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## Inheritance and wealth inequality: Evidence from population registers

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#### A R T I C L E I N F O

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#### 1. Introduction

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

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

### ABSTRACT

This paper uses population register data on inheritances and wealth in Sweden to estimate the causal impact of inheritances on wealth inequality. We find that inheritances reduce wealth inequality, as measured by the Gini coefficient or top wealth shares, but that they increase absolute dispersion. This duality in effects stems from the fact that even though richer heirs inherit larger amounts, the relative importance of the inheritance is larger for less wealthy heirs, who inherit more relative to their pre-inheritances more equal than the distribution of wealth among the heirs. Behavioral adjustments seem to mitigate the equalizing effect of inheritances, possibly through higher consumption among the poorer heirs. Inheritance taxation counteracts the equalizing inheritance effect, but redistribution of inheritance tax revenues can reverse this result and make the inheritance tax equalizing. Finally, we also find that inheritances increase intragenerational wealth mobility, but the effect is short-lived.

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

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

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

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

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

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

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

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

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

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

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

A series of sensitivity checks suggest that our main findings are robust across several dimensions. First, they do not change when the observed wealth levels are adjusted for potential measurement errors in our wealth and inheritance data. Second, they do not seem to be driven by unobserved inter vivos gifts from wealthy decedents; if anything, adding estimated gifts strengthens the equalizing impact of inheritances. Third, only analyzing inheritances from parents to their children (and neglecting one-third of heirs with more distant family or non-family ties) has a negligible impact on our conclusions. Fourth, we study the importance of young heirs (40 and younger), who could be driving the results because they tend to have relatively little wealth and thus should be affected relatively more by inheriting. While inheritance effects are indeed substantially larger in this younger group, inheritance effects are also important among older heirs. Finally, we exploit parent-child correlations in wealth accumulation and sudden deaths to examine whether heirs adjust their saving behaviors in response to expectations about future inheritances. If such responses were quantitatively important, we would miss a relevant aspect of how inheritances influence the wealth distribution. However, we find no indications of their importance or influence in the data.

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

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

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

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

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

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

 $<sup>^{\</sup>rm 4}\,$  See Davies and Shorrocks (2000) and Wolff (2015, chapter 2) for reviews of this literature.

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

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

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