the same rate as if they had been received as an inheritance, but some gifts may not have been reported to the tax agency. In this section, we present the results from three empirical tests that aimed to elucidate the role played by gifts in our main findings.

[24] Looking at aggregate shares, consumer durables amounted to about ten percent of total household assets in Sweden in the early 2000s (Waldenström 2016).
[25] See, e.g., Wolff (2015) and Piketty and Zucman (2015) for overviews.

Our data contain information about the sum of the *taxable* gifts made to the respective heir over the ten years prior to the decedent's death, and these data are used in our first test. Our calculations show that the aggregate value of these gifts corresponds to 3.6 percent of the aggregate value of net-of-tax inheritances, which is clearly a lower bound of the share of actual gifts, indicating that many gifts have not been reported to the tax agency. Nevertheless, we subtract the sum of these taxable gifts from the heirs' pre-inheritance wealth to obtain an appraisal of how much wealth the heir had before receiving such gifts and then perform the main analyses again (both DME and BAE). When estimating the DME, we also add the gift value to the received inheritance value, as though the gift were considered an inheritance instead. The results, shown in Appendix C, Tables C1 and C2 (row 3) show that the inheritance effect with respect to the Gini coefficient and the other measures of inequality are nearly identical to the main effects in Table 2 and Table 3. Taken together, these results suggest that reported taxable *inter vivos* gifts play essentially no role in our main findings.

The second test seeks to capture the impact of potentially existing gifts (in addition to the reported taxable ones). For this purpose, we follow Piketty and Zucman (2015), who argue that, absent actual data on *inter vivos* gifts, these transfers can be approximated as a fixed share of the bequeathed wealth. Following this suggestion, we compute two different gift amounts for each heir, one equal to 20 percent of the inheritance (which roughly corresponds to the level used for Sweden in the 2000s by Ohlsson et al. 2014) and one equal to 50 percent of the inheritance. Tables C1 and C2 (rows 4 and 5) present the results from this exercise. Here, the inequality-reducing effect of inheritance increases compared to when we use the observed (and possibly understated) gifts.

In the third test, we impute gift values for all heirs, exploiting information about actual gifts to the heirs who have received gifts. Here, our assumption is that, conditional on estate size, decedents *without* reported gifts still made gifts of the same size as decedents *with* reported gifts. More specifically, we divide the decedents *with* reported gifts into estate size deciles and calculate the median gift amount within each decile. Figure C1, Appendix C, displays the relationship between estate size and gift amount for the decedents who report gifts. We then divide the decedents *without* gift reports into ten estate groups using the same decile thresholds as we use for those with reports, assigning the non-giving decedents the decile-specific median value of gifts and distributing that amount among their heirs in equal proportions.

Finally, we follow the same procedure as in the previous tests and subtract the imputed gift(s) from the heirs' pre-inheritance wealth and perform the main analysis again. In the DME analysis, we also add the imputed gift value to the inheritance value. The results of this third test, reported in Tables C1 and C2 (row 6), suggest that the equalizing effect is once again larger than that in the main results and is similar to the estimates from the second gift test. In fact, the estimates closely resemble the estimates that we calculated in the test that made a 50-percent gift amount adjustment. The aggregate *imputed* gift amount as a share of total inheritance is 53 percent, which may particular explain this finding. However, unlike the previous test, which assumed that all heirs received the same proportion, the current test recognizes that gifts are not necessarily proportional to inheritances, which becomes evident when we again examine Figure C1. Wealthier decedents have obviously made larger gifts in absolute terms than decedents with lower estate values, but the ratio of gifts to estates decreases with the estate size. In other words, compared with those with larger estates, decedents with smaller estates make smaller gifts in absolute terms, but they give away larger shares of their wealth during their lifetimes. Figure C1 can thus explain why we find that the equalizing effect of inheritance increases when we adjust the analysis to account for imputed gifts.

6.3 The decedent's children as heirs

The third robustness dimension involves adjusting the study population by dropping all heirs that are not the decedents' children (about one-third).[26] This adjustment is performed to ensure that our results are not driven by inheritances left to distant relatives or beneficiaries of wills. The results (reported in Appendix C, Table C1 and C2, row 7) are consistent with our main results. The drop in the Gini coefficient is slightly larger than when all heirs, children and others are included. The other inequality measures are also in line with our main results, with the exception of the BAE on the decrease in P99/P50, which is statistically insignificant.

6.4 Are effects driven by young heirs?

One possible concern is that our main finding may be driven by the small group of relatively young heirs who, for standard life-cycle reasons, have almost no own wealth and thus dramatically change status when they inherit (the decedents who are associated with these heirs may also be relatively wealthy if they pass away earlier than expected). Available evidence regarding life-cycle wealth profiles in Sweden confirms that people generally have little wealth be-

[26] See Appendix A2, Table A2, for details on the heirs' relationships with the decedents.

fore they enter their 40s (see, e.g., for Sweden, Ohlsson et al. 2014), which is also true in our population of heirs.

We examine whether relatively "poor" young heirs drive the equalizing inheritance effect by removing all heirs who are younger than 40 from the analysis. The result, shown in Appendix C, Tables C1 and C2 (row 8), show that the equalizing effect is less pronounced when we exclude young heirs. The qualitative conclusion remains, but some estimates become statistically insignificant.

Overall, we conclude that young heirs do not drive the main inheritance effect. However, we do find that the effect is larger among younger heirs, which likely stems from these individuals lacking wealth and the relatively younger decedents having somewhat higher wealth than older decedents. However, it is simply a fact of life rather than a measurement problem that some heirs are young, which our population-wide data that cover all decedents and all heirs can establish for the first time.

6.5 Expectations and pre-inheritance wealth accumulation

One limitation of our estimation strategy is that it only captures how inheritances influence the wealth distribution after the receipt of the inheritance, not in the periods prior to the inheritance. If heirs have saved less in the years prior to inheritance because they expect to receive inheritances, we may overlook important parts of the total wealth response to inheritances. If the expected size of future inheritances is correlated with heirs' self-made wealth levels, then those with relatively low (high) wealth levels will likely save more (less) than if they do not expect inheritances. 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, 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, suggesting that expectation responses play a minor role in the overall relationship between inheritances and wealth ine-

quality. 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.[27]

Here, we present new tests that are 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 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 particular, we estimate a simple heir-decedent regression (at the heir level), in which we test whether changes in the expected size of inheritances, measured as the change in the decedent's wealth from $T-3$ to $T-1$ (adjusted by the number of heirs), lead to an offsetting change in wealth among the heirs. The hypothesis posits that, if the expected inheritance increases by SEK 1, the wealth of the heirs will decrease by SEK 1. However, we find that an increase in expected inheritance has no detectable impact on the heirs' wealth, suggesting that short-term behavioral expectation effects may not be important.

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). When we perform the previous test again using only heir-decedent pairs in which the decedent passed away because of a terminal illness; we again find that an increase in the expected inheritance amount has no impact on the heir's wealth. Consequently, neither this test nor the previous variant of the test provide evidence of responses in the heirs' wealth prior to inheritance. Detailed information about these tests can be found in Appendix C.1.

[27] Additionally, Dynan, Skinner and Zeldes (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 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.

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.

7. 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). We actually find evidence in support of such behavioral responses, shown by the difference between the larger DME and smaller BAEs, which appears to be driven by less wealthy heirs consuming a larger share of their inheritances. However, these responses are not quantitatively large enough to balance the main equalizing impact, and the equalizing impact persists in the years after the inheritance treatment.

Second, historical circumstances and the institutional context may have specific bearing on the detected patterns. A major part of the inherited wealth analyzed was generated during the 1960s, 1970s and 1980s, a period in 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.

Third, our focus on the inequality of personal wealth leaves out other relevant distributional

dimensions. One closely related outcome is lifetime resources, often defined as the sum of lifetime earnings and the lifetime flow of gifts and bequests. Given that lifetime earnings are more evenly distributed and much larger than lifetime gifts and bequests, the distributional consequences of inheritances are possibly markedly different from what we observe in this paper (although early simulation studies by Blinder (1974) 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 Additional data description

A1. Details on the study population

There are in total 1,367,148 observations (individuals and organizations) in the Belinda database who are observed as heirs or in other ways recipients of transfers during the years 2002–2005. All of these observations are not part of our study population. Table A1 shows how many observations that fulfills the following seven exclusion criteria (744,321), leaving us with a study population of 622,827 heirs.

First, we exclude individuals from our analysis that appears in the database only because they receive cedes, and cedes are not the consequence of decisions made by the decedent but instead by heirs deciding to pass on parts of (or the entire) inheritance.

Second, we also exclude organizations since they do not contribute to the distribution of personal wealth.

Third, we exclude heirs of married decedents. These almost predominantly spouses of the decedent and are excluded because there is no, or only a partial, bequest division and transfer to children or other heirs when a married person dies.

Fourth, we exclude heirs of the decedents that passed away over the period December 17 to 31, 2004. The motivation is that these heirs were exempted from inheritance taxation, due to the unusual event of the Asian Tsunami.

Fifth, we exclude whom there is not a Swedish personal identity number (PIN) reported in the deceased's estate inventory report. Without this identifier we cannot merge the data on personal wealth to the inheriting individuals. One potential reason that individuals may lack a PIN is because he or she is not a Swedish resident. Missing PINs for non-Swedish residents is not an issue as these individuals do not contribute to the wealth distribution in Sweden. Misreporting is another potential source of a missing PIN. While the law requires that all individuals mentioned in the estate division have a PIN in the estate inventory report, we cannot exclude the possibility that some have failed to comply with this requirement. One may worry that heirs lacking a PIN differ systematically from heirs with a PIN, especially if they would be extremely wealthy. We have investigated this issue by comparing some descriptive statistics of the two groups, heirs with and without PINs, using only the variables in the Belinda database (note that we cannot link data from other registers to the heirs when we have no PIN). The results indicate that they receive inheritances of similar magnitude. Heirs with PIN receive on average SEK 68,222 (USD 10,305) from the current decedent and heirs without PIN SEK 63,977 (USD 9,664). This, admittedly crude, comparison provide no indication that heirs without PIN would be wealthier than the average heir with PIN. The main difference that we can find is that heirs without PIN are much less likely to be the child of the decedent (4% vs. 56%). Instead they are often a sibling or nephew/niece of the decedent (50%) or a relative outside the succession order, a friend or similar (24%).

Sixth, we exclude heirs who under 18 years old the year when the decedent passed away. The motivation for not considering heirs under 18 is that minors do not receive full ownership of the inheritance and therefore it is unclear how to interpret this event in terms of a change in the level and relative position of their personal wealth.

Seventh, we exclude heirs that were not registered as living in Sweden in the year when the decedent passed away and in at least one more year over the study period 1999–2007. Heirs who are not registered in Sweden do not contribute to the wealth distribution and are therefore omitted.

Table A1. Exclusion criteria and study population

Total number of heirs and other recipients of transfers at death		1,367,148
Exclusion criteria:		
(1) Only cedes	198,538	
(2) Organization	6,047	
(3) Spouse	491,869	
(4) 17 - 31 Dec 2004	15,112	
(5) No Personal Identity Number (PIN)	110,213	
(6) Under 18 years old	177,219	
(7) Not living in Sweden	24,203	
Fulfills *any* of (1) - (7)		744,321
Study population		622,827

A2. Additional descriptive statistics

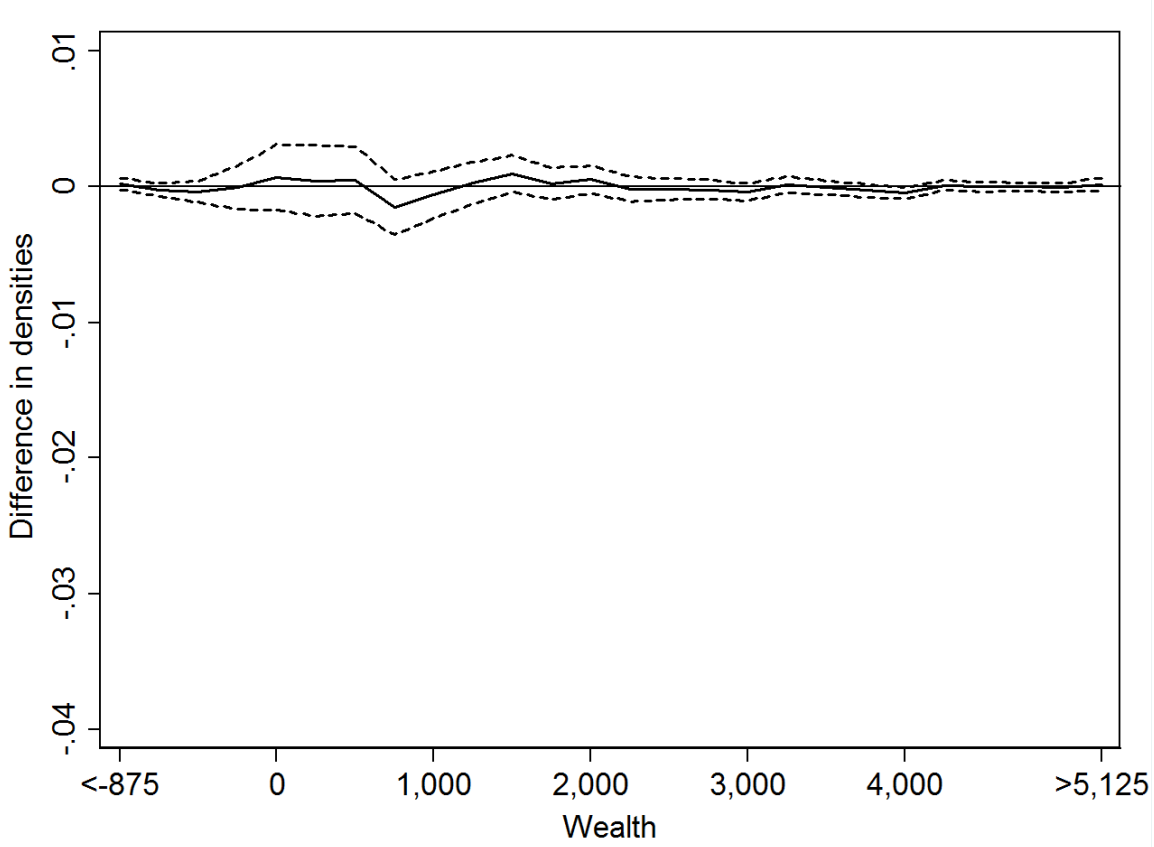
Table A2: Heirs' relationship with the decedent, by cohort.

Cohort:	2002	2003	2004	2005
Total class 1	62.7	63.3	61.8	65.1
Child	56.7	57.1	55.6	59.4
Grandchild	5.7	5.9	6.0	5.4
Great grandchild	<0.1	<0.1	0.1	<0.1
Others in class 1	0.2	0.2	0.2	0.3
Total class 2	33.2	32.6	33.9	28.2
Father	0.7	0.8	0.7	0.8
Mother	1.0	1.1	1.0	1.1
Sibling	9.1	9.0	8.9	8.2
Nephew/niece	18.3	17.7	18.7	15.0
Grandchild of sibling	2.9	3.0	3.3	2.4
Others in class 2	1.2	1.0	1.2	0.7
Total class 3	0.1	0.1	0.1	0.1
Grandmother	<0.1	<0.1	<0.1	<0.1
Grandfather	<0.1	<0.1	<0.1	<0.1
Uncle	<0.1	0.1	<0.1	0.1
Aunt	0.1	0.1	0.1	0.1
Outside succession order	4.0	4.0	4.2	3.9
Child of partner	0.1	0.1	<0.1	<0.1
Foster child	0.2	0.2	0.2	0.1
Stepchild	0.3	0.3	0.4	0.3
Others	3.5	3.5	3.6	3.6
Number of observations	162,207	159,292	150,914	150,414

Notes: Variables are expressed in percent.

Appendix B Additional results

Figure B1: Placebo test for the non-parametrical illustration of the BAE on the wealth distribution, 2002 and 2004 cohorts.



Notes: The graph (solid) displays the difference in densities (using bins of size SEK 250,000) between the difference in densities of the wealth distributions in $T-3$ (1999) and $T-1$ (2001) for the 2002 cohort and the difference in densities of the wealth distributions in $T-5$ (1999) and $T-3$ (2001) for the 2004 cohort. The estimates are based on data on 313,121 heirs (162,207 [2002 cohort] and 150,914 [2004 cohort]). The confidence bands (dashed) are based on bootstrapped standard errors (1000 reps). Wealth in constant (2003) thousand SEK.

Appendix C Robustness results

Table C1: Robustness of the DME on wealth inequality.

#	Outcome:	(1) Gini	(2) P90/P50	(3) P99/P50	(4) Top1%	(5) Top10%	(6) Bottom 50%	(7) CV	(8) P75-P25	(9) P99-P1
1	Baseline DME	–0.048***	–0.975***	–3.501***	–0.014***	–0.031***	0.029***	–0.817***	59,948***	239,900***
2	Adding durables	–0.040***	–0.732***	–2.649***	–0.012***	–0.026***	0.024***	–0.689***	51,992***	239,208***
3	Gift adj. 1 (observed)	–0.050***	–0.985***	–3.530***	–0.015***	–0.032***	0.030***	–0.844***	62,906***	254,025***
4	Gift adj. 2 (20 %)	–0.065***	–1.243***	–4.444***	–0.018***	–0.041***	0.040***	–1.028***	78,208***	281,194***
5	Gift adj. 2 (50%)	–0.095***	–1.700***	–6.069***	–0.025***	–0.057***	0.058***	–1.390***	95,495***	289,299***
6	Gift adj. 3 (imputed)	–0.102***	–1.930***	–6.883***	–0.026***	–0.061***	0.063***	–1.351***	72,423***	252,764***
7	Children only	–0.052***	–1.081***	–3.908***	–0.017***	–0.035***	0.031***	–1.134***	83,730***	304,272***
8	Excl. young heirs	–0.041***	–0.625***	–2.225***	–0.012***	–0.026***	0.026***	–0.273***	52,237***	269,064***

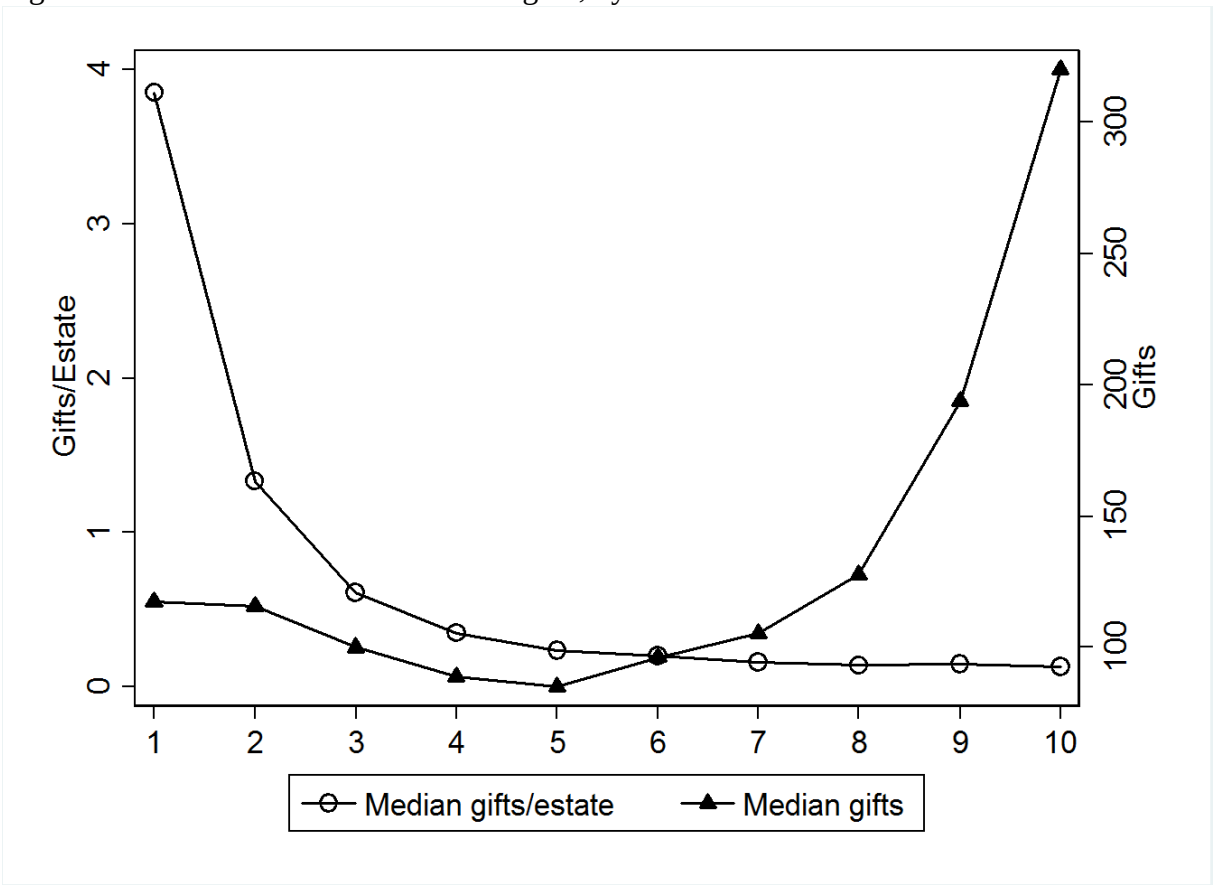
Notes: Estimates show the difference between wealth distributions in $T-1$ and the distribution of the sum of wealth in $T-1$ and the inheritance. Estimates in row 1–6 are based on data on 472,413 heirs, row 7: row 8: 406,532. Bootstrapped standard errors in parentheses (1000 reps.). * significant at the 10 percent level, ** significant at the 5 percent level, *** significant at the 1 percent level.

Table C2: Robustness of the BAE on wealth inequality.

#	Outcome:	(1) Gini	(2) P90/P50	(3) P99/P50	(4) Top1%	(5) Top10%	(6) Bottom 50%	(7) CV	(8) P75–P25	(9) P99–P1
1	Main static effect	–0.035***	–0.601***	–1.876**	–0.023**	–0.029***	0.018***	–4.320	64,998***	259,586*
2	Adding durables	–0.031***	–0.484***	–1.574**	–0.020*	–0.026***	0.016***	–3.720	60,852***	275,615*
3	Gift adj. 1 (observed)	–0.036***	–0.611***	–1.922**	–0.023**	–0.029***	0.019***	–4.349	67,978***	271,162*
4	Gift adj. 2 (20 %)	–0.050***	–0.854***	–2.729**	–0.027**	–0.037***	0.027***	–4.528	81,938***	293,526**
5	Gift adj. 2 (50%)	–0.077***	–1.241***	–4.128***	–0.033***	–0.051***	0.044***	–4.863	100,653***	292,881**
6	Gift adj. 3 (imputed)	–0.084***	–1.468***	–4.798***	–0.035***	–0.056***	0.050***	–4.870	77,952***	279,162*
7	Children only	–0.039***	–0.742***	–1.960	–0.030**	–0.034***	0.021***	–5.587	86,906***	403,022**
8	Excl. young heirs	–0.026**	–0.383***	–1.058	–0.007	–0.017**	0.016***	–0.254	47,589**	275,155*

Notes: See text for the details of the respective test. The estimates are based on 24 observations (3 cohorts [2002–2004] and 8 years) using data on 472,413 heirs (rows 1–6), 265,700 heirs (row 7), 406,532 heirs (row 8). * significant at the 10 percent level, ** significant at the 5 percent level, *** significant at the 1 percent level.

Figure C1: Absolute and relative size of gifts, by estate deciles.



Notes: The values are based on decedents with reported gifts. Gifts and estates in constant (2003) thousand SEK.

C1. Tests of expectations and pre–inheritance wealth accumulation.

The analysis in Section 7.5 is based on regressions of the following form:

$$\Delta W_{i,c}^{h} = \alpha + \beta \frac{\Delta W_{i,c}^{h}}{H_{i,c}} + \gamma_c + \varepsilon_{i,c},$$

Where the dependent variable $\Delta W_{i,c}^{h}$ is the change in wealth of heir i of inheritance cohort c ($c = 2002, 2003, 2004$) between $T-3$ and $T-1$, $\Delta W_{i,c}^{d}$ the change in wealth of the decedent of heir i between $T-3$ and $T-1$, $H_{i,c}$ the number of heirs of the decedent (of heir i), γ_c a cohort fixed effect, and $\varepsilon_{i,c}$ an idiosyncratic error term.

The regressions are estimated, using OLS, on the heirs of the 2002–2004 inheritance cohorts (less of heirs of decedents that had non-positive wealth in $T-1$), in total 373,615 observations in the baseline case (Column 1) and 299,809 observations when we consider the heirs with decedents that passed away due to terminal illness (Column 2). Standard errors are clustered at the heir–decedent level.

Table C3: Testing if heirs' respond to changes in expected size of inheritances.

	(1) All heirs	(2) Heirs of decedents that passed away due to terminal illness.
β	0.052	0.068
	(0.041)	(0.056)
Number of clusters	122,771	98,884
Number of observations	373,615	299,809

Notes: Standard errors, clustered at the heir–decedent level, errors in parentheses. * significant at the 10 percent level, ** significant at the 5 percent level, *** significant at the 1 percent level.