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Marten von Werder

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Marten von Werder*†

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Abstract

This paper uses SOEP data to study the distributional effect of intergenerational transfers on the wealth distribution of German households. Similar to most other central European countries, Germany is likely to face a period of increasing aggregate bequest flows. At the same time, there is an ongoing debate on the distributional implications of such wealth shocks. This study adds to the discussion by providing causal estimates for the effect of transfer receipt on the savings behavior of households. The model allows for dynamic adjustment and variations in the savings behavior over the wealth distribution. I use the estimates to decompose the overall effect of transfers on wealth inequality in the effect of the aggregated transfer volume, the transfer incidence over the wealth distribution and the effect of the savings behavior. The results are very much in line with the literature, indicating that transfers tend to equalize wealth inequality, despite minor variations in the savings behavior over the wealth distribution and despite a strong relationship between initial household wealth and transfer accrual.

Keywords: Intergenerational transfers, savings behavior, wealth distribution, inequality.

JEL Classification Numbers: D63 E21.

*Economics Department, Free University of Berlin. Boltzmannstraße 20, 14195 Berlin, Germany. E-mail: marten.werder@fu-berlin.de

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1 Introduction

Recent research in economics has paid a lot attention to wealth and its transmission through inheritances and gifts. While the studies of Piketty [2011] and Piketty and Zucman [2015] enquire the scale of future aggregate transmissions, other studies have focused on the effects of intergenerational transfers[1] on the inequality in the distribution of households' net wealth.[2] Particularly the contributions by Boserup et al. [2016], Elinder et al. [2016] and Wolff and Gittleman [2014] reveal the ambivalent nature of intergenerational transfers: Transfer accrual and transfer scale typically correlate positively with the net-of-transfer wealth of households (a pattern I will refer to as the *incidence effect* of transfer accrual). Richer households are hence more likely to receive transfers and are more likely to receive sizeable transfers than poorer households. Inheritances thus disequalize the absolute inequality in the wealth distribution. The corresponding effect on relative wealth inequality however is different: As the relative transfer size tends to decrease with net-of-transfer wealth, poorer households are more likely to receive higher relative bequests. The cited papers consistently show that wealth inequality, as usually measured in economics by relative means, decreases with intergenerational transfers.

Despite this compelling evidence, a further look at the matter appears worthwhile: The distributional effect of transfers on wealth depends strongly on the behavioral response of households to the transfer receipt. Brown et al. [2010] and Elinder et al. [2012] for instance establish that individuals demand more leisure after having received a transfer and thus even anticipate their retirement entry.[3] Hence, one might actually ask what share of a receipt households actually end up saving.

The bulk of the literature on intergenerational transfers and their impact on wealth inequality dismiss these behavioral adjustments, even though it may well have immediate repercussions on inequality [Wolff, 2002, 2015, Crawford and Hood, 2015, Bönke et al., 2017]. Wolff and Gittleman [2014] hypothesize for instance that poorer households are prone to save less out of or after transfer receipt than richer households. They show that such heterogeneities might revert the general finding that intergenerational transfers tend to equalize wealth. The authors nonetheless only present hypothetical evidence from plausible, albeit empirically not founded heterogeneities in the savings behavior across the wealth distribution. Their main analysis of the impact of transfers on wealth inequality bases on a decomposition approach which neglects the behavioral adjustment and assumes that households save 100 % of their transfers. Karagiannaki [2015] even presents some important, albeit weak, empirical evidence that the savings behavior in fact varies

[1] I summarize inheritances and gifts as *intergenerational* transfers. The SOEP data from 2001 include the source of these transfers and show that individuals typically receive gifts and inheritances, as one would expect, from their parents (roughly 70 %, all transfers included). Less than 5 % from e.g. spouses, which would actually not qualify as intergenerational transfer. As the source of transfers is not reported after 2001, I ignore the fact that transfers are partly intragenerational.

[2] Wealth in this study always refers to the concept of net wealth calculated as the sum of all assets minus all liabilities of a given household.

[3] Similar evidence is provided by Bo et al. [2015], Garbinti and Georges-Kot [2016], and for Germany by Doorley and Pestel [2016] and Crusius and von Werder [2017].

over the wealth distribution. While this alone is a step forward, the results are potentially biased (see discussion below). Karagiannaki does also not show how such heterogeneities might affect wealth inequality. Lastly, the studies of Elinder et al. [2016] and Boserup et al. [2016] resort to tools of treatment analysis in order to evaluate the effect of transfers on wealth inequality. Their studies implicitly control for (potential heterogeneities in) the savings behavior of households. The result that transfers equalize wealth persists, they however do not explicitly estimate the savings behavior and thus do not quantify nor illustrate the effect of transfers on the savings behavior.

The present paper aims at contributing to the literature in a twofold way: First, I provide causal estimates of how transfer receipt affects the savings behavior of households. The underlying model allows for dynamic adjustment and, in a second step, also for variations in the savings behavior over the lagged wealth distribution. The estimates reach beyond previous attempts to estimate the effects of receipt on the savings behavior as undertaken by Wolff [2015] and Karagiannaki [2015] by allowing for time constant heterogeneity and by instrumenting the wealth endowment of the household in the period of receipt. Secondly, I provide a simulation of how the estimated variations in the savings behavior contribute to the inequality effect of intergenerational transfers. Using a tobit model, I estimate the transfer incidence and am able to decompose the overall effect of transfer wealth on wealth inequality:

I suggest to decompose the overall effect of intergenerational transfers on wealth inequality in three subordinated effects: First, the effect of the total transfer volume that determines the relation of accruing transfers to the given wealth endowment of households. Second, the effect of the transfer incidence, which describes that inheritances do not accrue randomly over the wealth distribution, but that (1) transfer accrual, i.e. $P(B > 0)$, and (2) transfer size, i.e. $E(B|B > 0)$, depend on the net-of-transfer wealth.[4] Third, the effect resulting from the savings behavior of households out of their transfer receipts. Households may differ considerably in the capacity to transform transfer wealth in their regular stock of household wealth.

The results of my study are as follows: Estimating the average savings behavior out of transfers with granting more attention to potential endogeneity issues leads to substantially smaller estimates than presented by previous studies. On average and ceteris paribus, households tend to save only 60 Cents of an inherited Euro[5] (conditional on receipt, not controlling for whether transfer is expected) within a two years period after receipt. At the same time, households do not show a further significant dynamic adjustment. In contrast to the considerations of Wolff and Gittleman [2014] and the results of Karagiannaki [2015], I do not find systematic differences in the savings behavior out of transfers over the wealth distribution. The observed differences do also not necessarily suggest that richer households tend to save more out of transfers than poorer households. Not surprisingly, the corresponding simulation then also does not allow to infer that the effect of transfer receipt on the savings behavior itself has an disequalizing effect.

[4]Throughout the paper I will refer to net-of-transfer wealth as net wealth.

[5]Note that this is equivalent to say, that households save their entire transfer but displace 40 Cents of savings from other sources for each Euro inherited.

This is even true when resorting to probably biased estimates of an OLS regression that would suggest that richer households save most out of their transfers. Eventually the decomposition exercise shows that the aggregated transfer volume effect takes such a progressive form that even a strong transfer incidence and potentially regressive savings patterns do not qualify to overturn the equalizing effect that intergenerational transfers have on the households net worth distribution.

The remainder of the paper is organized as follows: Section 2 provides a brief overview of the recent literature in the study of intergenerational transfers. Section 3 introduces the reader to the statistical concepts shaping the distributional effect of transfers on wealth. Section 4 derives and discusses the econometric approach for estimating the savings effect of transfer receipt while section 5 gives a brief introduction in the data structure. Section 6 provides the corresponding descriptive statistics and leads to section 7, in which I present the results for the estimations and simulation. Section 8 presents tests on the robustness of the estimation and section 9 concludes. The appendix provides further details.

2 Literature

The question of how intergenerational transfers affect inequality in the net wealth distribution is cumbersome and has found different types of responses in the literature. I will here provide a brief overview of some:

- The most long-standing discussion related to this matter is probably the one between Kotlikoff and Summers [1981], Kotlikoff [1988] and Modigliani [1986, 1988] about the share of inherited wealth in total wealth. Kotlikoff and Modiglina primarily disagreed on whether returns to transfers shall be counted as transfer wealth or as saving effort of the individual: Modigliani related un-capitalized transfers to observed wealth and obtained much lower estimates of transfer wealth in aggregated wealth than Kotlikoff who attributed returns to inherited wealth fully to inherited wealth. The discussion was rather recently revived by Piketty et al. [2014]: The authors suggested to basically use capitalized transfer amounts while limiting the value of capitalized transfers at maximum to the observed wealth of individuals. Individuals are counted as heirs when their observed household wealth was at most as much as the capitalized inheritance value. The corresponding share of transfers in wealth thus amounts to 100 %. Individuals whose capitalized transfers do not exceed observed wealth, are counted as savers (with a respective share of x % inherited wealth). This approach bears the clear advantage that the share of inherited wealth cannot exceed observed wealth while taking into account the returns to inherited wealth. Hence, **?** base their argument directly on the inter-temporal budget constraint of individuals. Bönke et al. [2015] applied the Piketty-approach to Germany and found that roughly 1/3 of household wealth is attributable to intergenerational transfers. The main beneficiaries of intergenerational transfers, the paper reveals, is the upper middle class, where the proportion of inherited wealth is highest on average.

This approach certainly improves the understanding of intergenerational transfers in current wealth statistics and provides an interesting distinction between *savers* and *heirs*. It is also helpful in putting receipts into perspective that have accrued long ago (a disadvantage of the approach presented in this paper, which I will discuss in more detail in section 5). The approach by Piketty et al. [2014] does however base on hypothetical relations as it does not take into account how much of a transfer an individual actually had saved over time. It thereby only implicitly covers the behavioral reactions of individuals to transfer receipt and provides, in turn, rather a point of reference (of how much an individual could have saved out of a transfer if it had not consumed) rather than a solid estimate of how transfers *de facto* affect the wealth accumulation of individuals.

- Another branch in the literature attempts to retrace the distributional effect of transfers on the inequality in household wealth by primarily using a decomposition approach that has been suggested and applied by Edward Wolff to American data sources [Wolff, 2002, Wolff and Gittleman, 2014, Wolff, 2015], by Bönke et al. [2017] to multiple Euro-countries and by Karagiannaki [2015] to British data. The approach applies the decomposition of the *variance* to the coefficient of variation (CV), which is a commonly used inequality measure for wealth data. The inequality in household wealth is then decomposed in inequality loadings stemming from initial household wealth, transfer wealth and a term describing the correlation of these wealth components. The decomposition illustrates typically that transfer wealth correlates negatively with initial household wealth and thus causes a reduction in the relative inequality of household wealth. Bönke et al. [2017] provide decomposition results for Germany that are fully in line with the findings in other applications of the decomposition.

  The decomposition by Wolff also serves as an interesting illustration of how transfer wealth interacts with initial household wealth. The approach however crucially depends on the assumption that households save the entire intergenerational transfer. Wolff and Gittleman [2014] discuss this shortcoming in detail and raise concerns that differing saving patterns over the wealth distribution might severely bias the results of the decomposition. The present paper takes these concerns up and seeks to estimate, whether such a variation in the marginal propensity to consume across the wealth distribution exists and is suited to challenge the results of the above cited papers.

- A third approach in the literature uses regression analysis in order to tackle the main weakness of the previously mentioned approaches: How much of a transfer do households actually save or consume, respectively? The literature in this branch is diverse[6], I will here mainly refer to four papers: Elinder et al. [2016] and Boserup et al. [2016] analyze

[6]Several papers seek to estimate labor market reactions after transfer receipts: Elinder et al. [2012], Brown et al. [2010], Bo et al. [2015], Crusius and von Werder [2017], doorley2016

inheritance receipts in a in an event study framework. The former e.g. defines the totality of heirs in year t as *heir cohort t*. The authors can show that the inequality in wealth in cohort t decreases substantially compared to the inequality in the cohort $t+1$, which is only soon to inherit. The approach has the merit that results are likely to be correct as long as saving behaviors do not differ between cohorts. The impressive database underlying this study contains information on all bequests of Swedes dying between 2002 and 2004 and their heirs. It however does not encompass wealth information of the full Swedish population, it is thus hard to generalize the findings of this study. The finding that transfers tend to equalize wealth inequality thus seems to be robust against saving patterns. The treatment-based analysis however still misses to quantify saving behaviors, a shortcoming accommodated by the last two papers briefly mentioned in this literature review:

Karagiannaki [2015] and Maury Gittleman in Wolff [2015] provide estimates of regressing household savings (defined as difference between household net wealth in two periods, i.e. $W_t - W_{t-1}$) on transfers and controls. The resulting (linear) estimate illustrates how many cents a household saved, on average, from an inherited Dollar. Gittleman estimates that households save between 80 and 90 Cents of an inherited Dollar.[7] While the author controls for a number of possibly related factors, the results are potentially biased. For example, time-constant omitted variables like the parental background can matter as they are likely to relate the size of the inheritance and the wealth accumulation behavior of the individual. Thrifty parents pass on particularly high transfers to their similarly thrifty, and thereby richer, children. The estimate of interest would be upwards biased. The estimation also falls short of testing the hypothesis of Wolff and Gittleman [2014] as it does not allow the saving coefficient to vary over the wealth distribution. The paper by Karagiannaki [2015] contains the estimation of a very similar model and comprises two approaches used to test whether the saving out of transfers varies over the distribution: The quantile regression estimates suggest that households in upper parts of the *conditional* savings distribution tend to save more. This finding is however not directly illustrative for the question whether households vary in their savings behavior over the unconditional wealth distribution. The author thus interacts a dummy indicating the wealth quintile in the previous period of the respective household with the inheritance amount. She concludes that the propensity to save from the transfers "decreases (...) with initial wealth", although differences in estimates are not significant across quintiles. The results are interesting and seem to partly confirm the hypothesis of Wolff and Gittleman [2014]. The estimation however is likely to suffer from the same omitted variable bias as the one in Wolff [2015]. Moreover, interacting the dummy indicators is likely to introduce an endogeneity issue in a regression of savings: While the dummies convey information from the lagged wealth distribution, the dependent variable also includes lagged wealth. As the reader will see below, this paper resorts to a similar

[7] The authors use the PSID for this estimation. Wealth is observed in 5 year intervals, so that the consumption/saving estimate from transfers reflects the behavior on, supposedly, 2.5 years.

empirical approach as Karagiannaki, but attempts to apply a more suitable identification strategy.

The above presented three branches of literature are the major references for this paper: It seeks to provide a causal estimate of the propensity to save out of transfers in a fashion similar to e.g. Karagiannaki [2015]. It also tries to track down the distributional implications as done in the contribution by Elinder et al. [2016]. The literature has however brought along some further contributions: Westerheide [2005] regresses wealth on transfers and some controls using the same data set as the present paper. The regression however lacks control variables as age and seems to interpret wealth transfers as stocks.

3 The distributional effect of transfers

The literature consistently suggests that intergenerational transfers tend to equalize the inequality in household wealth.[8] Transfers will reduce the inequality in household net wealth if the following condition holds:

$$\left(\frac{P(B_{H,t}>0)\times E(B_{H,t}|B_{H,t}>0)}{E(W^{net}_{H,t-1})}\right)_{\tau=s} < \left(\frac{P(B_{H,t}>0)\times E(B_{H,t}|B_{H,t}>0)}{E(W^{net}_{H,t-1})}\right)_{\tau<s} \tag{3.1}$$

where τ denotes the respective quantile of the lagged wealth distribution. Transfers will tend to equalize the wealth distribution as long as the *expected* transfer in this quantile, defined as the probability $P(B_{H,t}>0)$ to receive times the average receipt $E(B_{H,t}|B_{H,t}>0)$ relative to the wealth quantiles' mean wealth, is higher for households from lower wealth quantiles. Or, measured in initial wealth, expected transfers are typically higher for poorer households than for richer households.[9] Under this condition, the share of wealth hold by poorer households will increase through transfer receipt. The effect will maintain as long as

$$\frac{P(B_{H,t}>0)\times E(B_{H,t}|B_{H,t}>0)_{\tau=s}}{P(B_{H,t}>0)\times E(B_{H,t}|B_{H,t}>0)_{\tau<s}} < \frac{E(W^{net}_{H,t-1})_{\tau=s}}{E(W^{net}_{H,t-1})_{\tau<s}}$$

Hence, when the ratio of expected transfers between rich and poor is smaller than the ratio of net wealth between rich and poor. The effect that intergenerational transfers have on the inequality in household wealth can apparently be decomposed. I suggest to decompose it into the following sub-effects:

- **Aggregated transfer volume**: Given the observed lagged wealth distribution, the aggregated transfer volume (aggregated over all quantiles) is the first channel determining

[8] At this stage measures of absolute inequality are neglected, which typically indicate higher inequality after transfer accrual.

[9] Relative transfers in the literature are expressed in lagged [Karagiannaki, 2015] or net-of-transfer [Kohli et al., 2006] wealth distributions. I here resort to the lagged distribution.

the relation between households' transfers and their wealth: [10] The higher the aggregated transfer volume, the potentially stronger can the inequality effect of transfers be. In order to illustrate this channel, I will generate a contrafactual wealth distribution after transfer receipt and distribute equal absolute shares of the aggregated transfer sum to the quantiles of the wealth distribution. The inequality effect of the aggregated transfer volume will thus be mechanically equalizing as poorer households will receive relatively higher transfers than richer households. The rationale here is that this counterfactual illustrates the equalizing potential of the aggregated transfer volume, i.e. the equalizing effect *this* sum of transfers could take if it would basically be randomly distributed over the lagged wealth distribution. Section 7.4 explains in more detail how these equal shares of transfers are generated.

- **Incidence**: Bequests do however typically not accrue randomly over the wealth distribution, but rather accrue more often and with higher amounts the higher the position of the receiving household in the lagged wealth distribution [Karagiannaki, 2015, Wolff and Gittleman, 2014, Kohli et al., 2006]. Hence, a larger share of aggregated bequests accrues to the advantage of richer households. I denote this leaning of the unconditional expected value of transfers the *transfer incidence* and consider it particularly interesting: The transfer incidence indicates the intergenerational wealth immobility between dynasties. This is the channel through which dynasties' capacities to perpetuate their class materializes. In other words, the transfer incidence represents the intergenerational relationship of wealth within dynasties beyond the observed monetary transfer. It is basically the channel illustrating the unobserved link in wealth between generations of the same dynasty (as heirs' *net-of-transfer wealth* correlates with the testators' wealth, represented by the observed transfer). It might encompass effects from different dimensions, e.g. previous parental investments in the human capital of their children, access to parental networks, valuable habits and values and the impact of genes [Adermon et al., 2016, Black et al., 2015].[11]

- **Savings behavior**: Lastly, one has to take into account the behavioral adjustment of receiving households. Transfer receipt is likely to affect the savings behavior - which can either be understood as saving out of the transfer itself or as displacing other savings. These economic reactions may well differ across the wealth distribution: More affluent households may have a lower propensity to consume out of transfers. Richer households may also acquire higher returns to their investments, as has been discussed in the literature [Bönke et al., 2015, Piketty, 2014]. The results presented by Karagiannaki [2015] suggest that

[10] This paper basically resorts to three periods of aggregated transfers over a total period of 15 years. While studies by e.g. Piketty and Zucman [2015] suggest increasing aggregate bequest flows, I will neglect this factor and will pool wealth and inheritances over time for the distributional analysis. The *aggregated transfer volume* effect is expected to be stronger, the bigger the inherited wealth is in relation to household wealth.

[11] Perhaps using the metaphor of a regression analysis helps to clarify this point: The economic status of the children depends on a number of here unobserved factors and observed monetary intergenerational transfers. The incidence effect reflects the average effect of all unobserved factors, i.e. the constant in a regression model. The effect of the transfers itself is controlled for, in the sense that we identify the incidence effect *before* transfers impact the childrens wealth level.

systematic variations along the wealth distribution in the capacity to save out of transfers are conceivable. Wolff and Gittleman [2014] discuss that such heterogeneities can overturn the equalizing effect of transfers on the wealth distribution. The relevant quantity for retracing the distributional impact of intergenerational transfers on the wealth distribution would then no longer be B_{Ht}, as in eq. 3.1, but rather the saved share[12]

$$B_{H,t}^{saved} = \beta_\tau \times B_{H,t}.$$

In section 4 a more detailed explanation of the β_τ estimate will follow. For the moment it is crucial that it captures the economic reaction of households to the transfer amount with $\beta_\tau > 0$. If $0 < \beta < 1$ estimates relying on the logic of inequality 3.1 may be biased: Obviously, $B_{H,t}^{saved} < B_{H,t}$[13], whereas variations of β over the wealth distribution further bias the analysis. Additionally, some papers derive $W^{net} = W_{ht} - B_{ht}$ and, by implicitly assuming that $\beta = 1$, are overestimating household wealth net of transfers.

Hence, intergenerational transfers can easily take a progressive or a regressive effect. While the sheer volume of transfers has no immediate distributional implication, the transfer incidence can develop either a progressive or regressive effect, depending wholly on the correlation of transfer size and household wealth. Assuming that poorer households save less out of transfers than richer households, this effect would rather take a regressive impact on wealth inequality.

4 Methodology

At the core of the analysis in this paper is the estimation of the share that households typically save from received intergenerational transfers. This share is denoted β. In what follows, first the estimation of the average β is derived, thereafter the procedure of how to consistently estimate variations of β over the wealth distribution.

4.1 Average effect

Estimating the average saving from intergenerational transfers, starts with assuming a data generating process of the following form:

$$W_{H,t} = \alpha_H + \beta_1 B_{H,t} + \beta_2 B_{H,t}^D + \gamma W_{H,t-1} + \delta_1 I_{H,t} + \delta_2 A_{H,t} + \epsilon_{H,t} \tag{4.1}$$

Equation 4.1 describes the level formulation of the model: Current household wealth $W_{H,t}$ is a function of intergenerational transfers, household income $I_{H,t}$, household wealth in the preceding

[12]Apparently this would also require representing β_τ in equation 3.1 above. I abstain from doing so for the sake of clearity.

[13]Note, that $\beta > 1$ is also conceivable. For instance, of households save the entire transfer and earn returns to their capital. Estimates of β however typically yield values of $\beta < 1$.

period, $W_{H,t-1}$ and age as control variable.[14] Transfers are modeled by $B^D_{H,t}$,[15] which is a dummy indicating bequest receipt, and $B_{H,t}$ which denotes the linear bequest amount.[16] α_H is a time-constant individual effect, $\epsilon_{H,t}$ is the common white noise error term.[17]

β is the parameter of interest in this specification and captures the economic response of the household to a transfer receipt. If $\beta < 1$, households on average tend to consume a share $1 - \beta$ (in the short term)[18] from the transfer amount.[19] If $\beta > 1$, households' wealth increases by more than the transfer amount, which is well possible, when re-investments bear immediate returns. Note too, that $W_{H,t}$ contains, as it is common in the literature, the observed values, i.e. including transfers. This way, the coefficient measures the propensity to save from transfers. Deducting transfers from $W_{H,t}$, i.e. regressing the net-of-transfer wealth, would yield a coefficient measuring the displacement of other wealth components through transfers. For example, if transfers cause households to save less from other sources (e.g. income) in face of the transfer, then $\beta^{W_{H,t}-B_{H,t}}$ would quantify this effect. The estimates are however fully exchangeable in that the here used coefficient $\beta = \beta^{W_{H,t}-B_{H,t}} + 1$.

As intergenerational transfers are considered a *flow*, W_{t-1} is subtracted from both sides of equation 4.1 yielding

$$S_{H,t} = \alpha_H + \beta_1 B_{H,t} + \beta_2 B^D_{H,t} + (\gamma - 1)W_{H,t-1} + \delta_K \mathbf{C}_{H,t,K} + \epsilon_{H,t} \tag{4.2}$$

where the dependent variable now is the flow[20] $S_{H,t} = W_{H,t} - W_{H,t-1}$ and $\mathbf{C}$ contains polynomials of age and household income and interactions of the two. Rewriting $\gamma - 1 = \rho$ and taking first differences in order to eliminate the individual effect, leads to

$$\Delta S_{H,t} = \beta_1 \Delta B_{H,t} + \beta_2 \Delta B^D_{H,t} + \rho \Delta W_{H,t-1} + \delta_k \Delta \mathbf{C}_{H,t,K} + \Delta \epsilon_{H,t}. \tag{4.3}$$

The underlying assumption that $\Delta B_{H,t}$ is exogenous given the elimination of the individual effect α_H is further discussed below in section 4.3. The dynamic structure of this model however makes

[14]Further control variables (e.g. being self-employed or retired) have been tested but do not impact the conditional savings behavior significantly.

[15]$B^D_{H,t}$ equals 1 only in the period of receipt.

[16]Transfers are thus modeled as interaction of the transfer amount $B_{H,t}$ and the receipt indicator $B^D_{H,t}$. Zero receipts are thus included.

[17]Using panel data, we might encounter correlations between households' error terms. I thus use cluster-robust standard errors in all specifications.

[18]Recall that dynamic specifications allow to derive the long term effect as $\beta^{long} = \beta/(1-\gamma)$, where $\gamma = 0$ implies $\beta^{long} = \beta$.

[19]Note, that it is unclear whether households consume out of the transfer itself or whether transfers displace other savings. For the distributional effect of transfers however, this distinction does not matter.

[20]Note that the data set only provides 3 periods of wealth observations. Hence, writing equation 4.1 with a flow as dependent variable *and* adding a lagged dependent variable, which would perhaps be a more common dynamic specification, would not leave a further lag as needed as instrument.

estimating equation 4.3 prone to being biased due to a correlation between $\Delta W_{H,t-1}$ and $\Delta\epsilon_{H,t}$:

$$\Delta W_{H,t-1} = W_{H,t-1} - W_{H,t-2} \tag{4.4}$$

$$\Delta\epsilon_{H,t} = \epsilon_{H,t} - \epsilon_{H,t-1} \tag{4.5}$$

In order to circumvent endogeneity issues, $\Delta W_{H,t-1}$ is instrumented by the level value $W_{H,t-2}$. The second-stage regression equation is thus represented by

$$\Delta S_{H,t} = \beta_1 \Delta B_{H,t} + \beta_2 \Delta B^D_{H,t} + \rho \Delta \hat{W}_{H,t-1} + \delta_k \Delta \mathbf{C}_{H,t,k} + \Delta\epsilon_{H,t} \tag{4.6}$$

where $\Delta \hat{W}_{H,t-1}$ is predicted from the first-stage regression

$$\Delta \hat{W}_{H,t-1} = \hat{\xi} W_{H,t-2} + \hat{\theta}_1 \Delta B_{H,t} + \hat{\theta}_2 \Delta B^D_{H,t} + \hat{\eta}_k \Delta \mathbf{C}_{H,t,k} \tag{4.7}$$

where $\Delta\nu_{H,t}$ is assumed to be a white noise error term.

Note that the model simplifies considerably in case there are no dynamic effects, i.e. $\gamma = 1$ and no significant impact is coming from controlling for lagged wealth. The ρ estimate from equation 4.6 then would be close to -1, reflecting the subtracted $W_{H,t-1}$. Reformulating the level equation 4.1 then yields the level equation:

$$S_{H,t} = \alpha_H + \beta_1 B_{H,t} + \beta_2 B^D_{H,t} + \delta_K \mathbf{C}_{H,t} + \epsilon_{H,t} \tag{4.8}$$

Here, the lagged wealth term on the right hand side of model 4.1 simply drops. The corresponding specification in differences is:

$$\Delta S_{H,t} = \beta_1 \Delta B_{H,t} + \beta_2 \Delta B^D_{H,t} + \delta_k \Delta \mathbf{C}_{H,t,k} + \Delta\epsilon_{H,t} \tag{4.9}$$

4.2 Heterogeneity in the saving effect

Karagiannaki [2015] finds some evidence for variation in β over the wealth distribution. Equation 4.6 is thus slightly extended:

$$\begin{aligned} \Delta S_{H,t} = {} & \beta_1 \Delta B_{H,t} + \beta_2 \Delta B^D_{H,t} + \sum_{q=2}^{5} \beta_{2+q-1} \Delta (B_{H,t} \times W^{q-1}_{H,t-1}) \\ & + \sum_{q=2}^{5} \beta_{6+q-1} \Delta (B^D_{H,t} \times W^{q-1}_{H,t-1}) + \rho \Delta \hat{W}_{H,t-1} + \delta_k \Delta \mathbf{C}_{H,t,k} + \Delta\epsilon_{H,t} \end{aligned} \tag{4.10}$$

Where $W^{q-1}_{H,t-1}$ is a dummy set of $q-1 = 4$ quantile indicators, indicating in which wealth quintile the household has been located in the previous periods' wealth distribution. These dummy variables are obviously also endogeneous and are thus instrumented with $(\Delta B_{H,t}) \times W^q_{H,t-2}$. As the reader will notice below, further variations of equation 4.6 and 4.10 will be estimated.

4.3 Exogeneity of Transfers

The consistency of the regression results hinges on the assumption that transfers are exogenous. I want to briefly state, why I consider this assumption plausible:

- **Gifts**: Intergenerational transfers include gifts. While it is conceivable that many inheritances accrue accidentally [Dynan et al., 2002], inter vivo transfers could occur primarily on purpose: If for instance households in need are more likely to receive gifts, then the β coefficient would be biased downwards. I will provide descriptive evidence whether such concerns seem warranted. Similarly, if gifts have accrued earlier, household wealth will be higher while actual inheritances will be lower. Most specifications therefore include w_{t-1} as control variable. Other specifications rely on using fixed effects in order to control for the impact of such earlier transfers. Lastly, I will also provide robustness tests excluding gifts.

- **Reverse causality**: The just mentioned issue is a variety of a potentially more general reverse causality problem. As it was mentioned in section 3, transfer accrual and size is partly a function of household wealth. This relationship could introduce a simultaneity issue w.r.t. β in eq. 4.1. I argue however, that the relationship is attributable to family characteristics whose impact vanishes in the fixed effects specifications. Most estimations also use *savings* as dependent variable for which the reverse causality issue seems to be less evident.

- **Previous inheritances**: In section 5 I will discuss in detail what transfers we are able to observe. Note however already, that the present study only resorts to inheritances received after 1998, dismissing most of the retrospectively observed transfer data.[21]The data set in use does not provide consistent wealth data for the transfer observations before 1998. Using fixed effects estimations, however, the previous transfer accruals should play no role.

5 Data

The analysis is based on data from the Socio-Economic Panel (SOEP) which is a longitudinal panel study from Germany covering roughly 11.000 households each year. The data contains information on wealth stocks on the individual and household level for the survey waves of 2002, 2007 and 2012. Wealth covers real estate holdings, financial wealth (savings, stocks and shares, any type of private insurance based wealth[22]), company assets, tangible assets and any kind of debts. This study resorts to the net wealth, as calculated by the SOEP by subtracting liabilities

[21] Westerheide [2005] uses all retrospectively observed inheritances: To do so, he assumes that inheritances are fully saved and capitalizes them over the period between receipt and period of wealth observation. Considering that inheritances partly accrued many years ago (and values thus grow high), this approach introduces a high degree of uncertainty.

[22] The data does not cover claims against public insurances as e.g. public pensions. At the end of this section I briefly discuss this issue.

from assets. As thoroughly discussed in the literature, surveys on wealth commonly suffer from non-random item non-response issues. In order to accommodate such problems, the wealth data in the SOEP is edited and imputed with 5 implicates.[23]

Inheritances and gifts are systematically surveyed in the SOEP since 2001 when the SOEP contained an extended module about inheritances. This module enquired households about (up to three) transfer receipts in the past and present. Only for the 2001 wave, however, the source, the recipient within the household and the nature of the transfers were surveyed. After 2001 the SOEP covers intergenerational transfers only on the household level and records the value[24] and type of the transfer. According to the SOEP, the inheritance values are net of taxes.[25]

Despite the commonly acknowledged high quality of SOEP data, some concerns remain: Vermeulen [2014] shows that even imputations and weighting strategies might fail in representing the top 1 % of the wealth distribution.[26] In the same way, non-random item non-response issues may also occur in the inheritance data where the remedy of imputations is lacking.[27]

The data availability requires some aggregation: Transfer data are aggregated over the 4 years prior to and the year in which wealth was observed, i.e. in 2002, 2007 and 2012 respectively. As transfers are only observed on the household level, the analysis uses the respective wealth data on the household level.[28] This yields a data set with 3 time periods containing the households net worth and the aggregated intergenerational transfers spanning from 1998 to 2012. All amounts are expressed in Euro prices of 2010.

Some conceptual issues remain with the given data set that are worth being discussed briefly:

- **Expectations:** Ideally, the analysis here would control for expectations regarding future transfer receipts as households are theoretically expected to adjust their behavior accordingly. The SOEP surveyed expectations in 2001: Respondents stated how likely they perceived to receive a transfer in the (not further specified) future[29] and whether the expected transfer will be below 50.000 DM ($\approx$ 25.000 Euro) or above. After all, the *expectations* data is likely to be very noisy. Also, being only surveyed in 2001, no corresponding infor-

[23] The SOEP imputation strategy is documented e.g. in Frick et al. [2010]. I follow the procedures suggested by Rubin [1987] for adjusting standard errors and for calculating point estimates in imputed data sets. Specifically, I resort to the STATA environment for imputed data and, if necessary, apply the procedures by hand.

[24] Until 2004 the SOEP only covered transfers above 2500 Euro, since then all transfers above 500 Euro are allegedly reported.

[25] Due to high allowances and exemptions for e.g. business capital, most intergenerational transfers are not taxed anyway. See Braun [2015] for an estimate of the efficient tax rate and Bach and Thiemann [2016] and Bach and Mertz [2016] for an evaluation of the German inheritance and gift tax statistics.

[26] Further work on the full depiction of household wealth dealing with non-observation bias and differential non-response bias is provided by e.g. Eckerstorfer et al. [2015], or with special focus on Germany by Westermeier [2016].

[27] While the PHF data may be more accurate in terms of wealth [Bartels and Bönke, 2015], they are only available for two waves and would thus restrict the scope of the analysis severely and are, taking Vermeulen [2014] as benchmark, still understating the top wealth. Access to the inheritance and gift statistics data is slowly liberalized but represents only an upper part of the inheritance distribution. See otherwise Bartels and Bönke [2015] for an overview of the available wealth data sets from Germany.

[28] Where individual information are needed in the analysis (e.g. age information), I resort to the characteristics of the household head.

[29] Respondents could reply by “No”, “Don’t know”, “Yes, that is likely”, “Yes, that is certain”

mation is available for transfers received between 1998 and 2001. Also, it is questionable whether the reported expectations bear still instructive information for transfers received up to 10 years after expectations had been stated. I therefore ignore the information on expectations in the main analysis and will resume the topic in section 8 in detail.[30]

- **Wealth type of transfer:** Westerheide [2005] uses the SOEP wave of 2001 in order to estimate a similar model as the one that will be estimated in this paper and shows that the wealth type of a transfer affects the consumption behavior out of intergenerational transfers. In line with what one would expect, consumption out of real estate and business capital seems to be less pronounced than out of more liquid wealth types. After 2001 wealth types of transfers are however not recorded anymore and will enter my estimation as an omitted variable.

- **Retirement wealth:** The SOEP wealth data does not yet contain information about public pension claims. While the wealth stocks we observe might e.g. well contain the old age provision of self-employed, many employees will have mainly saved for retirement by the statutory pension scheme. Hence, taking into account such claims would reduce wealth inequality strongly as shown by Bönke et al. [2016]. It is nonetheless disputable whether pension claims should be taken into account even if it would be possible: In contrast to the wealth so far reported in the SOEP, pension claims are not fungible and thereby lack a crucial criterion of what is typically rated as wealth.

- **Non-monetary transfers:** Wealth might well be transmitted over generations by other means than monetary transfer.[31] Parents, for instance, might invest strongly in the human capital of their children which might affect children's wealth and future monetary transfers at the same time. Such transfers are not observed but seem to be unlikely to bias the estimations results here: First, the estimation technique presented in 4 allows for time constant heterogeneity. Second, I control for *household earnings* which is the most obvious channel between parental investments in human capital and the ability to acquire wealth. Not observing such transfers however might translate in a misleading result of the simulation in section 7.4 underestimating the degree to which intergenerational transfers shape the wealth distribution. I will resume the discussion of this point in the conclusions.

- **Previous intergenerational transfers:** In fact, the SOEP does report inheritances in retrospect, thereby covering theoretically all transfers ever received by a household. I am however not using such information if the accrual was before 1998 as corresponding

[30] Doorley and Pestel [2016] also use the SOEP expectations for a study of the effect of wealth shocks on the intensive margin of labor supply. Brown et al. [2010] and also Crusius and von Werder [2017] resort to data sets with more detailed information on expectations about future transfers and analyze the impact of transfers with respect to the extensive margin of labor supply. The results in this literature appear nonetheless fuzzy and do not fully reflect the behavioral reactions that economic theory would predict.

[31] The point here of course also holds for unobserved prior concessions that children might provide to their parents for receiving transfers. Strategic bequest motives are for instance discussed in Cremer and Pestieau [2009].

observations on wealth are lacking. Note, however, that households of course can receive inheritances more than once, as inheritances must not exclusively occur from parents (and even if they did, the analysis on the household level permits multiple inheritances). Hence, even when households have received transfers before 1998 they still can receive further transfers.[32]

6 Descriptive Statistics

This section introduces to the characteristics of the sample underlying the analysis. Table 1 and 2 provide summary statistics for intergenerational transfers and household wealth, respectively. Note that the tables break down summary statistics to the three time periods, the analysis is based on. Hence, numbers referring to e.g. 2002 reflect the respective statistic of those transfers observed between 1998 and 2002. Table 3 then introduces in the analysis by descriptively depicting the statistical relationship between transfers and wealth over the wealth distribution.

6.1 Summary statistics

Table 1 summarizes some statistics about intergenerational transfers. Panel *a* for instance shows that the mean transfer, including inheritances and gifts, varies around 70.000 Euro (conditional on transfer receipt) over the three time periods. Panel *b* then captures the distribution of intergenerational transfers, suggesting that the median transfer is much lower than the mean, equaling roughly 17.000 Euro over all transfers. Panel *c* gives the absolute number of observed transfer incidents, distinguishing between inheritances and inter vivo transfers: In total, the analysis is based on 2142 cases. Relating to the absolute number of observations, less than 10 % of the households report to have received a transfer over these 15 years.[33] Interestingly, almost half of the observed incidents are actually gifts. The share of recipients seems to slightly increase over time. While this would be in line with expectations concerning inheritance flows, the small increases here are probably not significantly different from each other.

Table 2 presents some descriptive statistics of the households' net wealth over time. Panel *a* shows that average wealth is around 155.000 Euro. The median is well below that, revolving around 50.000 Euro. Panel *b* reports the mean wealth over quintiles.[34] Note that a significant share of the sample is indebted, meaning that average wealth for the poorest 20 % of the population is negative. Table 12 in the appendix reports on the wealth composition over time.

[32] Westerheide [2005] attempts to consider all reported transfers, no matter how long ago they have accrued. Typically, results will then crucially depend on the capitalization rate applied to older receipts.

[33] Note that this does not include the intergenerational transfers that accrued before 1998.

[34] Table 11 in the appendix includes the cut-off points for the wealth quintiles used in the main analysis.

Table 1: Descriptive statistics intergenerational transfers (in Euro):

	2002	2007	2012	Total
Panel a. Summary (conditional on receipt)				
Mean	81,957	61,114	83,205	75,491
Std. Deviation	153,574	131,008	195,580	168,641
Min	151	520	480	151
Max	1,789,820	1,502,987	2,523,150	2,523,150
Panel b. Distribution of transfers (conditional on receipt)				
p10	5,643	3,122	1,970	2,699
p25	9,076	6,292	6,152	7,159
p50	28,570	15,994	16,843	16,930
p75	93,835	52,029	48,584	56,433
p90	203,160	175,843	233,195	192,123
Panel c. Transfer receipts				
Cases	587	874	681	2142
Share recipients	0.059	0.098	0.119	0.094
Inter vivos (thereof)	258	440	366	1064
Share (thereof)	0.405	0.515	0.522	0.497

SOEPv30, own calculations. Data is weighted using longitudinal weights. Sample restricted to estimation sample.

6.2 Transfers accrual over the wealth distribution

Table 3 touches on the relationship between transfers and wealth. Panel *a* column 1 for instance, reports the number of observed transfer receipts over wealth quintiles from the preceding period, column 2 adds the share of recipients. Both indicators tend to increase over the wealth distribution, reflecting that it is more likely to receive a wealth transfer, the richer the household initially is. The mean transfer amount, as reported in column 3, indicates somewhat of a u-shape, showing high receipts for households from the bottom quintile of the wealth distribution. Mean transfers for the succeeding 20 % of the population are at first lower, but increase monotonically over the rest of the net wealth distribution.

Column 5 includes the key statistic in the analysis of the distributional effect of wealth transfers, that was introduced in inequality 3.1, the relative transfer size. In fact, the relative transfer size tends to decrease over the wealth distribution, which entails that the relation of transfer sizes and wealth stocks tends to yield an equalizing effect of intergenerational transfers. This pattern is commonly found in the literature: Wolff and Gittleman [2014] (table 3) and Karagiannaki [2015] (table 6) find the same relationship. Decreasing relative transfers over the wealth distribution imply that the wealth *share* of poorer parts of the population is increasing thus inequality is decreasing.[35]

There are however some reasons why the ratios in the last column of panel *a* in table 3 appear somewhat huge and jumpy: First, as noted in the table, the quintiles originate from $t-1$, thus relating the aggregated transfers of the last 5 years to wealth as observed 5 years ago. Quintile

[35]Note, again, that the absolute difference in wealth is typically increasing through transfers. Which is also documented by Wolff and Gittleman [2014] and Karagiannaki [2015] in the respective tables.

Table 2: Descriptive statistics household net wealth (in Euro):

	2002	2007	2012	Total
Panel a. Summary				
mean	162,634.05	156,612.24	134,031.31	149,974.52
p50	44,920.99	51,729.87	46,718.35	47,647.99
sd	397,786.46	348,858.01	267,501.84	337,776.35
min	-2,313,555.10	-1,510,926.13	-1,177,238.79	-2,648,154.88
max	12,799,097.00	8,964,804.50	9,855,908.00	12,920,548.40
Panel b. Mean wealth				
Quintile 1	-8751.502	-10765.71	-11505.11	-10459.01
Quintile 2	7598.68	9063.165	7523.368	8085.435
Quintile 3	49602.53	55361.64	51179.69	52056.41
Quintile 4	173223.8	167042.3	156903.6	165101.1
Quintile 5	595256.5	563793.9	471665.8	538840.4

SOEPv30, own calculations. Data is weighted using longitudinal weights. Sample restricted to estimation sample.

Table 3: Relationship of wealth and transfers (in Euro):

	Cases	Share of recipients	Mean amount[1]	Relative value[1,3] $E(B_t/W_{t-1})$
Panel a. Transfers over wealth quintiles from W_{t-1}				
Quintile 1	128	4.66	95,449	519.00
Quintile 2	214	7.88	43,208	477.20
Quintile 3	354	16.34	47,014	91.28
Quintile 4	363	13.55	52,831	32.18
Quintile 5	373	12.78	148,291	25.14
Panel b. Transfer receipts over age groups[2]				
< 30	840	9.40	31,735	.
30-45	4,446	13.74	69,176	85.68
45-60	4,656	11.45	82,798	36.71
60-75	2,526	6.71	74,725	22.59
> 75	384	2.09	127,190	37.08
Panel c. Transfers over HH income quintiles				
Quintile 1	1,056	3.74	36,197	35.76
Quintile 2	1,590	6.58	46,472	35.96
Quintile 3	2,064	8.40	108,683	62.49
Quintile 4	3,474	14.20	50,137	33.68
Quintile 5	4,350	16.92	99,527	37.35

SOEPv30, own calculations. Data is weighted using longitudinal weights. Sample restricted to estimation sample.
[1] Conditional on receipt.
[2] Number reflects *observed* receipts in respective age group, i.e. individuals receiving more than once count more than once.
[3] Number reflect the absolute values, thus, negative ratios for the first wealth quintile appear as positive numbers. Values in %.

1 is furthermore obviously a heterogeneous group: As shown in table 2, the mean wealth of this group is negative, encompassing all indebted households, irrespective of whether these are systematically short of resources or just temporarily indebted due to e.g. investments in human capital.

Panel *b* then presents the same indicators, albeit calculated across age groups. Age matters in some respects: First, while heirs receive their inheritances typically in the mid 50s, the numerous gift recipients in the sample are in their mid 40s (compare table 13 in the appendix). Second, young recipients either receive gifts, which are typically lower than inheritances, or inherit from young relatives, which then could not accumulate wealth over their entire life cycle. Consequently, column 3 shows that the mean transfer amount increases over age groups. Thirdly, life cycle theory predicts increasing wealth until retirement entry. This effect may contribute to the pattern that relative transfers are particularly high for young recipients. The various interrelations of age with both, wealth and transfers, seem to confirm earlier considerations to control for the impact of age in the regression analysis.

Panel *c* gives the indicators over the current quintiles of the household income distribution. While the mean amount as presented in column 3 do not indicate a systematic variation (contrasting somewhat the statistics provided by Wolff and Gittleman [2014]) over the income distribution, the probability to receive seems to be correlated positively with income levels. Again, the summary statistics reflect the expected pattern and suggest to control for household income in the estimation.

Considering the statistical relationships between wealth, transfers, age and income, the correlation of wealth and intergenerational transfers might well be misleadingly overstated by the results in table 3. In order to descriptively show whether there is a systematic incidence effect as argued in section 3 , I will briefly present the estimation results of a tobit model regressing the transfer amount on a dummy set indicating the households' wealth quintile in $t-1$ controlling also for age and household income with third order polynomials. Using the McDonald and Moffit [1980] decomposition in order to derive, first, the marginal effect on the intensive margin (i.e. the amount received)[36] and, second, the marginal effect on the extensive margin (i.e. the probability to receive), I estimate the results in table 4:

Panel *a* reports the descriptive results for regressing all transfers. For instance, having been in the 5^{th} wealth quintile in the previous period increases the probability of households to receive a transfer by 0.27 percentage points[37] compared to household who have been in the 1^{st} quintile. Considering the unconditional probability to receive a transfer when having been in the bottom 20 % of 4.7 %, the estimate suggests an increase of the probability by almost 6 %. The second

[36]Formally, using dummy variables the effect on the intensive margin equals

$$E_{q=i}(y|y^* > 0, x)] - E_{q=1}(y|y^* > 0, x)$$

and on the extensive margin

$$P_{q=i}(y^* > 0) - P_{q=0}(y^* > 0)$$

with $i = (2, ..., 5)$

[37]Evaluated at the means of the control variables and conditional on age and household income.

Table 4: Tobit estimation of incidence effect (marginal effects displayed):

Basis 1st Quintile	2nd	3rd	4th	5th
Panel a: All transfers.				
Extensive margin	0.0004	0.0022	0.0021	0.0027
se.	0.0168	0.0160	0.0164	0.0167
Intensive margin	8,429	45,775	44,514	57,519
se.	22,421	18,604	20,797	17,915
Overall effect	11,552	62,774	61,043	78,890
se.	30,736	25,504	28,514	24,559
Panel b: Inter vivos only.				
Extensive margin	0.0007	0.0027	0.0025	0.0018
se.	0.0195	0.0187	0.0194	0.0202
Intensive margin	5,731	21,743	19,978	14,390
se.	2,977	201	836	691
Overall effect	7,843	29,768	27,350	19,697
se.	4,074	272	1,144	945
Age controls	✓	✓	✓	✓
Income controls	✓	✓	✓	✓

Table includes marginal effects from Tobit estimations in which the transfer amount is regressed on a dummy set indicating the households' wealth quintiles in the previous period and polynomials of age and income.
SOEPv30, own calculations. Data is weighted.

row displays the effect on the intensive margin: Households, who have recently been in the 3^{rd} wealth quintile are, conditional on receiving a transfer, likely to inherit a transfer that is on average 45,700 Euro higher than a transfer received by households who were in the bottom quintile. The third row of panel a then presents the overall difference between households coming from different wealth quintiles. Panel b contains the same set of estimates, albeit resulting from excluding inheritances from intergenerational transfers. Generally, the differences between households from different quintiles seem less pronounced. The results in the extensive margin of panel b then somewhat accommodate concerns, inter vivo transfers are predominantly needs-driven. Even if there is such an effect, poor households are, conditional on age and household income, far less likely to receive a transfer than more affluent households. After all, the estimates in table 4 suggest that there is an incidence effect in transfer receipts independent of age and income effects: The richer households are, the higher is their probability to receive a transfer and, conditional on receipt, the higher will this transfer be. Hence, the distributional analysis of transfers w.r.t. to wealth inequality should take into account the heterogeneous transfer accrual.

7 Results

At first, I will present the estimated average effects of transfer receipt on the household saving behavior. Thereafter, the results of checking up on potential heterogeneities over the wealth distribution are provided. I will then discuss in the last subsection whether these heterogeneities translate into a disequalizing effect of transfers with regard to household wealth inequality.

7.1 Regression results: Average effect

Table 5 contains the results of regressing variations of the model derived in section 4.1. In particular the OLS specification (eq. 4.2) whose results are presented in column 1 is comparable to the estimations in Karagiannaki [2015] or by Maury Gittleman in Wolff [2015].[38] The estimates are read as follows: First, the transfer dummy is negative and highly significant implying that only transfers beyond 30.000 Euro[39] will typically raise heirs' savings. The estimates for the linear and squared transfer amount seem to suggest a non-linear relationship with a decreasing slope. As noted above, the estimates require a joint interpretation: Conditional on receipt, the OLS model implies an average marginal effect 7 758.77 Euro. Note that gifts and inheritances are expressed in 10 000 Euro in all regressions. Hence, the estimates describe an increase in transfers by 10 000 Euro. The average transfer in the sample equals roughly 75 500 Euro which, according to these estimates, would entail an increase in savings by roughly 36 600 Euro. Just as the joint significance of the three transfer variables, this effect is significant on the 1 % level.

Table 5: The average saving effect after transfer receipt:

Dep.: Savings	OLS[1]	FD[1]	FD[1]	FD with IV[1,2]	FD with IV[1,2]
Amount	8712.12***	5997.70***	655.97	3074.80**	1760.27
	(2313.22)	(1814.32)	(3793.31)	(1532.32)	(1792.13)
Amount squared	-63.14***		70.61*		17.42
	(16.06)		(36.36)		(27.18)
Transfer Dummy	-25568.60***	-10080.74	8968.42	-7315.82	-2619.10
	(9436.01)	(14106.40)	(14028.51)	(9564.40)	(9173.46)
W_{t-1}				-1.06***	-1.06***
				(0.16)	(0.16)
Controls	✓	✓	✓	✓	✓
Number of observations	10400	5200	5200	5200	5200

The table displays estimates of regressing savings on intergenerational transfers (specified by a dummy indicating transfer receipt, the linear and partly the squared amount) and the households' wealth in the previous period and further controls.
[1] Control variables: All parameters are conditional on controlling for polynomials of age and household income. Estimated with cluster robust standard errors. Complete estimation results are reported in the appendix. Intergenerational transfers are expressed in 10.000 Euros.
[2] First stage results reported in the appendix.
Estimations based on SOEP v30.

Looking at the publications using a resembling model, the results appear rather similar: Wolff

[38]Both other publications model transfers only linearly, though.
[39]The quadratic nature of the equation brings along a second zero: Transfers beyond 1 349 727.3 Euro will entail a negative savings effect of transfers.

[2015] lists estimates, which indicate that a 10 000 Dollar transfer causes savings to increase by slightly above 8000 Dollar.[40] The underlying PSID data also only surveyed wealth in 5 year intervals, thus implying a similar distance between transfer receipt and observation of wealth. Hence, the estimates are very much comparable to the one of the here estimated OLS model. Karagiannaki [2015] uses the British household survey panel and compares estimates implying an assumed average distance between receipt and wealth data point of 10 years. The estimates are accordingly lower, taking 0.67 (mean) and 0.62 (median). In an back-of-the-envelope calculation she infers an average propensity to consume of 7.3 % per annum. Applying this logic to the present estimates would yield a slightly higher average propensity to consume of 12 % per annum.[41]

After all, the given kind of OLS model seems to consistently yield similar results. As argued above, however, these estimates are likely to suffer from omitted variable biases. I thus present further estimates, seeking to control for confounding factors. For the sake of comparability to the literature and simplicity, the following models are reported with squared term and without squared term. Column 2 of table 5 presents a first differenced variation of the model already suggesting that the parameter of interest is upwards biased in the OLS estimation: The FD estimate suggests that, conditional on receipt, slightly less than 2/3 of an inherited Euro are saved. Column 3 adds a squared term to the previous model,which causes a sharp shift in the shape of the effect: The transfer dummy turns positive, just as the squared term. The linear term, however, decreases. The average marginal effect (conditional on receipt) equals 1 722 Euro. This implies that the propensity to save is estimated to be tremendously low for small transfer values, albeit increasing with transfer size (compare figure 1 below). While heirs, on average and c.p., tend to save almost the entire first 10 000 Euro (i.e. 9 694 Euro), the average conditional transfer of 75 500 Euro only entails an average increase in savings of 17 944 Euro. Note that the three estimates are jointly significant on the 1 % level.

Following the reasoning of section 4, it however appears important to control for lagged wealth when evaluating how transfers affect the savings behavior of households.[42] Wolff [2015] controls for wealth in his estimation linearly and Karagiannaki [2015] uses wealth quintiles from the previous period, both not dealing with potential endogeneity issues rising from these control variables. The estimates in column 4 (dummy and linear effect) and 5 (dummy, linear and squared term) control for lagged wealth by instrumenting it as shown in equation 4.6.[43] Naturally, using

[40] Wolff [2015] specifies transfers linearly, the marginal effect is thus constant.

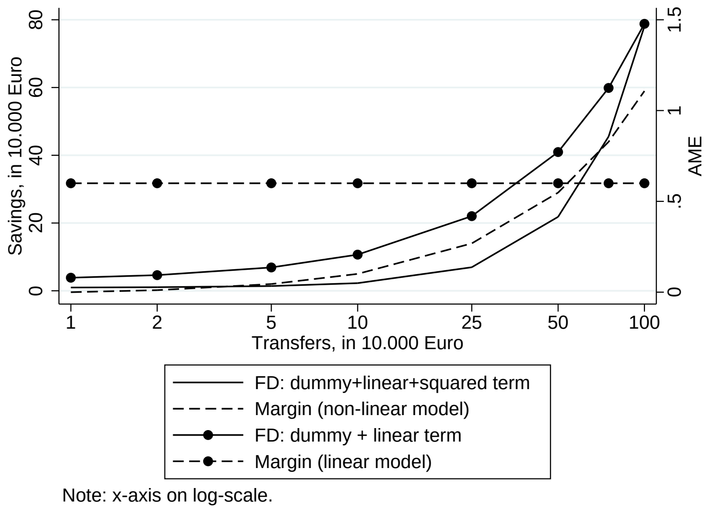
[41] Since there is no strong temporal variation in the accrual of transfers, the average distance in the present sample is expected to be (0+1+2+3+4)/5=2 years, where 0 means that people inherited in the year in which wealth was also observed. Empirically, the average distance in the sample is 1.8 years on average. The estimated average marginal effect given the average conditional transfer of 75 500 Euro equals .78 implying that $1 - 0.78 =$ 22 % of an inherited Euro were consumed. Hence, 22/1.8=12.2 % per annum. Due to the inaccuracy in the estimates, however, the present estimate for the marginal propensity to consume is not significantly different from the one presented by Karagiannaki [2015].

[42] Note that once lagged wealth is controlled for, it does not matter anymore whether *wealth* or *savings* is chosen as dependent variable. Except for the estimate of W_{t-1}, which will vary by 1, the estimates will remain the same.

[43] Table 15 in the appendix provides the first stage results of this estimation.

first differences and instrumental variable techniques reduces the accuracy of the estimation.[44] Neither the estimates in column 4 (p-value of 0.1285), nor those in column 5 are jointly significant on conventional levels. If anything, the estimates also rather speak for low saving rates from transfers. Interestingly, however, the lagged wealth parameter is very close to -1. Recalling from section 4 that the parameter γ as defined in equation 4.2 equals $\gamma = \rho + 1$ a Wald test reveals that γ does not differ significantly from 0. Controlling for lagged wealth does thus *not* impact the saving behavior out of transfers. Dropping lagged wealth as control variable then suggests that the models of equation 4.9 with, first, dummy and linear term and, second, dummy, linear and squared term respectively are consistent, the corresponding estimates in column (2) and (3) useful. The two sets of estimates might look different at first sight, figure 1 suggests that they actually behave rather similarly over the full range of transfers in the sample.[45]

Figure 1: Effect and Margins of FD Models



The main difference between the two is the difference in marginal effects: The model from column (2) implies a constant and fairly plausible marginal effect. The model from column (3) implies very low saving rates for low transfers and increasing, substantially higher saving rates from high transfers. Such a shape seems plausible for sizable transfer, for most transfers in the present sample, though, the saving rates appear rather low. After all, the model from column (2) (which is depicted in equation 4.9) appears to be simpler to interpret and more illustrative for the common transfer sizes in this sample.[46] The two parameters are jointly significant on the 1 % level and predict that roughly half of the average transfer in the present sample is saved.

[44]Note that standard errors are clustered at the household level. Also, they take into account the additional uncertainty due to multiple imputations.

[45]Note, that 99 % of the non-zero transfers in the given sample are below 1.000.000 Euro.

[46]In particular, the model with dummy, linear and squared term provides implausibly low saving rates for transfers between 20.000 and 50.000 Euro which encompasses 75 % of all observed transfers.

Transfers above 16 800 Euro on average and ceteris paribus will translate into increasing savings of recipients. Households also tend to save 60 Cents of an inherited Euro once they receive a transfer. The results presented in the literature are thus likely to be slightly upwards biased. The main driver for this bias could simply be the family background: Richer parents foster the wealth accumulation of their children (e.g. by investments in their human capital or by setting an example of living an economical life) and bequeath higher transfers. Controlling for time constant heterogeneity accommodates this flaw.

7.2 Regression results: effect heterogeneity

Nonetheless, non-linearities could conceal that lagged wealth still matters for the current savings behavior of households out of transfers. The purpose of this sub-chapter is to test, whether there is evidence for the hypothesis that richer households do save more from transfers than poorer households. This presumption is often stated in the debate on the effect of intergenerational transfers on wealth and in fact my have far-reaching implications for the distribution of wealth. Table 6 presents a number of specifications using interactions of the households' position in the lagged net wealth distribution (indicated by quintile dummies) and the transfer amount, both linearly and squared. The model interpretation thereby becomes increasingly cumbersome. Columns (1) to (3) present potentially endogenous results and are rather presented for pedagogical reasons:

Column (1) contains the results of an OLS regression of wealth (instead of savings) on the usual controls and interacting transfers with (not instrumented) indicators for the last periods' wealth position of households. The estimation is conceptually problematic, as the dependent variable is a stock and the key explanatory variables indicate flows. The estimation also fails to allow for individual fixed effects and is thus most likely to yield biased estimates. The results are nonetheless reported as this specification might be considered representing the most intuitive approach to display descriptively the differences between households from different wealth quintiles in saving from transfers. The estimated savings pattern over the wealth distribution roughly coincides with the often stated expectations: The poor save comparably little from transfers, the rich are much more capable of transforming wealth transfers into wealth.[47] These estimates are economically not necessarily illustrative, but will serve below as an extreme scenario in the simulation chapter (i.e. an upper bound for disequalizing saving patterns and thus the maximum disequalizing effect of transfers).

Replacing the dependent variable *wealth* by *savings* yields the results of column (2) and column (3), which adds a squared term to the specification. The otherwise unaltered specifications still do not allow for time constant heterogeneity and still do not instrument the wealth quintile indicators.[48] These two models rather serve as OLS-benchmarks.

[47] The differences are however not statistically significant.

[48] The endogeneity issue here is apparent: The dependent variable is defined as $S_t = W_t - W_{t-1}$ while the interactions on the right hand side include quintile indicators of W_{t-1}.

The expected saving pattern from column (1) has already vanished in the results of column (2) and (3). In particular the results from the model which only includes dummy and linear term appear irritating as the richest heirs would not necessarily gain by inheriting while all other heirs at least deviate significantly with respect to the linear savings terms. The model underlying column (3) then adds the squared inheritance amount. The estimated pattern appears similarly implausible: For most inheritances accruing in the top wealth quintile the saving effect is negative. After all, these benchmarks are likely to be biased, the estimated patterns are hardly illustrative.

Column (4) and (5) eventually present presumably consistent estimates of the savings behavior of households after transfer receipt and its variation over the lagged wealth distribution:[49] The models underlying column (4) and (5) of table 6 correspond to those of column (4) and (5) of table 5 except for that they add the interaction terms as formulated in equation 4.10.

The results from the model with dummy and linear term suggest the following saving pattern over the wealth distribution: The negative dummy for the top quintile indicates that only transfers beyond 92.000 Euro on average entail an increase in the savings of the richest 20 % of heirs. This value is well above the median (≈ 34.000 Euro) and well below the mean transfer in this quintile (≈ 148.000 Euro). The marginal effects implies that, conditional on being a heir in this quintile, fairly half of an inherited Euro is saved. Considering the mean transfer in this quintile, only $1/5^{th}$ of it would be saved, on average. The interaction effects estimating the savings behavior of the heirs from the lower quintiles indicate how their behavior deviates from the one in the top quintile. Considering the mean transfers in their quintiles, the first (saving $1/10^{th}$) and the third (saving half) show high propensities to consume. The second and fourth quintile save almost their entire transfers, judging from their mean transfers. Hence, this estimation does not allow to identify a somewhat consistent savings pattern over the lagged wealth distribution. Instead, neither do heirs in the bottom 4 quintiles deviate significantly (insignificance of interaction terms) from the savings behavior of the richest heirs (main effect) nor bear the estimates for the richest heirs significance on conventional levels (jointly significant only on the 29 % level). In accordance with the findings in section 7.1, there is again no sufficient evidence for dynamic effects, short and long term effects do not differ significantly.[50] Neither does the observed quintile-specific savings pattern allow to infer that the wealth endowment of heirs (conditional on the further controls) determines the households' treatment of transfers unambiguously in one direction (as assumed e.g. in the simulation in Wolff and Gittleman [2014].[51] Nor does the accuracy of the estimation allows to derive insights about the consumption behavior of groups of heirs. The estimated results are insignificant throughout. A single take-away might

[49]The first stage estimation results are not reported here as they encompass 25 estimations (5 instrumented variables in 5 imputed data sets). The results are however available on request.

[50]Again, the linear control for lagged wealth W_{t-1} yields an estimate of $\rho \approx -1$, leaving the γ parameter as defined in eq. 4.6 insignificantly different from 0. As the interaction approach however requires to take lagged wealth into account in anyway, the parameter remains in the presented models.

Column (5) again adds a squared term for the inheritance amount to the model and otherwise equals the estimation underlying column (4). The results, however, also do not provide further insights:

[51]The authors here assume that the savings rate rises proportionally with wealth with a specified slope parameter. Compare Simulation on p. 462ff.

Table 6: Heterogeneity in the savings effect across the wealth distribution:

Dependent variable	(1) OLS[1,2] Wealth	(2) OLS[1,2] Savings	(3) OLS[1,2] Savings	(4) FD with IV[1] Savings	(5) FD with IV[1] Savings
Transfer Dummy	-22570.17	41238.46	-25010.13	-48144.90	56497.38
	(31162.20)	(36861.78)	(30425.40)	(38270.29)	(108247.19)
Transfer × $W_{t-1}^{D=1}$	19747.47	-40850.10	13395.80	57910.75	-30453.94
	(33179.19)	(38731.44)	(32504.36)	(46477.22)	(109084.39)
Transfer × $W_{t-1}^{D=2}$	15025.61	-47064.41	15992.04	54543.62	-54392.89
	(32196.80)	(37988.95)	(32121.89)	(38196.77)	(113852.24)
Transfer × $W_{t-1}^{D=3}$	18365.55	-47241.97	-2651.93	43068.56	-72608.87
	(32660.05)	(38518.45)	(35715.11)	(41002.12)	(110833.15)
Transfer × $W_{t-1}^{D=4}$	-905.10	-63584.25	22617.85	50767.62	-63890.78
	(35150.30)	(39938.61)	(34612.52)	(44077.53)	(123757.94)
Amount	8224.48***	-5010.79	4863.45	5203.38	-21202.03
	(1655.41)	(3656.40)	(3712.52)	(3381.01)	(30418.45)
Amount × $W_{t-1}^{D=1}$	-3209.60*	10787.41***	5438.58	-4773.42	16464.38
	(1946.35)	(4070.28)	(5272.45)	(4910.57)	(31502.95)
Amount × $W_{t-1}^{D=2}$	99.72	13354.13***	4722.31	-1851.04	26425.88
	(2460.27)	(4095.77)	(8371.72)	(3979.23)	(33020.64)
Amount × $W_{t-1}^{D=3}$	-2515.75	10961.51**	9145.04	-4241.99	26210.57
	(3044.58)	(4380.45)	(7156.12)	(3754.47)	(31546.29)
Amount × $W_{t-1}^{D=4}$	2346.93	15463.16***	-1544.06	-166.63	28348.90
	(3137.53)	(4416.35)	(4274.37)	(4155.97)	(35587.92)
Amount^2			-59.30***		0.00
			(14.75)		(0.00)
Amount^2 × $W_{t-1}^{D=1}$			24.40		-555.58
			(28.19)		(785.72)
Amount^2 × $W_{t-1}^{D=2}$			43.89		-617.12
			(76.64)		(803.41)
Amount^2 × $W_{t-1}^{D=3}$			-75.86		-655.92
			(72.96)		(796.34)
Amount^2 × $W_{t-1}^{D=4}$			163.10***		-644.25
			(23.33)		(930.43)
W_{t-1}				-1.06***	-1.04***
				(0.16)	(0.16)
Controls	✓	✓	✓	✓	✓
Number of observations	10400	10400	10400	5200	5200

Note that each column includes the estimates from a single estimation, the middle rule just separates estimates to increase readability.

[1] Control variables: All parameters are conditional on controlling for a third order polynomial of age, a second order polynomial of household income and their interactions. Estimated with cluster robust standard errors. Complete estimation results are reported in table 16 the appendix. Intergenerational transfers are expressed in 10.000 Euros.

[2] Main effects of wealth quintile indicators reported in the table 16 in the appendix. Estimations based on SOEP v30.

be, that adding the squared terms in fact affects the suggested savings pattern over quintiles.

7.3 Discussion of results

The results presented in the previous section are surprising: The wealth endowment of a household does not seem to significantly impact how households adjust their savings behavior to the receipt of intergenerational transfers. The absence of a significant dynamic effect also implies that there is no gradual consumption (resp. saving) from intergenerational transfers. Households are thus expected to consume as much from a very recent transfer receipt as from one received long ago. [52]

Economically, it is conceivable that behavioral reactions across the wealth distribution do not differ significantly.[53] Households consumption will primarily depend on permanent income, negative transitory shocks are generally mitigated by welfare state institutions. Hence, there is not necessarily a need for higher consumption out of transfers in lower wealth quantiles.

Nonetheless, methodological issues and data limitations might contribute to the results: It is for instance conceivable that the households dynamic adjustment of their consumption path is not accurately identified. As noted above, the data structure entails that people are on average observed 2 years after receipt. Households might already have fully adjusted consumption within this time. It then appears as if households "immediately" consume the estimated and substantial share of roughly 1/3 of the transfer and might save the rest for e.g. own bequest considerations. Partly, the adjustment of the consumption path is also concealed by the returns accruing to the transfer receipts and that in itself might vary over the wealth distribution, as e.g. noted by Piketty [2014]. Also, as mentioned above, the pace of the dynamic adjustment of consumption is likely to be related to the wealth type of the transfer. Inherited real estate is less liquid than e.g. financial transfers [Westerheide, 2005]. My results might thus also reflect rather the immediate consumption from liquid assets and while not covering the longer term adjustments towards business capital and real estate. This shortcoming is however not only related to the lack of surveying the wealth type of the transfer but also the rather limited period of time covered by the data at hand.

The lack of significance may also be attributable to the costly estimation approach: After accounting for fixed effects and instrumenting lagged wealth, the analysis rests on a single time period only. The multiple imputation approach adds further uncertainty, the interaction approach virtually reduces the number of incidents per estimate and draws some degrees of freedom.[54] Improved data and methods might also reveal that the absence of dynamics results from the fact that some households invest their transfers and generate returns while others dissave.

[52] Also Westerheide [2005] does not find much variation in the saved share of transfers depending on whether they were received recently or already 5 or even 10 years ago.

[53] Looking at the relationship between saving behavior and income levels Brenke and Pfannkuche [2018] provides descriptive evidence suggesting that the savings rate varies with income. Income and savings rate are however obviously endogenously chosen.

[54] The statistical power however still maintains comparably low standard errors.

These effects could balance each other to some degree. I will take up the role of expectations for these results in the robustness part, section 8.

7.4 Simulation

The purpose of this paper is to track down the distributional effects that intergenerational transfers have on the household net wealth distribution. One can describe this effect using the following two distributions:

- W^{obs}: This is the net wealth distribution as observed in the SOEP (pooled over the periods of 2002, 2007 and 2012).
- W^{net}: This counterfactual distribution is the actual wealth distribution net of transfers. Note that this distribution is *not* derived by $W^{obs}_{H,t} - B_{H,t}$ but by $W^{net} = W^{obs}_{H,t} - \beta_{\tau} \times B_{H,t}$ in order to take into account the savings behavior of households after transfer receipt.

Calculating the difference between the inequality between W^{net} and W^{obs} then yields the overall effect of transfers on the wealth distribution: $G(W^{net}) - G(W^{obs})$, where $G()$ is some function describing an inequality index.

As described in section 3, I would like to decompose this overall effect in order to identify in how far a heterogeneous saving behavior and the transfer incidence contribute to the overall inequality effect of intergenerational transfers.[55] I will use some of the estimation results so far derived in this paper in order to quantify the impact of these effects and to derive the overall effect of transfers on wealth. To do so, I will estimate inequality indices for two further counterfactual distributions of wealth *after* transfer receipt:

- W^{equ}: Describes a counterfactual distribution required to identify in how far the incidence effect is driving the distributional implications in the overall effect. Using estimates of a tobit model[56] of the form described in appendix section 10.2.3, one can simulate a distribution of transfers that divides the aggregated bequest flow equally among the wealth quintiles in the sense that the expected unconditional transfer sizes over quintiles are equal in the counterfactual distribution. The difficulty here is that the incidence effect, as explained above, implies that both $P(B > 0)_{\tau}$ and $E(B|B > 0)_{\tau}$ differ across quintiles. In order to balance expected transfer sizes across quintiles only along the intensive margin, the tobit estimates are helpful for taking into account the differing shares of heirs over quintiles, i.e. the variations in $P(B > 0|\tau)$.[57] The expected (unconditional) transfer in

[55] The overall effect furthermore is a function of the ratio of the initial net worth of households and its relative size to transfers. I do not alter the wealth distribution and do not alter the aggregate transfer volume. Identifying the incidence effect however reveals in how far the distribution of transfers across the wealth distribution is driving the distributional effect of transfers.

[56] The model is similar to the one underlying the the descriptive results in table 4 (but leaving the age and income controls aside).

[57] Note that the equal distribution of transfers *among wealth quintiles* does neither imply that all households receive the same hypothetical transfer nor that transfers would have no distributional impact on wealth. It

wealth quintile τ is estimated to equal:

$$\hat{E}(B|\tau)_\tau = \hat{P}(B > 0|\tau)_\tau \times \hat{E}(B|\tau, B > 0)_\tau \tag{7.1}$$

In order to get the counterfactual while keeping the total sum of transfers constant, one requires a hypothetical reallocation of the transfers between quintiles that balances the respective differences between quantile-specific expected transfers and the global expected (unconditional) transfer. This is equivalent to solve for x_τ in

$$P(B > 0|\tau) \times (E(B|\tau, B > 0) + x_\tau) \stackrel{!}{=} \bar{E}(B)$$

and to add x_τ to each households' transfer in the respective quantile τ. The counterfactual distribution of transfers then is

$$\hat{B}^{equ}_{H,t,\tau} = B_{H,t} + \frac{\bar{E}(B) - \hat{E}(B|\tau)_\tau}{\hat{P}(B > 0)_\tau}. \tag{7.2}$$

Where $\hat{E}(B|\tau)_\tau$ is the expected (unconditional) transfer size in wealth quintile τ and $\bar{E}(B)$ the overall expected (unconditional) transfer size. The tobit estimation parcels out the total effect, as displayed in eq. 7.1, in extensive and intensive margin and thus provides with estimates for $\hat{P}(B > 0)_\tau$ (extensive margin) and $\hat{E}(B|\tau, B > 0)_\tau$ (intensive margin) the elements for the calculation of the counterfactual distribution as described in 7.2. $B^{equ}_{H,t,\tau}$ is derived by adding the quintile specific difference between the overall expected value of transfers and the quintile specific expected transfer to each transfer of this quintile.[58] The resulting transfer distribution is net of the incidence effect as it implies the same expected transfers per wealth quintile.[59]

The distribution $W^{equ} = W^{net} + B^{equ}$ then allows to identify the inequality effect of the transfer incidence as $G(W^{net}) - G(W^{equ})$.[60]

rather means that the expected (unconditional) transfer size for each quintile of the lagged wealth distribution is roughly same. This does not translate into equally sized transfers for all households as the share of heirs (i.e. $P(B > 0)$) varies over quintiles. In order to keep $E(B|\tau) = P(B > 0|\tau) \times E(B|B > 0, \tau)$ constant over quintiles, $E(B|B > 0, \tau)$ has to adjust according to the given $P(B > 0|\tau)$ (as one would otherwise need to somehow choose counterfactual heirs).

58 While the distributional analysis in this section uses pooled wealth data over the three time periods, W^{equ} is calculated separately for 2002, 2007 and 2012.

59 The aggregate transfer amount is kept constant by this procedure as the deductions for households above the mean balance the surplus of households below the overall mean transfer. Note as well that the given procedure balances the expected transfer per quintile by the absolute transfer amount only. Hence, given the incidence effect, as there are fewer recipients of transfers in the bottom quintiles, these households' receipts will be above the average expected transfer in order to balance the higher number of recipients in upper wealth quintiles. This way, there is no need to turn observed non-heirs into heirs in the bottom quintiles in order to equalize the transfer volume accruing in the bottom quintiles. Figure 4 in the appendix displays the distributional effect of the counterfactual accrual of transfers in a Lorenz diagram for 2012.

60 It would be furthermore possible to generate the distribution $W^{spar} = W^{net} + \beta_\tau \times B^{equ}$. This distribution would permit to identify the effect of heterogeneous savings behavior by $G(W^{net}) - G(W^{spar})$. Differences of this effect to the overall effect would then be attributable to the incidence effect. In order spare the reader of yet

- W^{mech}: This distribution is defined as $W^{mech} = W^{net} + B$ and allows to identify the the actual *mechanical* effect of transfers on the wealth distribution as $G(W^{net}) - G(W^{post})$. The mechanical effect ignores the impact of transfers on the savings behavior of households (i.e. neglects β_τ). Hence, if the mechanical effect would differ substantially from the overall effect, this difference would be attributable to the heterogeneous savings behavior of households after the receipt of transfers.

The proposed decomposition aims at equalizing the unconditional expected transfer size *over* quantiles in order to measure the impact of potentially systematic variations over the wealth distribution with direct distributional implications. The variation in transfer sizes within quantiles is however typically higher than between quantiles. The decomposition here thus is a coarse tool assessing only a single dimension of the variation in transfers. Also, the decomposition manipulates transfer distributions in order to reach evenly distributed expected transfers sizes in all quantiles of the wealth distribution. Another promising approach to reach such distributions could use the variations in transfers within quantiles and simply manipulate the households' survey weights. Such an approach is considered equivalent to the approach implemented here.

The overall effect of intergenerational transfers contains both the incidence effect and the effect on the savings behavior of households. The decomposition seeks to point these underlying dynamics out. Tables 7 and 8 provide a number of inequality indices for the mentioned four distributions. Note that the distributions in the panels *a*, *c* and *d* rest on β_τ estimates. The distributions in the panels *b* to *d* include transfers, whereas different concepts of transfers. Panel *a* shows the only net-of-transfer distribution. While the results in table 7 base on the preferred β_τ estimates as presented in column (4) of table 6, table 8 rather serves as a robustness check using the endogenous estimates of column (1) in table 6, which bear a savings pattern closer to the initial expectations.

Table 7 presents the main results of the simulation by listing the estimated inequality in the four relevant wealth distributions. Inequality is expressed by four relative inequality indices (the Gini index[61], Coefficient of Variation[62] and the 90/50 and 75/25 percentile ratios.) and, in the last column, an absolute one (the difference between the 75th and 25th wealth percentile). The Gini index is reported twice: The *Gini0* only considers households with non-negative wealth in order to reflect a Gini measure bound between 0 and 1.[63] While the unrestricted Gini index overestimates inequality, the restricted will underestimate inequality due to the systematic omission of the lower end of the wealth distribution. The most reliable inequality measure here is

another counterfactual distribution, the effect of heterogeneous savings is identified as described above.

[61]Note that the Gini index looses his characteristic of being bound between 0 and 1 as wealth data contains negative values. In this case, the Gini could reach values above 1. Also, subtracting the saved share of transfers from observed wealth to reach the distribution W^{net} affects the share of households with negative wealth rendering the Gini indexes not necessarily comparable to each other.

[62]The CV is defined as the ratio between the standard deviation and the mean, i.e. $CV = \frac{\sigma}{\mu}$. Due to the mentioned flaws of the Gini index in the context of wealth data, the CV is commonly used as reference in measuring wealth inequality.

[63]It is common to report this reference as the Gini index in context of wealth and without restrictions to non-negative values might be heavily misleading.

Table 7: Inequality in actual and counterfactual wealth distributions:

	Gini	Gini0	CV	p90/p50	p75/p25	p75-p25
a.W^{net}: *Counterfactual wealth net of transfers.*						
Index	.755	.69	2.38	8.63	331	184,829
Std. error	.0138	.01	.129	.561	119	6,049
Distributions including transfers:						
b.W^{obs}: *Wealth distribution as observed:*						
Index	.734	.685	2.25	7.97	99.5	196,153
Std. error	.0118	.0101	.128	.479	57.7	6,028
c.W^{mech}: *Transfers added w/o heterogeneous savings behavior.*						
Index	.752	.692	2.35	8.5	234	186,900
Std. error	.0134	.01	.129	.498	91.5	5,870
d.W^{equ}: *Transfers added w/o incidence and savings effect.*						
Index	.743	.684	2.2	7.84	165	181,999
Std. error	.0158	.0103	.163	.524	75.5	5,929

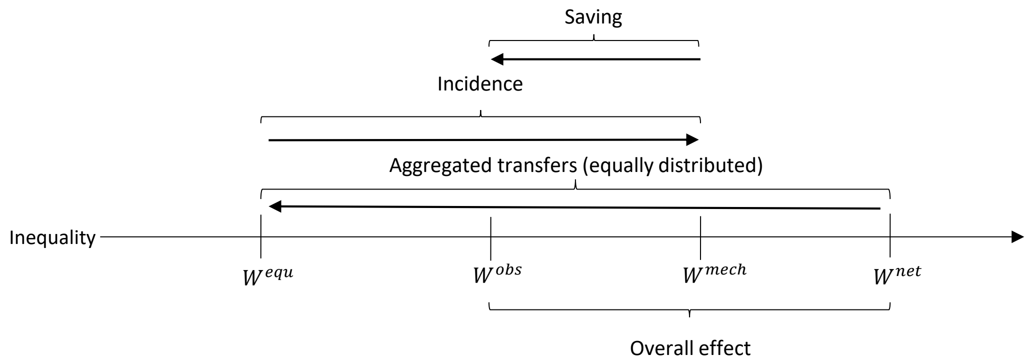
Note: SOEP v30, own calculations. Results are weighted. Data pooled across 2002-2012 periods.

thus the CV.

First, panel *a* gives the wealth inequality in household wealth net of transfers, W^{net}. Panel *b* reports the inequality in the observed wealth distribution. Comparing the inequality between panel *a* and panel *b* indicates the overall inequality effect of transfers on the household wealth distribution. According to all relative inequality measures, inequality is about 2 Gini points higher in the distribution net of wealth transfers. Absolute wealth inequality has risen, though. Both of these results are well in line with the literature [Wolff and Gittleman, 2014, Elinder et al., 2016, Karagiannaki, 2015, Boserup et al., 2016]. This result was to be expected after having seen above that there is no clear pattern found according to which richer households would save more out of transfers than poorer households. The observed wealth distribution W^{obs} however is already result of adjustment of the savings behavior of households after bequest receipt. The literature widely neglects the potential variations in the savings reactions, table 7 panel *c* therefore helps to pin down the actual nature of the savings effect:[64] Panel *c* displays the inequality in wealth if only adding transfers mechanically to the net-of-transfer distribution. Hence, the distribution neglects the adjustment of the savings behavior of households after bequest receipt. All relative inequality measures suggest that the inequality in W^{mech} is higher than in W^{obs}, implying that the savings behavior as estimated *adds* strongly to the equalizing effect of transfers on wealth inequality. This finding opposes the hypothesis of Wolff and Gittleman [2014] who assumed the savings behavior over the wealth distribution would rather tend to disequalize wealth. Comparing the panels *a* and *c* furthermore leads to the conclusion that controlling for the savings effect reduces the equalizing effect of transfers substantially. Studies not controlling for the savings behavior of households might thus heavily overestimate the genuine effects of

[64]That is, the effect of the savings behavior out of transfers on the inequality effect of transfers

Figure 2: Stylized illustration of decomposition:



transfers as they attribute the equalizing effect of the savings behavior falsely to transfers in general.

Panel d then provides the counterfactual inequality in wealth after transfers, if the aggregated bequest flow would have been equally split among all wealth quintiles. The difference in relative inequality compared to W^{mech} is fully attributable to the transfer incidence (as the savings behavior is kept out of this comparison). It indicates that the relationship between parental wealth, as represented by the transfer size, and children's wealth is contributing to wealth inequality *beyond* the transfers observed here.[65] [66] Note here that $W^{equ} = W^{net} + B^{equ}_{H,t}$ *must* be more equal than W^{Net} and W^{mech}, but is not necessarily more equal than W^{obs} as W^{obs} additionally takes the savings effect into account.[67] According to the coefficient of variation and the restricted $Gini0$ measure, the equalizing effect of equally distributed transfers is slightly stronger than the equalizing effect of the savings behavior. After all, the incidence effect disequalizes wealth. Note however, that the incidence effect is included when comparing W^{net} and W^{obs}, so that the equalizing forces behind transfer accrual are stronger than the disequalizing effect of the transfer incidence. Hence, relative transfers are still higher for poorer people and intergenerational transfers are thus still equalizing wealth inequality.

The decomposition approach presented here adds to the understanding of how transfer accrual affects wealth inequality. Nonetheless, the differences between most of the inequality measures in table 7 are not significant and thus only hint to potential relationships that I cannot back with sufficient evidence. Taking the effect directions as given,Figure 2 gives a stylized illustration of how the subeffects add up to the observed overall effect.

[65] In the sense that those households that are comparably rich *and* receive a comparably high transfer have become rich already without this very transfer. Hence, there is a strong correlation in wealth across generations not resulting from the transfers observed here.

[66] Assuming that e.g. the number of children and other factors contributing do not systematically differ between rich and poor.

[67] Taking also the savings effect into account in W^{equ} would however need to result in a more equal distribution than W^{obs} and seems to be more equal given $CV = 2.17$.

Table 8 presents decomposition results as in the previous table, albeit based on the OLS estimates of β_τ (presented in table 6 column (1)), which suggested a strong heterogeneity in the savings behavior over the wealth distribution and in this context serve as a kind of upper bound of regressive savings patterns. The pattern suggested that the richest 20 % of the population save a much higher share of wealth than the bottom 20 % and, considering the tremendous differences in the estimated indicators, even the bottom 80 % of heirs. The underlying *beta* estimates are clearly endogenous, but applying the decomposition to the resulting distribution serves an interesting illustrative purpose: Interestingly, the decomposition results under this savings behavior do not differ substantially from those presented above. In fact, even the clearly heterogeneous and rather regressive savings pattern in the OLS estimation does not revert the equalizing forces of transfers and thus still yields an equalizing effect of transfer accrual. The reason simply could be that also this pattern does not indicate a monotonically increasing β over the wealth distribution.The equalizing effect of the savings behavior has however clearly decreased. The results however show that small variations in the savings pattern do not necessarily translate in substantial differences in inequality. Assuming a monotonically increasing relationship between wealth and saving may thus still revert the equalizing effect of the savings behavior. It is nonetheless unlikely that it would revert the overall effect, according to the predominant equalizing effect of the aggregate transfer volume.

After all, the simulation meets concerns by Wolff and Gittleman [2014] that heterogeneous saving patterns could lead to a disequalizing effect of transfers on the wealth distribution: Even when identifying the pure savings effect net of the transfer incidence does not warrant such concerns. The estimations presented in this paper suggest in line with the literature, that transfers tend to equalize inequality in wealth even after taking dynamic adjustments of household behavior into account. The effects, while being only partly statistically significant, however seem rather small and do not necessarily bear economic significance.

8 Robustness

The Robustness section present some simple robustness checks for the estimation of the savings effect. Namely, exclusion of gifts, expectations concerning future transfer receipts, the time between transfer receipt and observation of the household and, lastly, excluding extreme observations.

8.1 Excluding gifts

So far, intergenerational transfers encompass *inheritances* and *inter vivo transfers*. While a single person can bequeath only once (i.e. at death), it may well pass on gifts several times during the life course. A concern may thus be that the transfer variable in the preceding estimations is endogenous: Households may have received gifts as financial support in moments of need. These households would then be likely to show a particularly high propensity to consume out of

Table 8: Inequality in actual and counterfactual wealth distributions (robustness):

	Gini	Gini0	CV	p90/p50	p75/p25	p75-p25
a.W^{net}: *Counterfactual wealth net of transfers.*						
Index	.747	.689	2.34	8.42	189	187,524
Std. error	.0118	.01	.128	.51	60.9	5,944
Distributions including transfers:						
b.W^{obs}: *Wealth distribution as observed:*						
Index	.734	.685	2.25	7.97	99.5	196,153
Std. error	.0118	.0101	.128	.479	57.7	6,028
c.W^{mech}: *Transfers added w/o heterogeneous savings behavior.*						
Index	.742	.69	2.31	8.38	146	189,995
Std. error	.0116	.0102	.127	.501	61.2	6,064
d.W^{equ}: *Transfers added w/o incidence and savings effect.*						
Index	.731	.679	2.15	7.31	93.6	187,016
Std. error	.013	.0106	.157	.524	57.8	6,111

Note: SOEP v30, own calculations. Results are weighted. Data pooled across 2002-2012 periods.

transfers. Additionally, preceding gifts may establish a biasing link between observed household wealth and observed *inheritances*: The more gifts a household received (before being observed here), the higher the household's wealth and the lower the actually observed inheritance. The estimate of interest would then be downward biased. The latter problem of unobserved preceding gifts is sufficiently addressed by taking first differences. The former issue, however, requires to exclude gifts and to only use inheritances as intergenerational transfers.[68] Excluding gifts will of course come at the cost of statistical power: As table 1 shows, almost half of the observed transfers are transfers between living persons. Table 9 presents some estimation results based entirely on inheritances. Columns 1 and 2 present OLS estimations with and without control variables, column 3 reports the FD model (results *with* inter vivos: table 5, column 2), column 4 the FD-IV model (reference results in table 5, column 4). Compared to the results basing on all observed transfers, the point estimates in table 9 tend to be somewhat smaller, albeit not significantly different from those in table 5.[69] Hence, there is no evidence that there is a more pronounced consumption out of gifts, the results rather indicate the opposite. After all, it does not seem likely that using inheritances and gifts introduces a bias.

[68]Note that households still can receive more than a single transfer, as they obviously can inherit from different persons. See footnote 1 for a brief overview of the source of transfers.

[69]Using STATAS 'suest' command adjusted for multiple imputation yields a p-value for the null hypothesis that the difference between the *amount* estimates in e.g. the FD estimation in table 9 and table 5 is 0.258. The respective p-value for the *transfer* estimate is 0.873. Hence, we cannot reject the null hypothesis, that the two coefficients have the same value.

Table 9: Excluding inter vivo transfers:

Dep.: Savings	OLS[1]	OLS[1]	FD[1]	FD with IV[1]
Amount	7288.77**	7449.48**	5018.64**	2694.47
	(3137.91)	(3065.32)	(2372.56)	(2026.20)
Amount squared	-60.39***	-59.14***		
	(18.07)	(17.24)		
Transfer Dummy	-25074.51*	-25990.57*	-11218.71	-4839.39
	(15082.74)	(14957.18)	(17656.98)	(13084.15)
W_{t-1}				-1.08***
				(0.17)
Controls		✓	✓	✓
Number of observations	9863	9863	4929	4929

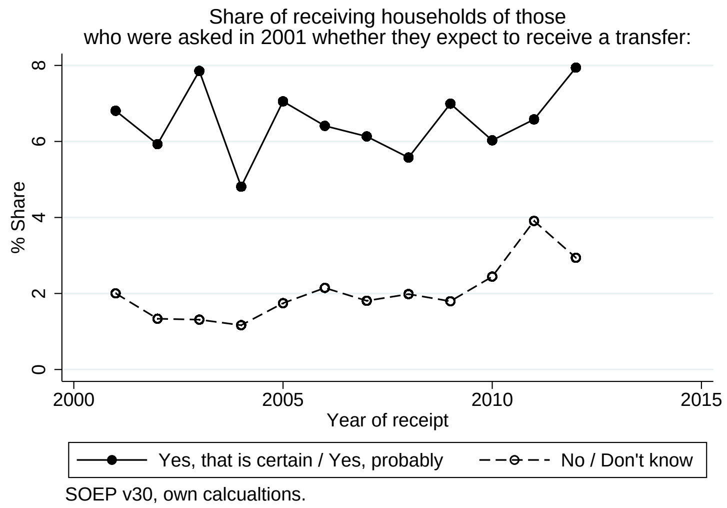
[1] Control variables: All parameters are conditional on controlling for polynomials of age and household income. Estimated with cluster robust standard errors.
+ Intergenerational transfers are expressed in 10.000 Euros.
+ Estimations based on SOEP v30.

8.2 Expectations about future transfer receipts

Economic theory predicts that expectations about future transfers will affect the consumption and savings behavior of individuals over the life cycle. In brief, individuals who are certain to receive a transfer will already take the expected future transfer amount into account when trading off current utility from consumption and saving. Everything else equal, one would expect higher consumption rate out of unexpected transfers. Considering the approach in this paper, *expectations* will enter the estimation in the error term. If they are time-variant, they could also interfere with the estimation: If *expectations* correlate with e.g. *amount*, then they could bias the parameter of interest. As described in section 5, the SOEP enquired in 2001, whether individuals expected to receive an intergenerational transfer. Respondents could reply with "Yes, that is certain", "Yes, probably", "No" and "I don't know". Figure 5 in the appendix seeks to validate these statements by plotting the share of households that eventually received a transfer statement category over time. While respondents stating that a receipt is certain or likely show a higher relative probability to actually receive a transfer in the following periods, differences between answers appear small and rather noisy. I thus summarize the groups into, first, the group of those who somehow expect to receive and, second, in those who either do not know or seem to be certain not to receive. Figure 3 displays the relative probability of respondents from these groups to actually receive a transfer between 2001 and 2012: In fact, people who have stated in 2001 that they are confident to receive a transfer in the unspecified future seem to be slightly more likely to actually receive a transfer. Roughly 6 % of the households in this group receive a transfer over the observed following decade. The group of non-expectators is a bit less likely to receive, showing only about 2 % of the households inheriting.

In order to test whether these differences in expectations translate into different saving behaviors after bequest receipt, I interact the variables *amount* and *transfer* as in equation 4.6 with

Figure 3: Expectations about transfers and actual receipt:



the indicator variable differentiating between expecting and non-expecting households. The results of this test are displayed in table 10, in the columns headed with *Expectations*: Note first, that the interaction with *expected* further complicates the interpretation.[70] The main effects describe the behavior of recipients who did not anticipate their receipt.[71] Both of which are insignificant, individually and jointly, which suggests a rather inaccurate estimation and which is also facilitated by a particularly high propensity to consume out of unexpected transfers. The interaction terms with *expected* describe the behavior of individuals that anticipated their receipt. In fact, the point estimates suggest that, conditional on receipt, households tend to save slightly more out of expected transfers ($\approx 1/2$ of an inherited Euro). Taking into account the intercepts, however, renders the total effect of e.g. the average transfer amount insignificant. The savings effect of anticipating heirs is thus also not significantly different from the savings effect of non-expecting heirs.[72] The second column of results displays the corresponding results for the model that additionally controls for lagged wealth. The results are similar in that they equally suggest a higher savings propensity out of transfers for anticipating heirs conditional on receipt. Tests of whether dummy and linear term differ between the groups however do not allow to reject the null hypothesis that there are no differences in the behavior between anticipating and non-expecting heirs. Also in this specification the estimate for w_{t-1} does not allow to infer significant dynamic effects or the necessity to control for households' lagged wealth.

[70]As always with interaction terms, the interaction effect only represents the deviation from the main effect. In this case, however, one still has to take into account that the *transfer dummy* and *amount* are implicit interactions, too.

[71]Note that *expectations* are time-constant, as they are observed only once. Hence, they drop out of the FD specification, the behavior of non-receiving expectators is thus not identified.

[72]This holds despite the fact that the expecting households save significantly out of transfers (joint significance on 1 % level). Nevertheless, the groups do not differ significantly from another.

After all, while there is weak evidence that heirs who expect to receive a transfer tend to save more and consume less out of eventually received transfers, these deviations are estimated comparably imprecisely and do not allow to infer systematic differences in the savings behavior based on expectations. Similar evidence is for instance found by Brown et al. [2010] or Doorley and Pestel [2016]: Brown and colleagues analyze the extensive margin of labor supply based on the early retirement behavior of heirs and controlling for expectations. While they find that heirs of unexpected transfers react more strongly (which is coherent with the implicit consumption patterns estimated here), the differences between the groups of expecting and non-expecting recipients is statistically not significant. Doorley and Pestel [2016] use the same data set as the present study and do not succeed in establishing deviating behaviors based on expectations.

Interacting the transfer-related variables with the expectations indicator in the model for heterogeneous savings effects (see equation 4.10) does also not reveal systematic differences in the savings behavior over the wealth distribution or between expecting and non-expecting heirs. The results of the estimation are thus not presented here.

Table 10: Robustness of the average saving effect:

	Expectations		Timing of receipt		Outlier sensitivity	
Dep.: Savings	FD[1]	FD with IV[1]	FD[1]	FD with IV[1]	FD[1]	FD with IV[1,2]
Amount	3033.51	-333.24	5607.29***	2848.33**	6425.91***	3514.17***
	(2778.75)	(1883.85)	(1874.62)	(1437.17)	(1688.27)	(1065.30)
Amount × Expected	4654.32	5681.04**				
	(3429.64)	(2531.57)				
Transfer Dummy	-885.58	2691.47			231.04	-1956.86
	(13403.62)	(9260.21)			(10518.51)	(6794.62)
Transfer × Expected	-16228.05	-14495.77				
	(34142.37)	(18134.85)				
W_{t-1}		-1.04***		-1.06***		-0.86***
		(0.14)		(0.16)		(0.08)
Transfer in t			-14265.83	15847.17		
			(29429.11)	(17218.45)		
Transfer in $t-1$			-44742.58	-1113.94		
			(39779.56)	(19365.61)		
Transfer in $t-2$			-12157.24	-748.33		
			(22669.85)	(16833.69)		
Transfer in $t-3$			22320.65	14530.60		
			(37081.43)	(17566.74)		
Transfer in $t-4$			5297.63	-15539.07		
			(36674.41)	(16342.07)		
Controls	✓	✓	✓	✓	✓	✓
Number of observations	5158	5158	5200	5200	5200	5200

[1] Control variables: All parameters are conditional on controlling for polynomials of age and household income. Estimated with cluster robust standard errors.

[2] Topcoding: Inheritances above p99 (99^{th} percentile) are replaced by the value of p99. Similarly, wealth below p1 and above p99 is replaced by the respective values.

+ Intergenerational transfers are expressed in 10.000 Euros.

+ Estimations based on SOEP v30.

8.3 Timing of receipt

As described in section 5, intergenerational transfers are aggregated over the four years prior to and the year of the wealth observation itself. The temporal difference between year of receipt and year of wealth observation are however known, which permits to explicitly control or specify the timing of receipt.[73] Generally, assuming a steady consumption from received transfers, one would expect that transfers received already 4 years ago (i.e. in $t-4$) contribute less to observed savings than more recent receipts. Consistently with the negligible dynamic effects documented in table 5 and table 6, I do not manage to gather sufficient evidence that these patterns systematically occur. The columns labeled *timing of receipt* in table 10 allow to draw this conclusion. While there are naturally multiple ways to test the impact of the timing of receipt,[74] I decided to split up the *transfer dummy* in 5 timing-of-receipt determined dummies. That is, I estimate separate intercepts for the 5 different timings of receipt, keeping the linear term constant.

As expected, the *amount* estimates are very similar to the main results presented in table 5. The separately estimated intercepts vary unsystematically and are estimated with substantial uncertainty. Hence, there is no clear pattern of a steady consumption stream from transfers over time.[75]

8.4 Outlier

In order to check whether results are significantly driven by few but extreme observations,[76] I resort to a top and bottom coding approach:[77] I calculate the 99^{th} and 1^{st} percentile for wealth taking the multiple imputation approach into account and replace values below p1 and above p99 with the value of p1 and p99 respectively. I proceed accordingly for intergenerational transfers.

The results are displayed in columns 6 and 7 of table 10. In fact, the point estimates for *amount* do not differ significantly from the baseline estimation. Slight changes are however visible with respect to ρ: The parameter that indicates dynamic effects has fallen to roughly .86, which implies that $\gamma = \rho + 1 = 0.14$ is close to being statistically different from zero ($p \approx 0.064$).

[73] Specifying the timing is not needed to prevent an omitted variable bias in the estimation as it is not clear why the timing of receipt should correlate with e.g. the amount of a transfer. Allowing the model for variations in the timing of receipt rather can reveal an interesting behavioral effect in itself.

[74] I also tested estimating separate linear *amount* parameters depending on the timing of receipt or interacted the *amount* variable with a further variable indicating the timing of receipt. While none of these procedures revealed a systematic variation in the savings contributions of a transfer, the latter procedure is additionally cumbersome as it introduces a further implicit interaction term with *amount*.

[75] Westerheide [2005], as noted above, tries to consider all reported transfers in his analysis. Interestingly, he does also not find a clear pattern of consumption over time.

[76] Karagiannaki [2015] provides quantile regression-based estimates for the median of the distribution in order to preclude the impact of such observations.

[77] While it is generally reasonable to check the sensitivity of the analysis to extreme observations, the main concern with wealth and inheritance based studies rather results from an insufficient coverage of rich households and households with high transfer receipts [Vermeulen, 2014]. This is also why studies resort to cumbersome methods seeking to display the top of the distribution correctly. See for instance Saez and Zucman [2016]. Top coding thus further withdraws information from a sensitive part of the distribution. Nonetheless, this approach allows to illustrate the impact of those few extreme observations of which a truly complete data set might have more.

The long term β would then indicate a slowly increasing savings share after bequest receipt, a pattern probably attributable to returns to savings. The evidence in this regard is however weak, excluding further wealth observations also difficult to justify. I tested, whether these dynamics translate into differences in the savings behavior over the wealth distribution by re-running model 4.10 on the outlier-corrected sample but did not find patterns challenging previous conclusions.

9 Conclusions

This paper utilizes German panel data from the SOEP in order to evaluate the effect of intergenerational transfers on the inequality in households' net worth distribution. In particular, the paper seeks to decompose the effect: First, households receiving a transfer do not necessarily save the entire transfer. They rather adjust their economic behavior to the new financial conditions, which might entail that transfer savings displace regular savings and thus a post-transfer household wealth below their initial wealth plus the nominal transfers. I therefore estimate the causal effect of transfer receipt on the savings behavior of households allowing for dynamic adjustment and for heterogeneities in the parameter of interest over the wealth distribution. This is important, as Wolff and Gittleman [2014] and Karagiannaki [2015] hypothesize that such heterogeneities could crucially shape the inequality effect of transfers. Secondly, using tobit regression techniques, I estimate how intergenerational transfers scatter over the wealth distribution. I use the causal estimates from the first and the descriptive evidence from the second step in order to decompose the overall effect of transfers in three subeffects: First, in an *aggregate flow volume* effect, the incidence effect and the savings effect.

The results of the paper are well in line with the literature and suggest that intergenerational transfers have a widely equalizing effect on the wealth distribution. This equalizing effect is primarily attributable to the aggregate transfer volume, which causes that bequests tend to be relatively bigger for poorer households. The incidence effect, which entails that households receive transfers more often and typically on a bigger scale, greatly counteracts this effect, while not exceeding the progressive nature of the aggregate transfer volume effect. Lastly, there is no evidence that heterogeneities in the savings behavior of households after bequest receipt have a substantial impact on the overall distributional effect of transfers on wealth inequality. The here estimated variations in savings over the wealth distribution rather tend to add to the equalizing nature of transfers. While it is however well conceivable that other patterns of saving over the wealth distribution might overturn the present results, none of the estimations in this paper justifies concerns that transfer accrual was recently disequalizing wealth inequality in Germany.

The results also convey considerable differences to those in the publications by Wolff [2015], Karagiannaki [2015] which suggested higher savings rates out of intergenerational transfers. All three studies may well describe the statistical relationships in the respective countries appropriately. The existing gaps remind not to generalize the results of descriptive studies.According to the results in this paper, households on average save only about 2/3 of their transfer within a

2 years period after receipt and do not show a consistent dissaving (or reinvestment) behavior thereafter.

All results are subject to the common limitations of empirical studies with wealth and intergenerational transfers, though: Despite multiple imputation and weighting schemes, there are retaining concerns that survey data does not fully depict the wealth distribution [Vermeulen, 2014]. Similar concerns may be justified for the transfer distribution in general and the underlying limited understanding of intergenerational transfers as primarily monetary advantages. The equalizing effect of transfers also only holds for relative inequality indices. Absolute inequality measures, while being of less importance in economics, consistently indicate increasing inequality through transfers, which might be of interest for other research fields. Finally, the given study focuses on the important topic of intergenerational transfers between households but thereby also neglects that resources might well have been shared within families across households before the formal transfer. The study of the inequality between dynasties and its dependence of intergenerational transfers is thus of equal importance.

Future research in this field could devote some attention to the question what purposes households consume their transfers for. Also, the link between bequest receipt and own bequest motives deserves further research.

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10 Appendix

10.1 Appendix: Descriptives

Table 11 describes the quintile cut-off points as used for the construction of the quintile dummy set in the main estimation.

Table 11: Appendix: Quantile cut-offs as used in estimation

	2002	2007	2012	Total
(distinction as used in estimation)				
Q20	0	0	0	0
Q40	17006	22899	18636	19298
Q60	100564	101157	93996	97253
Q80	255711	250023	227471	242371

SOEPv30, own calculations. Data is weighted.

Table 12: Appendix: Dispersal of wealth types: % of HH own wealth of respective type.

	2002	2007	2012	Total
Estate (residence owned)	0.42	0.46	0.45	0.45
Estate (other real estate)	0.13	0.14	0.14	0.14
Insurance	0.56	0.61	0.59	0.59
Financial	0.54	0.59	0.56	0.56
Business	0.07	0.07	0.06	0.07
Tangible	0.13	0.09	0.11	0.11
Consumer	0.17	0.22	0.22	0.20

SOEPv30, own calculations. Data is weighted.

Table 13: Appendix: Age of recipients of gifts and inheritances.

	2002	2007	2012	Total
Mean age heirs	51	56	54	54
std.	14	13	13	13
Mean gift recipients	43	44	43	44
std.	12	11	10	10

SOEPv30, own calculations. Data is weighted.

10.2 Appendix: Results

10.2.1 Appendix: Average Effects

Table 14: Complete results average effects estimation

Dependent variable Savings	OLS (no controls) (1)	OLS (2)	OLS (no interest) (3)	FD (4)	FD (5)	FD with IV (6)	FD with IV (7)
Amount	8864.42***	8712.12***	9248.78***	5997.70***	655.97	3074.80**	1760.27
	(2465.71)	(2313.22)	(2362.88)	(1814.32)	(3793.31)	(1532.32)	(1792.13)
Amount squared	-65.00***	-63.14***	-69.82***		70.61*		17.42
	(17.89)	(16.06)	(15.61)		(36.36)		(27.18)
Transfer Dummy	-14217.97	-25568.60***	-25722.25***	-10080.74	8968.42	-7315.82	-2619.10
	(9542.74)	(9436.01)	(9289.01)	(14106.40)	(14028.51)	(9564.40)	(9173.46)
W_{t-1}						-1.06***	-1.06***
						(0.16)	(0.16)
Age		-40409.84*	-40358.45*	-65153.24	-62264.77	-14407.91	-13743.02
		(22935.03)	(22947.67)	(42089.03)	(42336.52)	(34115.18)	(34227.75)
Age^2		600.55	600.08	1071.17	1007.13	195.21	180.24
		(381.94)	(382.14)	(741.21)	(744.05)	(554.74)	(556.61)
Age^3		-2.92	-2.92	-5.13	-4.67	-0.84	-0.73
		(2.06)	(2.06)	(4.10)	(4.11)	(2.90)	(2.92)
Agg HH income		-18.23***	-18.21***	-21.85**	-20.93**	-14.38	-14.16
		(6.83)	(6.83)	(10.16)	(10.34)	(11.40)	(11.47)
Age × Agg HH income		0.88***	0.88***	1.11**	1.05*	0.62	0.60
		(0.34)	(0.34)	(0.54)	(0.54)	(0.55)	(0.56)
Age^2 × Agg HH income		-0.01**	-0.01**	-0.02**	-0.02*	-0.01	-0.01
		(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Age^3 × Agg HH income		0.00**	0.00**	0.00*	0.00	0.00	0.00
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Agg HH income^2		0.00***	0.00***	0.00***	0.00**	0.00	0.00
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Age × Agg HH income^2		-0.00***	-0.00***	-0.00**	-0.00**	-0.00	-0.00
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Age^2 × Agg HH income^2		0.00***	0.00***	0.00**	0.00**	0.00	0.00
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Age^3 × Agg HH income^2		-0.00***	-0.00***	-0.00**	-0.00**	-0.00	-0.00
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Year Dummy 2007		0.00	0.00				
		(.)	(.)				
Year Dummy 2012		3793.36	3845.40				
		(7083.44)	(7084.30)				
constant	-1737.86	882024.39*	880842.29*	-16591.63	-17306.00	-6071.20	-6260.80
	(3182.37)	(444189.92)	(444455.90)	(14354.74)	(14334.20)	(7769.94)	(7789.71)
Number of observations	10400	10400	10400	5200	5200	5200	5200

[1] Control variables: All parameters are conditional on controlling for polynomials of age and household income. Estimated with cluster robust standard errors on the HH level. Complete estimation results are reported in the appendix. Intergenerational transfers are expressed in 10.000 Euros.
[2] First stage results reported in the appendix.
Estimations based on SOEP v30.

Table 15: First stages of average effect

Dependent var: D.W_{t-1}	(1)	(2)	(3)	(4)	(5)
W_{t-2}	-0.44***	-0.47***	-0.27***	-0.39***	-0.37***
	(0.06)	(0.09)	(0.04)	(0.06)	(0.06)
D.Amount	-2778.93**	-2473.76**	-2852.75**	-2869.98**	-2942.47**
	(1229.07)	(1182.84)	(1210.98)	(1204.69)	(1206.14)
D.Transfer Dummy	-3690.84	-2668.53	-1196.05	-5359.88	-1403.02
	(9068.55)	(8505.00)	(7890.00)	(7505.92)	(8863.53)
D.Age	-9017.28	-13115.91	5096.85	201.11	-1870.57
	(30621.82)	(27641.73)	(24254.44)	(24584.75)	(25026.83)
D.Age^2	70.33	117.46	-154.06	-82.10	-33.19
	(532.19)	(480.56)	(424.35)	(429.88)	(439.77)
D.Age^3	-0.77	-1.02	0.44	0.02	-0.19
	(2.94)	(2.66)	(2.35)	(2.39)	(2.44)
D.Agg HH income	3.06	3.79	3.52	5.68	3.95
	(7.35)	(6.57)	(5.87)	(6.51)	(5.98)
D.Agg HH income^2	-0.00	-0.00	-0.00	-0.00	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
D.Age × Agg HH income	-0.23	-0.27	-0.24	-0.37	-0.28
	(0.39)	(0.35)	(0.31)	(0.34)	(0.32)
D.Age^2 × Agg HH income	0.00	0.00	0.00	0.01	0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
D.Age^2 × Agg HH income^2	-0.00	-0.00	-0.00	-0.00	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
D.Age^3 × Agg HH income	-0.00	-0.00	-0.00	-0.00	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
D.Age^3 × Agg HH income^2	0.00	0.00	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
constant	92098.05***	99816.04***	65368.40***	87899.34***	77904.43***
	(14230.04)	(20559.01)	(9505.11)	(14741.27)	(14799.95)
Number of observations	5200	5200	5200	5200	5200

[1] Control variables: All parameters are conditional on controlling for polynomials of age and household income. Estimated with cluster robust standard errors on the HH level. Complete estimation results are reported in the appendix. Intergenerational transfers are expressed in 10.000 Euros.

[2] First stage results reported in the appendix.

Estimations based on SOEP v30.

10.2.2 Appendix: Heterogeneous Effects

Note: Table 16 only reports the missing estimates for the control variables from the models reported in table 6. Specifically, column (1) here in table 16 corresponds to column (1), column (2) here corresponds to column (4) in table 6 and column (3) here corresponds to the column (5). This is done as the table would otherwise not capture all estimates.

Table 16: Control variable estimates of heterogeneous effects estimation:

	OLS	FD with IV	FD with IV
	(1)	(2)	(3)
Specification	Dummy + linear term	Dummy + linear term	Dummy+linear+ squared term
Dependent variable	Wealth	Savings	Savings
[Omitted estimates of table 6]	.	.	.
$W_{t-1}^{D=1}$	-398599.37***		
	(16244.21)		
$W_{t-1}^{D=2}$	-389579.78***		
	(16404.56)		
$W_{t-1}^{D=3}$	-355732.31***		
	(17461.63)		
$W_{t-1}^{D=4}$	-266369.87***		
	(15961.31)		
$W_{t-1}^{D=5}$	0.00		
	(.)		
Age	-538.86	-13053.76	8186.35
	(23033.08)	(34261.43)	(45307.88)
Age^2	-143.07	169.10	-322.03
	(396.94)	(557.25)	(864.50)
Age^3	1.35	-0.66	2.98
	(2.21)	(2.91)	(5.65)
Agg HH income	-9.54	-14.02	-4.93
	(6.86)	(11.33)	(17.36)
Agg HH income^2	0.00**	0.00	0.00
	(0.00)	(0.00)	(0.00)
Age × Agg HH income	0.33	0.60	-0.00
	(0.35)	(0.55)	(1.01)
Age^2 × Agg HH income	-0.00	-0.01	0.00
	(0.01)	(0.01)	(0.02)
Age^3 × Agg HH income	0.00	0.00	-0.00
	(0.00)	(0.00)	(0.00)
Age × Agg HH income^2	-0.00*	-0.00	0.00
	(0.00)	(0.00)	(0.00)
Age^2 × Agg HH income^2	0.00	0.00	-0.00
	(0.00)	(0.00)	(0.00)
Age^3 × Agg HH income^2	-0.00	-0.00	0.00
	(0.00)	(0.00)	(0.00)
Year Dummy 2007	0.00		
	(.)		
Year Dummy 2012	5359.36		
	(5749.95)		
constant	622541.72	-6655.89	-6363.00
	(437229.43)	(7749.79)	(8292.79)
Number of observations	10400	5200	5200

[1] Control variables: All parameters are conditional on controlling for polynomials of age and household income. Estimated with cluster robust standard errors on the HH level. Complete estimation results are reported in the appendix. Intergenerational transfers are expressed in 10.000 Euros. Estimations based on SOEP v30.

10.2.3 Appendix: Simulation

The results of table 17 are derived from a tobit estimation of the form:

$$B^*_{H,t} = \delta + \sum_{q=1}^{5} \gamma_q I[\tau(W_{H,t-1}) = q] + u_{H,t} \tag{10.1}$$

Where $u_{H,t}$ is the error term, $u_{H,t} \overset{iid}{\sim} N(0, \sigma^2)$. With:

$$B_{H,t} = \begin{cases} B^*_{H,t}, & \text{if } B^*_{H,t} > 0 \\ 0, & \text{if } B^*_{H,t} \leq 0 \end{cases}$$

Table 17: Simulation: Auxiliary tobit estimates

Dependent variable: Amount	(1) Tobit 2007	(2) Tobit 2012
Quintile indicator of respective lagged wealth distribution:		
Quintile 1	0.00	0.00
	(.)	(.)
Quintile 2	42109.04***	32430.06**
	(15479.07)	(14563.20)
Quintile 3	90013.02***	58744.67***
	(13158.78)	(13825.25)
Quintile 4	84496.35***	70525.02***
	(13774.01)	(13812.40)
Quintile 5	115913.89***	76988.03***
	(13303.77)	(13736.15)
constant	-318531.46***	-276439.05***
	(14649.34)	(13939.52)
sigma	182818.65***	176328.44***
	(5223.87)	(5391.14)
Number of observations	8185	5731

Estimations based on SOEP v30.

Figure 4: Distributional impact of actual transfer accrual (f) and counterfactual one (cf):

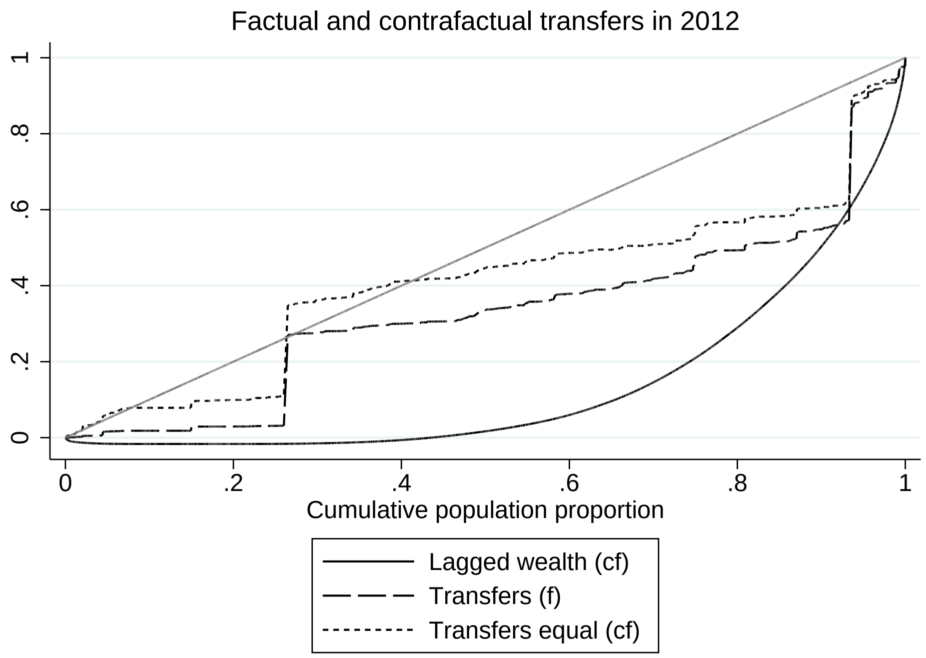
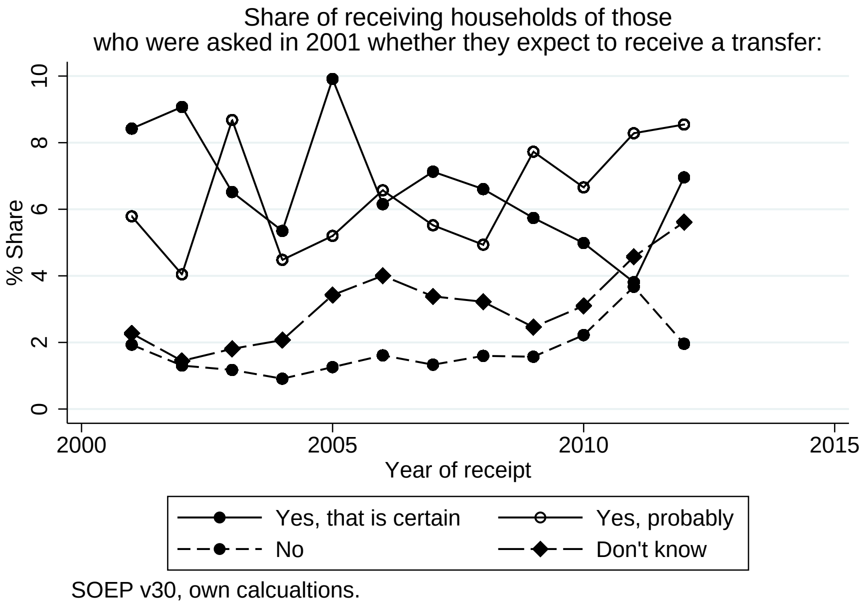


Figure 5: Expectations about transfers and actual receipt:



10.3 Appendix: Robustness

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