The impact of intergenerational transfers on private pension savings

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Abstract – We use detailed panel data to investigate how gifts and inheritances affect the financial decision making of households with respect to private pension savings. Our findings are fourfold: First, the receipt of a gift or inheritance significantly increases the amount invested in households' voluntary private pension accounts. Second, our findings are heterogeneous in such a way that a received gift or inheritance only increases private pension saving of households above the median income and wealth. Third, the approximately 25% of households in our sample who do not own any private pension products are unaffected by a receipt of a gift or inheritance. Fourth, households expecting to receive a gift or inheritance in the future do not decrease their investments into private pension today. Our findings suggest that intergenerational transfers are a previously unconsidered determinant of households' investment decisions regarding private pension savings.

Keywords: Household finance, savings and investment behavior, retirement saving, private pension, intergenerational transfer, bequest, inheritance, gift

JEL-Classification: D14, D15, D31

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1. Introduction

Every second household in Germany will receive a gift or inheritance during their life.[1] Moreover, with the older individuals of the affluent baby-boomer generation reaching the age of 70, the German media regularly points out the vast sums of transfers that are going to be passed on in the near future. Numbers for those annual flows of gifts and inheritances range above 200 billion euro per year – a number that continuously grew in the last decade.[2] This is likewise the case for other countries such as France, where intergenerational transfers are estimated to reach up to 25% of national income by the year 2050 (Piketty, 2011).[3] As bequest flows are reaching all-time highs, considerable changes in the public pension systems force households to take initiative to privately save for their retirement. For Germany, demographic developments that cause the old-age dependency ratio to double by 2060, triggered major pension reforms at the turn of the millennium.[4] With a steady decrease in the public pension replacement rates, the pay-as-you-go system gradually changes into a funded system, in which the state incentivizes individuals to save privately for old age. We follow Bäcker & Kistler (2016) and define private pension products to include subsidized funded pensions (e.g. "Riester"-contracts), endowment life insurances and non-subsidized private pensions. Observing the developments of increasing intergenerational transfers on the one hand and an inevitable shift towards a need for private retirement savings on the other, we pose the question to what extent gift- or inheritance receipts and private pension savings are connected? To broaden this question, could intergenerational transfers contribute to reducing future pension gaps, and if so how much of a gift or inheritance would be retained by the heir-household for the specific purpose of private pension saving? Further, would everyone's private pension account benefit equally from an intergenerational transfer or would we face a classical Matthew effect?

[1] Estimated by the Allensbach Institute (2015). Our panel data confirms this figure: 36% of panel households (average age still below 50) received a gift or inheritance above 10k EUR already up until 2014. Corneo, Bönke and Westermeier (2016) affirm this number with same data, stating that around one third of households received an intergenerational transfer already at the time of their study.

[2] Regarding recent media articles, see e.g. Handelsblatt (2017) or Wirtschaftswoche (2017), reporting each on different studies. Concerning the size of annual bequest flows, a study by Braun (2015) estimates that 2,100bn EUR will be transferred in the 10 year period 2015-2024, yielding an average transfer of 210bn EUR per year. Compared to 2001, this annual number grew by about 20%.

[3] For the rest of Europe and the US, studies likewise confirm that in today's society receiving intergenerational transfers plays a major role in increasing substantially the net wealth levels for heir-households (e.g., Fessler & Schürz, 2015; Wolff & Gittleman, 2014).

[4] We refer to Börsch-Supan et al. (2015, 2016) regarding details on the pension reform and forecasts of pension developments.

In this study we introduce a formerly unconsidered determinant of private pension saving, namely intergenerational transfers. We find that gift and inheritance receipts have large positive impacts on the amount that is saved in private pension accounts, thus securely retained for old-age, however this effect is not homogenously distributed over all heir-households. Surprisingly, literature at the intersection of intergenerational transfers and old-age saving is rather scarce. We add to the literature on impacts of intergenerational transfers on financial decision making of households (e.g., Andersen & Nielsen, 2011; Brunnermeier & Nagel, 2008) and, more specifically, on the impacts of gifts and inheritances on saving decisions of heir-households (Brown & Weisbenner, 2004; Weil, 1994; Westerheide, 2005). Whereas prior literature finds that those receipts do positively affect investment decisions with respect to stock market participation and that the largest part of the received assets is retained as 'wealth', little is known about *how* the majority of received gifts and inheritance is saved and if those assets will benefit the heirs later in old age. Our study attempts to fill this gap by looking at the relation between intergenerational transfers and those financial products that are specifically designed to provide systematic saving possibilities for old age, namely funded private pension products. Conversely, we append to the literature on private pension saving determinants, where for instance Börsch-Supan et al. (2012; 2008) highlight sociodemographic characteristics of households that predict the propensity to own private pension products. Likewise, other studies point out financial literacy levels and professional financial advice as important determinants for private retirement saving (e.g., Mitchel & Lusardi, 2007; Rooij, Lusardi, & Alessie, 2012; Shum & Faig, 2006). Our study introduces the novel event 'receiving an intergenerational transfer' as a factor that influences how much households (and specifically *which* households) save into their private pension accounts. Further, we examine by how much the mere expectation of a future receipt impacts the households' private pension saving.

In order to explore those specific relations, we draw on novel household panel data provided by the Deutsche Bundesbank, which contain a large section on gifts and inheritances, as well as details on nearly all individuals' and households' finances. We follow households over time and see how a recent receipt of assets through an intergenerational transfer affects the financial decision making of households regarding private pension saving. With the panel data we circumvent the issue of household heterogeneity by looking at within-household effects only. It allows us to draw conclusions regarding the impacted *amount* of private pension saving, as well as regarding *who* benefits most of the receipt, *what type* of transferred assets have the largest

impact and *whether expectations* play a role. Utilizing the panel structure, we conduct a 'first difference' approach to examine if there is an effect over time if a gift or inheritance is received.[5] Acknowledging the caveats of survey data (compared to experiments), we mitigate the disadvantages by controlling for selection bias and apply a nearest neighbor propensity score matching. Doing so, we create a sociodemographic twin sample of heirs and non-heirs, to simulate quasi-clinical conditions. Following Abadie and Imbens (2011), we likewise conduct an Average Treatment Effect (ATE) analysis to confirm if the 'treatment' of receiving a transfer impacts private pension saving by testing both, heirs and non-heirs, *before* and *after* the receipt. Further, we test for alternative explanations and address endogeneity concerns by means of an instrumental variable approach, following Bucher-Koenen & Lusardi (2011).

Based on our panel regressions, we derive four core findings: First, households who receive a large gift or inheritance within the three-year period under review increase their invested private pension amount by 15k EUR *more* compared to peer households. Looking at a euro to euro base, we observe that about 8 cents of every euro received as gift or inheritance are invested in private pension products. On its own, '15k EUR more' already constitutes an increase in magnitude of *four times* the investment a non-heir household devotes to private pension savings during this period in our sample.[6] To put 15k EUR (received today and invested in private pension provisions) into another perspective: Assuming, households would regularly invest 250 EUR per month into retirement saving, then non-heir households would have to save for approximately 6 working years in order 'to catch up' with a heir.[7] Assuming some households can only afford to save half of this recommended amount (thus 125 EUR per month), then those households would have to save for approximately 14 working years in order to catch up. Second, we examine whether our results are heterogeneous regarding certain sociodemographic factors. We find that especially households above the median net income and above

[5] See Johnson (2005) and Vaisey and Miles (2014).'First difference' follows the similar logic of difference-in-differences (DiD).

[6] Only gifts or inheritances with value greater 10k EUR which were received in the three-year time frame 2011-2014 are considered. Comparable non-heir households increase their investments by approximately 3.5k EUR during the three years (see **Table 1**).

[7] Rule-of-thumb recommendation is to save approximately 250 EUR per month to close the pension gap (e.g., Looman, 2014). Assuming a net monthly household income of 2,500 EUR (see **Table A2**) combined with the recent national savings rate in Germany of 10% (Destatis, 2018) jointly confirm the 250 EUR/month recommendation. Calculation available upon request. Underlying assumption is a stock-market-comparable interest rate of 5% p.a. (compounded monthly) and payments made at the beginning of each month.

the median net wealth are able to increase their amount invested in private pensions after receiving a gift or inheritance – a finding, which is not due to any difference in the size of the received gifts or inheritances. In the context of saving, the phenomenon – that the rich can *afford* to save from intergenerational transfers – is confirmed in other recent research (e.g., Elinder, Erixson, & Waldenström, 2018) and leads to the conclusion that not all households should rely on intergenerational transfers to substitute for own private pension savings. Third, following the idea of Andersen and Nielsen (2011), who look at stock market *participation rates* as a reaction of an intergenerational transfer receipt, we examine if the participation rate for private pension products is influenced by a gift or inheritance receipt. We find that neither the indicator variable of such a receipt nor the euro value of the transfer impact the households' propensity to own private pension products. The approximately 25% of households in our sample who do *not own* any of those retirement products remain unaffected by the intergenerational transfer receipt, indicating that the increase in the private pension amounts stems from households who already own those products – and not from new households who *start to own* them. Fourth, we find that the households' expectation to receive a gift or inheritance in the future does not negatively impact the private pension saving behavior in the present. Households with promising prospects to receive considerable assets, might potentially be less motivated to save today from income (compare: Brown & Weisbenner, 2004). However, our findings suggest that households do *not rely* on future receipts and remain unaffected by any future promising assets that they might (or might not) receive one day.

From our findings we derive direct policy implications for decision makers: With respect to adjustments of the progressive inheritance tax rate, we recommend neither to increase the current rates, nor to introduce a flat rate tax on all gifts and inheritances.[8] Both measures would decrease the received net transfer amounts of heirs and thus decrease the disposable funds that could be used to invest in private pension savings (even if this would primarily mean to help the more affluent half of households). Legislators should instead think about ways to ease the flow of funds from gifts or inheritances into private pension accounts for heir-households. Similar to §17 (ErbStG, 2017), which grants especially the spouse an additional tax exemption for the receipt

[8] The effective tax rate that is paid on inheritances (and gifts) in Germany is estimated to be already below 3% due to large and family-friendly tax allowance amounts and a progressive rate that is favorable towards small-to-medium sized transfers (Braun, 2015). Thus, the current general system can be considered as already relatively fair and a flat rate tax is unlikely to improve it. What causes public discussion and sometime indignation regarding inheritances is the fact that extremely large inheritances often include businesses which are passed on with relatively entrepreneurial-friendly tax rates. This is however not in the scope of our research.

of benefits, policymakers could give heirs an additional tax allowance for funds that flow irrevocably into their private pension accounts. Further, legislators should support especially heir-households *below* the income- and wealth median and foster their build-up of individual private pension savings by providing incentives like additional tax breaks or a quick, non-bureaucratic "asset shifting process" if they invest a certain share of the inheritance directly in their private pension. Policymakers would thus contribute to closing future pension gaps in a more *targeted* approach to support especially those less affluent households who need it the most.

2. Literature review

This paper extends the body of literature at the intersection of intergenerational transfers and retirement saving. First, regarding intergenerational transfers, we add to the prior researched impacts of gift and inheritance on investments and savings. We build on the research of Andersen and Nielsen (2011), who find that receiving a substantial intergenerational transfer increases the probability of entering the stock market. Likewise, Brunnermeier and Nagel (2008) find that a positive change in liquid wealth through a gift or inheritance has a positive effect on the stock market entrant probability.[9] As part of their efforts to contribute to the 'equity puzzle' (see e.g., Campbell, 2006), both papers conclude that stock market participation costs are not hindering households to invest in equities, since those costs can be well covered by funds received through the intergenerational transfers. Meanwhile, Westerheide (2005), as well as Brown and Weisbenner (2004) conduct research on the question of how intergenerational transfer receipts impact the saving behavior of households. Their studies inquire *how much* of a received gift or inheritance is saved and whether saving from income is negatively affected by the transfer receipt. For instance, Westerheide (2005) finds that about 80% of the intergenerational transfer is saved by the heir and that gifts and inheritances considerably affect the wealth creation of households. Joulfaian (2006) confirms those figures using US estate tax records and finds that 79% of an inheritances is saved and retained as wealth. Likewise, Brown and Weisbenner (2004) look into the effect that intergenerational transfers have on households' propensity to save from labor income and find no evidence that households significantly decrease their saving of labor income within the first twenty

[9] Likewise, Andersen, Hanspal and Nielsen (2018), looking into past negative effects that impact financial decision making, make use of inheritance receipts as asset inflows and find that heirs increase their risk taking slightly (prior to any negative event).

years following the transfer receipt.[10] Both studies, however, only state that the majority of received assets is retained, but do not go into detail on *how* it is saved – a question which is especially relevant for the liquid part of the receipt.

Second, regarding research on retirement saving, we extent the literature on determinants of private pension saving. Previously found determinants comprise personal factors like income, age and household size (e.g., Börsch-Supan et al., 2012, 2008), as well as financial planning and -literacy (Mitchel & Lusardi, 2007; Rooij et al., 2012) and received financial advice (Shum & Faig, 2006). With our findings, we add '*gift and inheritance receipt*' as a previously unconsidered determinant for households' decision for private pension saving.

Third, we extent the literature on inequality caused through gifts and inheritances where research discusses whether intergenerational transfers increase or decrease inequality. A finding with large consensus is that intergenerational transfers increase absolute inequality, however decrease relative inequality, since for less-wealthy households even a smaller intergenerational transfer receipt makes a relatively large difference (e.g., Boserup, Kopczuk, & Kreiner, 2016; Wolff & Gittleman, 2014). However, Wolff (2002) points out that poorer households rather spend more out of their received inheritances, whereas the "rich are likely to save them" (p. 263). Likewise, in their recent study Elinder et al. (2018) confirm that less wealthy individuals consume a larger share of their inheritance and that especially richer heirs have a tendency to save more from their received transfer. Both authors' findings are somewhat alarming and provide evidence that private pension saving – potentially initiated and increased by the receipt of a gift or inheritance – might be driven by the more wealthy households. If so, intergenerational transfer will not serve as an simple 'miracle cure' to prevent the widespread issue of (future) old age poverty that affects parts of the population in many countries. Braun (2015) adds to this discussion, stating that those who will inherit are primarily the ones that already own higher-than-average wealth. For policymakers it is imperative to know *who benefits* from a gift or inheritance with respect to private pension saving. This would help to calibrate incentive setting to impel less wealthy households to save a larger portion for old age from a received intergenerational transfer.

[10] Brown and Weisbenner (2004) find that intergenerational transfers do significantly crowd-out households' saving form income, but only 20+ years after the gift/ inheritance is received.

Fourth, our study adds to the literature regarding *expectation* of future gifts and inheritances and their impact on today's financial decision making. Few scholars have researched on the topic of expected transfers and saving behavior, despite the fact that large inheritance flows are yet expected to come (e.g., Piketty, 2011). Brown and Weisbenner (2004) find that the mere expectation of receiving a gift or inheritance does not alter the households' decision to save more or less. Likewise, Wolff (2015) states that expectation regarding future inheritance do quantitatively not play a role in affecting the saving behavior. Elinder et al. (2018) use the Swedish population register "Belinda" and examine if expected inheritances affect individuals' wealth and thus their saving behavior. Pairing decedents and heirs, they examine if an increase in decedents wealth leads to dissaving for heirs, but find no evidence of an impact. Weil (1994), on the contrary, finds that that the expectation of receiving an inheritance increases households consumption spending by 5%. His findings imply that the mere expectation can actually have an impact on the households' present financial behavior. For policymakers it is crucial to know if the sole expectation of a future inheritance restrains households from saving for old age. If found to be true, this possible reliance of some households on future asset receipts is extremely risky and likely to impoverish households, who wrongfully rely on future intergenerational transfers instead of saving early enough for retirement. In that case, policymakers would be advised to inform households insistently on the risk of reliance on future inheritances and to further adjust the incentives for households to save today for their private pension.

Given the degree of importance due to the sheer size of intergenerational transfers in societies (e.g., Braun, 2015; Piketty, 2011; Wolff & Gittleman, 2014) and the increased need for households to privately safe for old age (e.g., Börsch-Supan et al., 2012), it is somewhat surprising that literature at the intersection of intergenerational transfers and retirement saving is relatively scarce. What has been done in prior related literature with respect to intergenerational transfers and saving in general? The topic of inheritances and its role in the build-up of wealth received attention after the publications of Kotlikoff and Summers (1988; 1981) followed by a vivid discussion with Modigliani (1988). Kottlikoff et al. found that intergenerational transfers account for a larger proportion of households' overall wealth than previously assumed in Modigliani's life-cycle hypothesis (Modigliani & Ando, 1963; Modigliani & Brumberg, 1954). Due to different calculation methods in their respective works (see e.g., Beckert, 2007) the exact separation of wealth stemming from either income saving vs. intergenerational transfers cannot be precisely specified. However, most research agrees

that a 'considerable share' of overall household wealth is attributable to gifts and inheritances (e.g., Corneo, Bönke, & Westermeier, 2016; Gale & Scholz, 1994; Kessler & Masson, 1989; Wolff & Gittleman, 2014).[11] In line with the argument that intergenerational transfer is a crucial component of wealth composition, further research supports this claim by showing that up to 80% of the received gifts and inheritances are retained (Joulfaian, 2006; Westerheide, 2005). Other research simply assumes that 100% of the intergenerational transfer is retained by the household and that the received assets can be in full invested to yield an interest (Crawford & Hood, 2016; Wolff, 2002; Wolff & Gittleman, 2014). Thus, the broad disposability of retained intergenerational transfers triggers the question of *how* households are saving the received transfers? Finding answers to this question and understanding channels in which very large sums of future transferred assets will flow is important since it triggers policy implication regarding the most efficient taxation of gifts and inheritances. Further, regarding retirement saving and the issue of impending future old age poverty for parts of the population, policymakers should be very interested in if households wisely save and invest received gifts and inheritances such that those assets will benefit the heir as proper old age saving.[12] Especially Germans have traditionally used channels such as checking- and saving accounts to accumulate wealth. In times of extremely low interest rates, however, those deposits yield a negative real return (Deutsche Bundesbank, 2017), which triggers households to invest in other, more profitable options. An obvious option for households to yield positive returns over the long-run are investments in the stock market. Although a comprehensive European study by Arrondel et al. (2014) shows that the receipt of a gift or inheritance slightly increases stock market participation by approximately 3%, this seems to be too small to explain where the majority of the retained intergenerational transfers flows. Correspondingly, recent literature on Germany finds that stock market participation in any form still ranges at a levels below 24% (Badarinza, Campbell, & Ramadorai, 2016; Bannier & Neubert, 2016), providing evidence that there must be other, more preferred ways of saving. We

[11] Note: Our research focuses entirely on the receivers' (heir) side of gifts and inheritances. Therefore, we do not focus on the testator side of bequests, covering topics such as why people leave an estate (e.g., Bernheim, Shleifer, & Summers, 1985; Dynan, Skinner, & Zeldes, 2002; Jurges, 2001).

[12] Another substring of inheritance-literature revolves around the topic of intergenerational transfer's impact on labor supply, which is likewise of great importance to policymakers regarding e.g. labor market policies. Summarized under the term "Carnegie Effect", studies show that a receipt of an inheritance is associated with a significant increase in the likelihood of early retirement (e.g., Bø, Halvorsen, & Thoresen, 2018; Brown et al., 2010; Doorley & Pestel, 2016).

highlight two options how intergenerational transfers can be saved. First and not surprisingly, a considerable part of intergenerational transfers is retained as received real estate. Braun (2015) finds that almost every second transfer contains homes and Westerheide (2005) stresses in particular that transfers containing real estate are largely contributing to the high percentage of saved intergenerational transfer value. Arrondel et al. (2014) support this point by showing that German households' probability of owning a home is increased by 8% (statistically significant at 1%-level) after having received a gift or inheritance. Further studies confirm that also liquid intergenerational transfers flow into homes. For instance, receiving intergenerational transfers improves home financing conditions, as well as mortgage down-payment times and is thus supporting households to become home owners (Engelhardt & Mayer, 1998; Spilerman & Wolff, 2012). Second and potentially less obvious, households can invest the received assets into dedicated private pension products, that are designed to specifically accumulate wealth for old age. Private pension products as defined by Bäcker & Kistler (2016) include subsidized private pensions, endowment life insurances and non-subsidized private pensions. In most cases these products include tax reliefs for the holder or direct monetary benefits through state-subsidies. Further, the underlying investments of those defined contribution products can optionally include mutual funds. Thus, private pension products often provide reasonable capital market returns, while normally possessing guaranteed minimum monthly benefit amounts to be paid out once the holder enters retirement. Given those beneficial characteristics, private pension products are amongst the most popular saving products in Germany (Raffelhüschen, 2017) and are therefore a veritable option for households' investments after receiving a larger intergenerational transfer sum. Policymakers should be eager to see if households invest increasingly in their private pensions after the receipt of a gift or inheritance since stimulating households to invest voluntarily for old age as part of the change from a pay-as-you-go to a funded system is a declared goal of politics (Börsch-Supan, Bucher-Koenen, Coppola, & Lamla, 2015). Identifying private pension saving as an appealing option to allocate received gifts or inheritances to, we expect to observe an economically meaningful increase in the amount invested in those products after the receipt of an intergenerational transfer. Our study is based on panel data for Germany, however we believe that our findings apply to other countries that face large amounts of assets to be transferred between generations and changes towards a funded, private pension system (see e.g., Piketty, 2011 for France).

We provide supplementary information comprising further technical facts on inheritance taxation and the German three-pillar pension system in our internet appendix or upon request.

3. Data and key variables

To investigate the impact of gifts and inheritances on individuals' private pension savings, we draw on novel survey data on household finance and wealth provided by the Deutsche Bundesbank in the Panel on Household Finances (PHF), which is representative of the German population. The PHF data is elicited via personal face-to-face interviews and covers a wide range of individual and household finances including details on households' consumption patterns, real- and financial assets, liabilities and intergenerational transfers, as well as data on individuals' pensions and insurance contracts.[13] Interviews with the 3,565 households sampled in the first wave of the PHF were conducted between September 2010 and July 2011. The most recent second wave was administered between April and November 2014 and samples 4,461 households. A total of 2,138 households participated in both waves and are the subject of our study. We exclude households in which the 'Financially Knowledgeable Person' (FKP), i.e. the household member in charge of financial decision-making as identified in the PHF, has either retired or changed between waves, which leaves us with a final sample of 1,254 households. Generally, variables used in our analysis are recorded at the household level. Respondents' demographic characteristics naturally mark an exception: here, we collect the demographics of the household's FKP.

We chose the PHF since it provides us with detailed data on intergenerational transfers. Specifically, households are asked about the three largest gifts or inheritances they have received at the time the interview is conducted. For each gift or inheritance, the PHF then records the year in which it was received as well as asset type and value.[14] Using this data, we generate the indicator variable *Gift/inheritance received* which assumes a value of one for the 111 sampled households who received a gift or inheritance of at least 10,000

[13] See Schmidt et al. (2017) and von Kalckreuth et al. (2017) for a technical documentation of the PHF.

[14] The respective questions in the PHF are worded: "*Have you or another member of your household received a larger gift or inheritance, e.g. money or other valuables, from someone who does not belong to the household*" (hh0100); "How many larger gifts or inheritances were there?" (hh0110); "*In what year did you receive the gift/inheritance that was the most important for your current financial situation?*" (hh020$x); "*What type was the gift/inheritance?*" (hh030$x); "*What value did the gift/inheritance have when you received it?"* (hh040$x)

EUR at some point *between* wave 1 and wave 2 (*Heirs*). Moreover, households are asked to indicate whether they expect to receive a gift or inheritance in the future. Based on this item, we create the indicator variable *Gift/inheritance expected* which takes a value of one for the total of 185 households who stated in wave 2 that they anticipate to receive a gift or inheritance.[15]

Our key dependent variable, *Private pension EUR amount*, is the total amount of private pension savings across all members of a given household. Following Bäcker and Kistlers' (2016) definition, private pension savings include state-subsidized Riester- and Rürup-plans, endowment life insurances and all other private pension plans concluded in the household. **Table A1** provides variable descriptions and **Table A2** reports summary statistics of the households under review.

Heirs in our sample differ from the group of non-heirs along several dimensions as depicted in **Table A2**. Thus, to circumvent the issue of potential selection bias confounding our analyses, we follow Andersen and Nielsen (2011) and apply a propensity score matching to identify the appropriate benchmark group of non-heir households. Specifically, we use the nearest neighbor matching procedure – as used by Abadie and Imbens (2006) – with one-to-one matching and assign heir-households to non-heir households with similar propensity scores. Since we have a comparatively large number of non-heirs, we follow Andreou, Louca, and Petrou (2017) and require that the difference in propensity scores of matched twins be no larger than 0.01. We use wave 1 as our matching base and thereby make sure that our covariates used for matching are either fixed (e.g. gender) or measured before the treatment (Grilli & Rampichini, 2011).

With respect to our choice of covariates required to create the propensity score, we follow Smith and Todd (2005) and take into consideration that the covariates should influence the outcome variable (here: *Private pension EUR amount*) and at the same time the treatment status (e.g., *Gift/inheritance received*). By doing so, we account for the fact that households with a higher education and income are more likely to have a wealthier family background which in turn increases the probability of receiving significant intergenerational transfers. To provide an unbiased starting point for our matched sample, we remove households who have received a

[15] The respective question in the PHF is worded: *"Does your household expect a larger gift or inheritance from someone who is not a household member in the future?"* (hh0700). Note: For the regression we exclude additionally households who stated that they expect a gift or inheritance in wave 1 (2010/2011) already. This reduces the sample to 91 households who expect a gift or an inheritance for the first time in wave 2. We do so to make sure we capture the unconfounded impact of expected gifts or inheritances.

large gift or inheritance at some time *before* our first observation in 2010/2011. We obtain a final sample of 118 households with data for both waves.

[Please insert **Table 1** about here.]

Table 1 reports summary statistics of our matched sample of households which we use for subsequent analyses. In wave 1, households in our matched sample have in average a net monthly income (net wealth) of 3,623 EUR (235,512 EUR), consist of ~2.6 household members and are married in 66% of all cases. 73% of the households own private pension products and possess in average 22,558 EUR (unconditional mean) invested in those private pension products. The household's FKP is 44.4 years old and has in 42% of the cases a university degree.

Additionally, **Table 2** provides summary statistics on the intergenerational transfers under review.

[Please insert **Table 2** about here.]

42% (58%) of transfers are gifts (inheritances) and that the majority of assets (71%) are transferred by parents to their children. Moreover, the average gift or inheritance value amounts to 100,244 EUR.

4. Results

4.1. Univariate evidence

As an initial analysis to examine if the 'treatment' of receiving a gift or inheritance has an impact on private pension saving, Abadie and Imbens (2011) suggest a procedure that measures the effect of a single explanatory variable in combination with a nearest neighbor matching. The advantage of their approach is that the matching and the impact measurement of the explanatory variable are conducted *in one step*, in which the standard error can be calculated more precisely. **Table 3** reports the results of the calculated Average Treatment Effect (ATE) applying the described nearest neighbor matching approach with bias-corrected matching estimators and cluster-robust standard errors.

[Please insert **Table 3** about here.]

We calculate ATEs at two points in time: at wave 1, i.e. *before* any gift or inheritance is received by the treatment group, and at wave 2 *after* the treatment group has received a gift or inheritance greater 10k EUR. In wave 1, we find no significant difference regarding the euro amount of private pension investments between the treatment group (*heirs*) and the matched control group (*non-heirs*). Compared to the average household,

the group of heirs has initially 2,511 EUR more in their private pension savings account. This difference is rather small in magnitude and not statistically significant (z=0.65). At wave 2, however, we observe a statistically and economically significant difference in the amount of money households hold in their private pension accounts. Specifically, the pension savings of heirs are 10,765 EUR larger than those of the average household (significant at the 5%-level, z=2.14). Thus, the wave 2 ATE provides preliminary evidence in support of the hypothesis that households receiving an intergenerational transfer seem to significantly increase their private pension savings. A disadvantage of Abadie and Imbens' (2011) ATE approach is that it does not allow for multivariate analysis. In what follows, we examine therefore in OLS panel regressions whether this relationship persists once we control for a battery of additional variables, which have been shown to explain individuals' likelihood of saving for old age in prior research. In order to prevent selection bias we draw on our defined nearest neighbor matched sample (see **Table 1**) for the following multivariate analysis.

4.2. Regression analysis

4.2.1. Model

We estimate a panel regression with household fixed effects and choose a 'first difference' approach (Johnson, 2005; Vaisey & Miles, 2014).[16] By doing so we circumvent the issue of unobserved variables causing heterogeneity, since we consider merely *within* effects of households. Additionally, this approach allows us to control for time-variant variables that might affect the dependent variable. Parenthood, for instance, or a change in income or employment status at some point in between the two waves likely alter a given household's decision to save for private pension. Thus, our generic regression model is formalized as

$$\Delta Private\ pension_i = \beta_0 + \beta_1\, Gift/inheritance_i + \gamma\, \Delta Controls_i + Fixed\ effects_i + \varepsilon_i \qquad (1)$$

where the dependent variable either indicates if there is a change in the euro amount of private pension savings *or* whether there is a change in households' ownership of private pension products (in the latter case estimated

[16] Johnson (2005) and Vaisey and Miles (2014) propose two possible OLS compatible regression methodologies in a panel setting with only two waves, i.e. the 'Lagged Dependent Variable' (LDV) approach and the 'First Difference' (FD) approach (e.g. using Stata's *XTREG, FE* command). They conclude that the FD method produces less biased results and should thus be preferred over the LDV approach. Our chosen first difference approach follows essentially the same logic as any Difference-in-Differences estimation and examines if the 'treatment' of receiving an intergenerational transfer has a significant impact on our dependent variable (here: the change in private pension).

by means of an linear probability model)[17]. Our key explanatory variable indicates in the first estimation whether or not a gift or inheritance has been received between wave 1 and wave 2 (*Gift/inheritance received*). By using a dummy variable to express the receipt of an intergenerational transfer we follow the approach of Weil (1994) and Arrondel et al. (2014). For our second estimation, we follow Andersen & Nielsen (2011) and use additionally the euro value of the respective intergenerational transfer (*Gift/inheritance EUR value*) as explanatory variable.

4.2.2. Main results

In **Table 4** we provide results of the panel regressions, which estimate if the receipts of gifts or inheritances have significant impacts on households' private pension saving.[18]

[Please insert **Table 4** about here.]

First, we examine in specification (1) and (2) if the receipt of an intergenerational transfer (dummy variable) between wave 1 and wave 2 has an impact on the euro amount that is invested in private pensions. Specification (1) shows that the isolated effect of *a gift/inheritance received* increases the household's private pension account balance by 18,457 EUR, significant at the 5%-level (t=2.54). The additional inflow for heirs is material and implies that households use a substantial part of their received intergenerational transfer as investment in their private pension. In specification (2), we control for the change in covariates, which were identified in prior literature to impact private pension saving behavior. The coefficient of our key explanatory variable *gift/inheritance received* slightly decreases in size but remains statistically significant at the 5%-level (t=2.23). Therefore, households who receive a gift or inheritance within the three year period between wave 1 and wave 2 invest in average ~15k EUR *more* in their private pension savings, compared to their sociodemographic non-heir twins. To illustrate: if a comparable non-heir household invests in average 3.5k

[17] We choose a linear over a logistic model. Long and Freese (2014) state that if the probabilities (here: for e.g. owing a private pension product) are between 0.20 and 0.80, the odds represent nearly a linear function of the probability and the out-of-bounds probabilities are not a concern. Since our probabilities fulfill these conditions, we conclude that a linear and a logistic model yield equally adequate results. Due to ease of interpretation (Wooldridge, 2010) we use a linear approach. A probit regression featuring the same results is available upon request.

[18] We exclude outliers of gifts/ inheritances EUR value beyond three times the standard deviation. The average euro amount received as a gift or inheritance is 100k EUR. All estimations are based on the matched sample as presented in **Table 1** .

EUR during this three year period in private pension saving (see **Table 1**), then the effect through the received gift or inheritance represents an *additional increase* in magnitude of four times the regularly invested sum. Although we conduct a propensity score matching already in the first place to create the nearest neighbor ('sociodemographic-twin') sample, we control additionally for time-variant covariates within our panel regression to capture potential changes in between the panel waves. For instance Börsch-Supan et al. (2012), as well as Bucher-Koenen and Lusardi (2011) find that disposable income is positively related with private pension saving. Our results confirm the literature and unsurprisingly show that an increase in monthly net income between 2011-2014 (e.g. through a salary raise) is positively associated with an increase in the euro amount accumulated in the private pension accounts. Similarly, household size is found to be positively related to private pension saving (e.g., Börsch-Supan et al., 2008) due to the considerable subsidies paid per child and year by the state. Further, we control for a change into self-employment between the two waves. Since self-employed individuals are often not covered anymore by the statutory pension system, FKPs who switch into self-employment are strongly encouraged to use private ways to save for old age, e.g. through special Rürup-pension plans (BdV, 2018). Our findings confirm the expected positive correlation. Lastly, we control for whether the household has received any professional financial advice in the last three years, since prior literature has shown that receiving *financial advice* has a positive effect on related financial investments of households (e.g., Gaudecker, 2015; Shum & Faig, 2006). Likewise, we find a positive relation between received financial advice and the euro amount invested in private pensions.

Second, similar to Andersen and Nielsen (2011), we are interested if the euro size of the intergenerational transfer has a specific impact on the amount that gets invested in private pension savings. In specification (3) and (4) we provide results using the key explanatory variable *gift/inheritance EUR value* in order to depict how much of every received euro is likely to be invested in private pension accounts. Looking at the isolated effect in specification (3), we estimate a coefficient of 0.104, significant at the 1%-level (t=3.46). Adding the changes in the control variables into the panel regression in specification (4), the coefficient decreases to 0.0751 but remains statistically highly significant (1%-level, t=2.68). Thus, we interpret that of every euro received between the two waves, approximately 8 cents flow into the private pension saving accounts of households.

Looking at our baseline findings of 15k EUR which heir households put in additionally in private pension saving over the course of three years (or approximately 8 cents of each euro received), we pose the question if such an increase is due to more households starting to take out private pension products after a receipt (*volume effect* of ownership) or if the households that already own those products simply step up their investments (*value effect*). Thus, we regress the change in private pension ownership as dependent variable on both of our key explanatory variables as depicted in specification (5) and (6) using the full set of time-variant control variables. We find that neither the dummy variable *gift/inheritance received*, nor the continuous variable *gift/inheritance EUR value* significantly impact the ownership probability of private pension products. We conclude from those results that the receipt of an intergenerational transfer does not alter the decision of households to start owning private pension products. Thus, we do not observe a volume effect (aka more people would start owning private pensions) that is triggered by a transfer receipt. Therefore, households who *already* own private pension products most likely use the received assets to bolster their private pension accounts (observable value effect).

In **Table A3** (in appendix) we replicate our baseline results from specification (2) and (4) applying firstly panel weights and secondly time fixed effects to our panel regressions.[19] All results remain consistent with our baseline results in this main section.

4.2.3. Heterogeneous treatment effects

Prior literature on private pension saving behavior finds substantial differences, depending on household characteristics, such as prior education (Börsch-Supan et al., 2008), age (Börsch-Supan et al., 2012) or income (Bucher-Koenen & Lusardi, 2011). Thus, we investigate if and how the effect of intergenerational transfers on the amount of private pension savings varies across subgroups of households in ways previously unaccounted for by the baseline model specified in equation (1). Since including (quasi-)time-invariant variables, such as

[19] Regarding the use of survey weights in our main regressions, we follow Brunnermeier & Nagel (2008), as well as Bucher-Koenen and Ziegelmeyer (2014) and do not use weights. We refer to Deaton (1997), who states that there is no argument for weighting and that weighting is not more efficient compared to not weighting. Regarding time fixed effects, we jointly test beforehand for the dummies of the two waves to be equal to zero (H_0) and conclude not to use time fixed effects in our main regression, since we fail to reject the H_0. Since we are coping with only two waves, we neglect any potential bias of a serial correlation in this time series.

education, age and income classes in our fixed effects model is not possible, we follow Johnson (2005) and let the relevant time-invariant variables enter the regression specification via interactions with the time-varying variables. Formally, we account for potential heterogeneous effects by estimating

$$\Delta Private\ pension\ EUR\ amount_i = \beta_0 + \beta_1\, Gift/inheritance_i + \beta_2\, Gift/inheritance_i\ x\ [Indicator\ variable_i] + \gamma\ \Delta Controls_i + Fixed\ effects_i + \varepsilon_i \quad (2)$$

where our set of household characteristics enter the equation one by one as indicator variables. At this, we dichotomize all metric variables via median splits and the variable suffix *_high* denotes above-median values of observations for these variables. Again, we use wave 1 values to set the indicator variable, since we want to make this sub-classification before any treatment (i.e. receiving a gift or inheritance) might affect the variable. **Table 5** reports results obtained from our analysis of heterogeneous treatment effects.

[Please insert **Table 5** about here.]

Panel A differentiates according to heir-households' characteristics and panel B according to gift/inheritance types using the indicator variables logic as presented in equation (2). In line with our baseline regressions, set (a) (left-hand side) uses *gift/inheritance received* as the explanatory independent variable, whereas set (b) (right-hand side) uses *gift/inheritance EUR value*.

For the first indicator variable, β_1 ($\beta_1 + \beta_2$) reports the effect of receiving a gift or inheritance given the household is below (above) the median net income and β_2 shows the difference in the reported effects for low and high net income households, respectively. We find that households with an above median net income invest significantly more in their private pension accounts if receiving a gift or inheritance, as β_2 is large (i.e. 22.6k EUR and 0.11 EUR/per EUR received) and statistically significant. Notably, this difference is not explained by lower-income heir-households receiving smaller gifts and inheritances.[20] Relatedly, for the second indicator variable *household net wealth_high*, we find a similar pattern, indicating that especially more wealthy households invest the transfer receipts in private pension. Possible explanations are that households above the medians can afford to invest the additionally received funds into private pensions, since other expenditures such as down payment of mortgages or rent, insurances and other necessary private consumption

[20] Heir-households below the median income receive gifts/ inheritances of average size of 109k EUR, whereas the higher income households receive gifts/ inheritances of average size of only 95k EUR. Therefore, reasons for lower investment in private pension for below median income households cannot be found in the size of the actual transfer.

(e.g. mobility) can be covered already by the higher income or wealth. This finding is in line with related research, where Wolff (2002) and Elinder et al. (2018) find that the rich are more likely to generally save from their received gift or inheritance, whereas the less-wealthy households (have to) spend their transfers.

An interesting side finding in panel A is that households with an FKP's age above the median (45 years), invest significantly more into private pension when receiving a gift or inheritance (β_2: 26.5k EUR and 0.14 EUR/per EUR received). For young heirs the impact is close to zero. Thus, our results suggest that the effect of receiving gifts or inheritances on private saving for old age is almost exclusively driven by households with FKPs aged 45-65 years. As before, the difference cannot be explained by younger households receiving smaller gifts and inheritances, since the average transfer sum of above-median age households is even smaller compared to the below-median age households. Possible explanations are that younger households might use the funds from intergenerational transfers to pay down their home first, which can be seen as a somewhat 'extended form' of old age saving. Likewise, the number of households with older FKPs aged 45-65 who still have children living at home is smaller. Thus, older households do not need to provide for younger children anymore and can focus on investing a received gift or inheritance in a more selfish way: for their own pension. For the remainder of subgroups in panel A (e.g. households with and without a university degree), we do not find unbiased and statistically significant differences in their reactions regarding an intergenerational transfer receipt and their investments in private pension saving.

In panel B of **Table 5**, we examine further heterogeneous treatment effects, which consider the specific gift or inheritance characteristics and interact them as indicator variables once again with our key explanatory independent variables in set (a) and (b). First, we test whether the 'content' of the intergenerational transfer matters in influencing the household to increase the euro amount invested in private pension. Inserting the dummy indicator variable *gift/inheritance includes real estate* (equals '1' if the transfer includes at least one real estate item) in the interaction reveals that there is a difference between transfers that include a real estate component vs. those that don't (β_2: ~26.3k EUR and 0.06 EUR/per EUR received). Our explanation for that is twofold: (i) intergenerational transfers involving real estate are larger in size[21] and (ii) households might use

[21] Mean of the 25 households with gifts/ inheritances in the matched sample *including* real estate is 150k EUR as opposed to the remaining 30 households with gift/ inheritances *not including real estate* with mean values all below 100k EUR (see **Table 2** for further details).

the inherited home as main residence and thus free up money (e.g. no rent expenditure) to invest in private pension. Our results are supported by Westerheide (2005), who likewise finds that intergenerational transfers involving real estate trigger a larger degree of saving.

Second, we test whether the impact of receiving transfers influences private pension savings differently if the receipt was expected vs. unexpected. If a receipt was expected, there is a chance the household has already 'priced-in' the upcoming gift/ inheritance and adjusted investments already *prior* to the actual receipt, such that the effect *after* the receipt is somewhat 'dampened'. Related research on the impact of inheritance receipts on probability of early retirement (Brown, Coile, & Weisbenner, 2010) finds that the effect of an unexpected inheritance receipt is twice as big compared to the effect when the inheritance is expected (p. 431-432). To test this interrelation in our case, we include the dummy variable *gift/inheritance already expected* (equals '1' if the transfer was expected) in the interaction, indicating if the household stated already at wave 1 that she expects to receive a gift or inheritance. Our results show that there are no significant differences depending on if the receipt was unexpected or expected. Household who did not expect the receipt, invest ~14.9k EUR (or 0.08 EUR/per EUR received) more in private pension, whereas households who did expect the receipt invest ~16.0k EUR (or 0.06 EUR/per EUR received) more – both compared to non-heirs in the same three years period. Our findings imply that households are prudent enough, not to price-in future expected inheritances in their private pension investment decisions today. Only once the gift or inheritance has actually 'arrived', the transfer is used to bolster the heir's private pensions saving – independent of if the transfer was expected or not. Interestingly and in line with our findings, Doorley and Pestel (2016), who research likewise on German data (SOEP), find also no difference between expected vs. unexpected inheritances (p. 13). Carefully interpreted, we would state that households in our German panel, do not price-in potential future expected gifts or inheritances in their current investment decisions, but prudently wait until the transfer has materialized before taking any actions.

4.2.4. Expecting a gift or inheritance

Besides examining if households use a *received* intergenerational transfer for sustainable purposes like retirement saving, policymakers should likewise be interested in, if the mere *expectation* of a future gift or inheritance – thus without the tangible receipt yet – negatively impacts the saving behavior in the present. Weil

(1994), for instance, finds that households that expect an inheritance, increase their consumption already at the present day by 5%. Households could possibly rely on future transfers and become less disciplined in putting aside funds for their own retirement saving. A potential reliance on future asset receipts is risky and likely to impoverish those households in old age, who wrongfully rely on future intergenerational transfers instead of saving early enough for retirement. In such a case, policymakers should be alarmed and ready to initiate counter-measures such as adjustments of pension saving incentives and information campaigns.

Using a second matched socio-demographic twin sample, we explore if households, who state that they expect a large gift or inheritance in the future, actively change their private pension investment behavior.[22] Our generic regression model, suitable to our panel data, is formalized as

$$\Delta Private\ pension\ EUR\ amount_i = \beta_0 + \beta_1\, Gift/inheritance\ expected_i + \gamma\, \Delta Controls_i + Fixed\ effects_i + \varepsilon_i \qquad (3)$$

where our dependent variable indicates whether there is a change in the amount of private pension savings across all household members (*Private pension EUR amount*) in the time between wave 1 and wave 2. **Table 6** reports the corresponding results.

[Please insert **Table 6** about here.]

Specification (1) shows the effect of switching from 'not expecting a gift/ inheritance' to 'expecting a gift/ inheritance', expressed by the key explanatory dummy variable *gift inheritance expected*. Surprisingly, we find a significant *positive* effect (β_1=12.3k EUR, t=2.74), when not controlling for other covariates. Looking in isolation at the coefficient, the result implies that households who start expecting a gift or inheritance, invest more – rather than less – in private pension saving compared to peer households.

In specification (2) we add controls to our panel regression, which include amongst others gifts or inheritances that were actually received between the waves. Taking the changes in those controls into consideration, we observe that our controls explain most of the changes in private pension saving amount (e.g. R^2 quadruples

[22] Making use of the panel dynamics, we are interested in households who make an active switch from 'not expecting' in wave 1 to 'expecting' in wave 2. We exclude households who expected a gift/ inheritance already in wave 1, since (i) we do not know since when exactly they started expecting the intergenerational transfer, which might bias later our results and since (ii) we want to examine a quasi-treatment effect for those households making an active switch from not expecting in wave 1 to expecting in wave 2 (assumption: some event triggered households to start expecting a future gift or inheritance). We base our nearest neighbor propensity score matching on households that fulfill these criteria. Thus, the matched sample contains households that expect a transfer, as well as sociodemographic twins serving as control group.

comparing specification (1) and (2)). As a consequence, the coefficient of our key explanatory variable *gift/inheritance expected* shrinks considerably in size and becomes statistically insignificant (β_1=4.2k EUR, t=0.64). From those results we conclude that household expecting to receive a future gift or inheritance do not significantly change the amount they invest in private pension saving. Specifically, we do not find any evidence suggesting that there is a *negative* impact on private pension accounts due to the expectation of a future gift or inheritance.

4.2.5. Robustness analysis

Alternative explanations. Our main analysis suggests that households receiving a gift or inheritance invest approximately 15k EUR (or 8 cents of every received euro) more in private pension over the three years compared to similar peer-households. Could there be other reasons for this significant difference in private pension saving amounts? There is the possibility that non-heir household choose other ways to save for old age, such as investing in real estate or in other financial products, i.e. bonds, investment funds or single stocks. Investing in a house or in the capital markets can be seen as likewise valid ways of saving for old age, which we do not want to discredit in any way. However, we want to exclude the possibility by all means that our key findings represent a statistical artefact and that the exposed difference in the private pension saving amounts of heirs is only so prominently large due to the fact that non-heirs simply invest in alternative ways to save for old age. To exclude this possibility and to bolster our results, we run our baseline regressions multiple times with several sample restrictions. Incrementally we exclude households stating that they save for a home or invest in bonds, investment funds or stocks. If our detected effect on private pension saving is still present in a subsample of households where – for instance – *no one* owns any investment funds, we can exclude the possibility that non-heirs chose investment funds as alternative investments. Thus, we would strengthen our argument that indeed the receipt of a gift or inheritance makes a substantial contribution to the private pension saving of heirs, visible through a large difference in the private pension accounts of heirs vs. non-heirs. **Table 7** provides regression results for our restricted samples.

[Please insert **Table 7** about here.]

In specification (1) and (2) we exclude all households that stated either in wave 1 or wave 2 that the they save for a home. As argued, we exclude the possibility that *non-heir* households save for a house, what could in

return explain their low investment in private pension saving products. Specification (1) shows the same significant impact of ~15k EUR additional investment in private pension for households receiving a gift or inheritance. Likewise, specification (2) shows that approximately 9 cents of every euro received is invested. We can exclude the alternative explanation that the considerable difference between heirs and non-heirs stems from the fact that non-heirs simply safe for old-age in different ways – namely here by saving for a home. For all regressions we use the full set of controls as in our baseline regressions. We repeat the two regressions in specification (3)-(8), where we exclude one-by-one all bond owner, all investment fund owner and all single stock owner. Every single set of panel regressions remains statistically significant at the 10%-level or better. The size of the effect that intergenerational transfer receipts have on private pension saving oscillates only slightly around our baseline regression results, confirming our findings in terms of magnitude. We conclude that our baseline results are robust to the alternative explanations under review and our findings should not represent a statistical artefact.

Endogeneity. In our baseline panel regression we examine the impact of a received gift or inheritance. This transfer is tangible (ownership of assets is transferred from testator to heir) and concluded at the time of the second observation. Thus, we believe there exists a fair chance of a causal relation between explanatory and dependent variable. In the case of the mere expectation of a future transfer, however, our model becomes more vulnerable since expectation formation can be impacted by hidden factors, such as underlying information from the past (e.g., Schmalensee, 1976). It is possible, that an omitted variable exists that influences both, the expectation to receive a future gift or inheritance and the amount invested in private pension. In this case, we would face endogeneity due to such an omitted variable, which would biases our OLS regression results. Braun (2015) states that rather households who own already large amounts of financial assets (i.a. private pension products) are the ones who will receive gifts or inheritances in the future. An attempt to explain this concatenation: First, offspring from wealthy families have potentially been in contact with finance topics earlier in their lives and often enjoyed a better education. Second, those offspring – having unequivocally better starting positions in life – are more likely to make better careers, aggregate more wealth and i.e. save

more in private pension since they are aware of the benefits of retirement planning (tax breaks, subsidies).[23] Third, those households have already in the first place larger assets in the wider family that will be transferred at some point. What is more, those advantaged households are more likely to *realize* that they are eligible to expect a future receipt and might already price-in this factor in their financial planning. Therefore, a potential omitted variable (e.g. "wealth in household's wider family") could affect both, the expectation to receive a future transfer and the amount invested in private pension, which would confront us with an endogeneity issue.

Bucher-Koenen and Lusardi (2011) face a similar endogeneity concern in their research regarding financial literacy and retirement planning. They overcome their concern applying instrumental variables (IV) which they base on the geography where the household lives. In our attempt to circumvent a potential omitted variable we follow a similar approach. We instrument *gift/inheritance expected* using at first one, then two instrumental variables within a two-stage least square (TSLS) panel regression model. **Figure A1** in the appendix visualizes our instrumentation framework. For our first instrumental variable, we make use of the peculiarity, that Germany was separated in a capitalistic and a socialistic part up until October 1990. Due to the difference of the political systems, the wider families of individuals in West Germany aggregated more wealth (e.g. real estate in more valuable locations, cash in the more stable currency Deutsche Mark, access to financial markets) compared to individuals living for two generations in the socialistic East Germany (aka the German Democratic Republic). We follow findings of East/West differences by Braun (2015) and assume that individuals from West Germany have a higher likelihood of receiving a substantial gift or inheritance and thus *expect* to receive such an intergenerational transfer more often. Further, we assume that the build-up of private pension savings is uncorrelated to whether the individual was living in East or West Germany due to the following reasons: First, more than 20 years are between the reunification of Germany and the first PHF survey wave, giving households from both geographies enough time to invest in their private pension accounts. Second, important pension reforms in Germany that stipulated private pension savings were introduced in 2001 through the statute "Altersvermögensgesetz"/AVmG (see e.g., Börsch-Supan et al., 2012) thus being

[23] The positive impact of prior education, financial literacy or income on private pension saving is widely confirmed in prior literature (e.g., Börsch-Supan et al., 2012; Bucher-Koenen & Lusardi, 2011; Rooij et al., 2012).

approximately 10 years apart from both, the reunification and the first PHF wave. The results of the two-stages least square panel regression model, including quality indicators, are shown in **Table 8**.

[Please insert **Table 8** about here.]

In specification (1) *gift/inheritance expected* is instrumented by the dummy variable *'household's residence in 1989 was in West Germany'*.[24] In line with the results of the non-IV regression regarding *gift/inheritance expected* (**Table 6)**, the main coefficient is positive and significant (β_1=20.6k EUR, t=2.59). The bottom part of **Table 8** shows i.a. results of the endogeneity test for the main regressor. The Chi^2 p-value of 0.1651 indicates that an omitted variable is less of a problem than expected, since the H_0 cannot be rejected (H_0: variable *gift/inheritance expected* is exogenous). Nonetheless, we conduct our IV approach keeping the assumption that our key explanatory variable potentially is endogenous and that an omitted variable cannot be ruled out entirely. F-test results (F=160, p-value=0.000) for our first-stage regression confirm that our chosen instrument is correlated with *gift/inheritance expected* and therefore is relevant. In addition, we run a Kleibergen-Paap test for underidentification with the results showing that our model is identified and that our instrument is correlated with the regressor (Chi^2 p-value = 0.000). This also is affirmed by being above all critical values of the weak identification tests (Stock & Yogo, 2005). Since Hansen J-statistic test is only applicable in cases where the number of instrumental variables is larger than the number of to-be-instrumented variables, we do not receive any test results. In specification (2), we complete the model and add the same controls as in our non-IV regression (**Table 6**). Results for all covariates' coefficients are in line with our non-IV regression. Our variable of interest *gift/inheritance expected (IV)* obtains a positive coefficient (β_1=8.7k EUR, t=1.00), which is larger compared to our non-IV regression, but statistically not significant.

To improve the prediction procedure of *gift/inheritance expected* in the first-stage regression, we add a second instrumental variable to our first one to instrument jointly our key explanatory variable. As depicted in the instrumentation framework (**Figure A1**), we incorporate the additional dummy variable *'household never received any gift/ inheritance before the interview date wave 1 (2011)'*, equal to one if the household is a non-heir in wave 1. Our rationale behind this second instrument is that households with no prior receipt of a gift or

[24] Based on survey question "*Where did you have your residence when the Berlin Wall fell?".* Of our matched sample (N=182), 79% of FKPs stated West Germany, 14% East Germany and 7% elsewhere (i.e. abroad). Dummy variable used as instrument is equal "1" if FKP stated "West Germany".

inheritance are naturally more likely to still receive and expect a future transfer.[25] Looking at all coefficients, the results in specification (3) and (4) closely mirror the results of specification (1) and (2). In specification (4), thus including the relevant controls, the coefficient of our key explanatory variable *gift/inheritance expected (IV)* is once more positive and statistically not significant (β_1=9.8k EUR, t=1.26). The first-stage quality indicators report relevant (F=79.6 and F=58.4) and identified/ non-weak instruments. Hansen J-statistic lets us fail to reject the H_0 of the overidentification test (p=0.3596; H_0: instruments are correctly identified). Thus, we conclude that the instruments are valid and correctly identified (Baum, Schaffer, & Stillman, 2010). Again, we confirm our non-IV results in **Table 6**, stating that the pure expectation of receiving a future gift or inheritance does *not* decrease the euro amount invested in private pensions in the present. If anything, results point rather towards an increase.

5. Discussion

Interpretation of results. In our study, we document the positive impact of the receipt of a gift or inheritance on households' private pension savings. We make use of the longitudinal structure of our data that allows us to conduct panel regressions and to look at within-household effects over time. Besides, we control for selection bias via propensity score matching and build a nearest neighbor twin sample to simulate a quasi-experimental setting. Further, we control for time-variant covariates that might affect the household's propensity to save for old age during the observation time frame. Finally, we test for alternative explanations and conduct an instrumental variable approach to mitigate the potential issue of an omitted variable when estimating the effects of expected gifts and inheritances.

First, we observe that households, who receive a larger gift or inheritance within the three-year period under review, increase their invested private pension amount by 15k EUR *more* compared to peer households (significant at the 5% level). Looking at a euro to euro base, we find that about 8 cents of every euro received as gift or inheritance are invested in private pensions products (significant at the 1% level). On its own, '15k EUR more' already constitutes an increase in magnitude of *four times* the investment a non-heir household

[25] A more superior instrument would be data on if parents of household's FKP (plus spouse) are still alive. Unfortunately, this data is not available. We thus use the proxy "never received any gift before" to approximate "parents are still alive" and combine this in the regression with the first instrument "being from West Germany" (indicating higher wealth level of wider family).

devotes to private pension savings during this period in our sample. In a compact simulation, we calculate that non-heir households that are able to save 125 EUR per month for retirement would need approximately 14 years to 'catch up' with a heir-households in terms of old age saving.[26] Our findings highlight the positive role of intergenerational transfers in strengthening households' private pension investments. Received assets from gifts and inheritances can thus be 'locked-away' in long term retirement saving accounts, where the funds are typically not inadvertently consumed (disciplining function of pension provisions) and serve later in old age as an important pillar – besides public- or occupational pension, real estate or e.g. equity investments – to secure financial well-being once in retirement. Second, we find that especially households above the median net income and wealth levels are able to increase their amounts invested in private pensions after receiving a gift or inheritance – as also confirmed in related literature (e.g., Elinder et al., 2018; Wolff, 2002). Possible explanations are that households above the medians can *afford* to invest the additionally received funds into private pensions, since other expenditures such as down payment of mortgages or rent, insurances and other necessary private consumption can be covered already by the higher income or wealth. This leads to the conclusion that especially less fortunate households do not benefit from the positive impact of gift and inheritance on private pension saving, thus indicating that policymakers should especially offer incentives or solutions for this subgroup of households. Politics cannot just rely on 'old wealth' to be transferred, which then solves the issue of old age poverty, since especially poorer households are, on the one hand, most at risk by a widening pension gap and, on the other hand, the ones that cannot/ do not save their received intergenerational transfer funds in voluntary pensions. Likewise, this finding constitutes an additional appeal for households *not* to rely solely on gifts and inheritances as a substitute for regularly saving for private pension from disposable income. Third, we examine if the participation rate for private pension provisions – thus the ownership of those products – is influenced by a gift or inheritance receipt and observe that neither the indicator variable of such a receipt nor the euro value of the transfer impacts the households' propensity to own private pension products. Thus, the approximately 25% of households that do not own any private pension products remain completely unaffected, indicating that the euro-increase in the invested private pension amounts stems

[26] Calculation available upon request. Underlying assumption is a stock-market-comparable interest rate of 5% p.a. (compounded monthly) and payments made at the beginning of each month.

only from households who already own those products. Facing the fact that the large majority of households owns already private pensions at the first point in time of our observation, we might miss a positive, significant impact of intergenerational transfer on ownership due to a potential ceiling effect.[27] Building on this, one could speculate that the remaining, smaller share of non-owners are strictly opposing classical private pension products as defined by Bäcker et al. (2016) and favor other strategies to save for old age. Fourth, we find that the households' mere expectation to receive a gift or inheritance in the future does not negatively impact their private pension saving behavior in the present. For policymakers this finding can be interpreted as a relief since a household's potential reliance of on a future asset receipt would have to be seen as very risky in cases where the household *wrongfully* relies on future intergenerational transfers instead of privately saving properly for old age. That this worst case scenario is not completely far-fetched is confirmed by Börsch-Supan et al. (2016) who highlight that wrong expectations about future (public) pensions are a potential reason for under-saving towards old age. Likewise, Lamla and Gasche (2014) find that more than one third of households in Germany rely completely on the state regarding pensions. Nonetheless, other surveys highlight the more positive aspects, e.g. stating that 71% of households are completely aware of the fact that they should *not rely* on future intergenerational transfers as a replacement for conducting own private retirement savings (IfD Allensbach, 2015), which is in line with our findings.

Implications. First, we derive implications for policymakers regarding adjustments of the progressive inheritance tax rate and recommend neither to increase the current rates nor to introduce a flat rate tax on all gifts and inheritances.[28] Both measures would decrease the received net transfer amounts of heirs and thus decrease the disposable funds that could be used to invest in private pension savings (even if this would

[27] For a precise definition of the statistical ceiling effect we refer to Cramer and Howitt (2004). Essentially, if a value is approaching the maximum it can reach, the possibility of making the wrong conclusion that an explanatory variable (here: gift/inheritance receipt) has no effect, must be taken into consideration.

[28] The effective tax rate that is paid on inheritances (and gifts) in Germany is estimated to be already below 3% due to large and family-friendly tax allowance amounts and a progressive rate that is favorable towards small-to-medium sized transfers (Braun, 2015). Thus, the current general system can be considered as already relatively fair and a flat rate tax is unlikely to improve it. What causes public discussion and sometime indignation regarding inheritances is the fact that extremely large inheritances often include businesses which are passed on with relatively entrepreneurial-friendly tax rates. This is however not in the scope of our research.

primarily mean to help the more affluent half of households). Moreover, in case of an increase of inheritance tax rates, testators and heirs could be tempted to illegally evade the taxation systems by shifting assets in grayish investment areas, where there is a low likelihood that these assets will ever flow legally back into e.g. a Riester-pension account. Instead, legislators should think about ways to ease the flow of funds from gifts or inheritances into private pension accounts for all receiving heir households. Similar to §17 (ErbStG, 2017), which grants especially the spouse an additional tax exemption for the receipt of benefits ('survivor's pension'), policymakers could give heirs an additional tax allowance for funds that flow irrevocably into their private pension accounts. This might be especially interesting for inheritances between parties that are not family-related and where therefore the standard tax allowance is low (at only 20k EUR) and the progressive tax rate is substantially higher (namely at 30% and 50%).[29] Further, legislators should support especially heir-households *below* the income- and wealth median and foster their build-up of individual private pension savings by providing incentives like additional tax breaks or a quick, non-bureaucratic "asset shifting process" if they invest a certain share of the inheritance directly in their private pension. Policymakers would thus contribute to closing future pension gaps in a more *targeted* approach to support especially those less affluent households who need it the most.

Second, the impact of gifts and inheritances on the formation of private pension saving has managerial implications for financial institutions. Banks and insurance companies can use inheritances and receipts of gifts as an anchor point in conversations within client consultation sessions to enable the allocation of received transfers into bank-supplied private pension saving products. Private studies and publications by financial institutions on the topics of inheritances and private pensions are already quite common.[30] Professional financial advice, if given properly while obeying the strict, but consumer-friendly regulations which the supply-side faces, can be beneficial for the client – or at the least more beneficial than *not receiving* any advice regarding notably complex topics, such as (taxable) inheritance receipts and retirement planning, where a decent financial consultation is likely to pay-off for households.

[29] Compare tax bracket 1 and 3 for tax allowances ("Steuerfreibeträge") in §16 and tax rates ("Steuersätze") in §19 (ErbStG, 2017).

[30] Compare e.g. studies enabled by banks (IfDAllensbach, 2015; Raffelhüschen, 2017) or research institutes founded by financial institutions such as the DIA ("Deutsches Institute für Altersvorsorge", see e.g. Braun, 2015)

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Figures and tables

Table 1

Summary statistics: Matched sample

Panel A : Wave 1 (2010/2011)

	All Complete matched sample			**t/o Heirs** Gift/inheritance received [between 2011-14]			**t/o non-Heirs** Control group w/o gift/inheritance		
	N	Mean	Std.-Dev.	N	Mean	Std.-Dev.	N	Mean	Std.-Dev.
Private pension ownership	118	0.729	0.446	55	0.727	0.449	63	0.730	0.447
Private pension EUR amount	118	22,558	35,195	55	20,452	29,153	63	24,397	39,873
Household net income (EUR)	118	3,623	2,952	55	3,754	3,342	63	3,509	2,585
Household net wealth (EUR)	118	235,512	604,679	55	266,595	809,878	63	208,377	342,224
Household members	118	2.585	1.208	55	2.564	1.151	63	2.603	1.264
Household members employed	118	1.551	0.853	55	1.564	0.788	63	1.540	0.913
Male	118	0.483	0.502	55	0.436	0.501	63	0.524	0.503
Married	118	0.661	0.475	55	0.673	0.474	63	0.651	0.481
Age	118	44.37	10.10	55	43.950	10.98	63	44.750	9.326
Unemployed	118	0.025	0.158	55	0.018	0.135	63	0.032	0.177
Self-employed	118	0.076	0.267	55	0.073	0.262	63	0.079	0.272
Financial literacy	118	2.831	0.399	55	2.745	0.480	63	2.905	0.296
University degree	118	0.424	0.496	55	0.418	0.498	63	0.429	0.499
Financial risk tolerance	118	1.602	0.587	55	1.564	0.601	63	1.635	0.576

Panel B : Wave 2 (2014)

	All Complete matched sample			**t/o Heirs** Gift/inheritance received [between 2011-14]			**t/o non-Heirs** Control group w/o gift/inheritance		
	N	Mean	Std.-Dev.	N	Mean	Std.-Dev.	N	Mean	Std.-Dev.
Private pension ownership	118	0.780	0.416	55	0.782	0.417	63	0.778	0.419
Private pension EUR amount	118	33,056	55,759	55	38,909	74,246	63	27,945	31,764
Household net income (EUR)	118	4,074	2,318	55	4,005	1,914	63	4,135	2,634
Household net wealth (EUR)	118	279,348	453,165	55	312,831	553,932	63	250,117	344,122
Household members	118	2.712	1.248	55	2.764	1.247	63	2.667	1.257
Household members employed	118	1.669	0.740	55	1.709	0.762	63	1.635	0.725
Male	118	0.483	0.502	55	0.436	0.501	63	0.524	0.503
Married	118	0.746	0.437	55	0.782	0.417	63	0.714	0.455
Age	118	47.74	10.08	55	47.20	10.92	63	48.210	9.345
Unemployed	118	0.025	0.158	55	0.036	0.189	63	0.016	0.126
Self-employed	118	0.110	0.314	55	0.109	0.315	63	0.111	0.317
Financial literacy	118	2.805	0.543	55	2.800	0.558	63	2.810	0.535
University degree	118	0.466	0.501	55	0.455	0.503	63	0.476	0.503
Financial risk tolerance	118	1.517	0.551	55	1.473	0.573	63	1.556	0.532

Notes: This table reports descriptive statistics of our matched sociodemographic twin sample resulting from the propensity score (nearest neighbor) matching approach. Households that are retired and households in which the Financially Knowledgeable Person (FKP) has switched during the survey are excluded from sample. Additionally, all households which received a gift / inheritance before the interview date in wave 1 (2010/2011) are excluded to provide an unbiased starting base. Outliers for gifts/ inheritances with euro values beyond 3 times the standard deviation are removed. Panel A depicts figures for survey wave 1 and Panel B depicts the same figures for survey wave 2. "Heirs" include those households who *did* receive a gift/ inheritance >10k EUR during the period 2011-2014 and thus represent the first-time heirs. "non-Heirs" include households who did *not* receive a gift/ inheritance >10k EUR during the period 2011-2014 and represent the sociodemographic twins (matched control group). Data is not weighted.

Table 2

Summary statistics: Gifts and inheritances of first-time heirs in matched sample

Panel A: Classification and donor of gift/ inheritance

	N	% of all gifts/inheritances	Donor of gift/inheritance	% of all gifts/inheritances
All gifts/ inheritances	55		Parents	70.5%
t/o gifts	23	41.8%	Grandparents	6.6%
t/o inheritances	32	58.2%	Other family	19.7%
			No answer	3.3%

Panel B: Size and type of gift/ inheritance

			Gift/ inheritance value in EUR		
	N	% of all gifts/inheritances	Mean	Std.-Dev.	Median
All gifts/ inheritances	55		100,244	131,737	46,000
t/o with money	35	63.6%	95,554	142,460	30,000
t/o with real estate	25	45.5%	150,360	166,051	90,000
t/o with securities	1	1.8%	70,000	NA	70,000
t/o with others	3	5.5%	49,333	26,858	38,000

Notes: Table depicts first-time heirs in period 2011-2014 only, excluding gift/ inheritance outliers. Panel B displays values for gifts/ inheritances that include at least one of the specified assets. Overlap exists since some gifts/ inheritances include both, e.g. money *and* real estate. Data is not weighted. "Others" include (i) land (ii) jewelry/furniture/art and (iii) life insurance.

Table 3

Propensity score matching: ATE on private pension EUR amount

	N		ATE	AI Robust SE	z	p-value
ATE: Wave 1 – Before receiving g/i	Total	880	2,511.38	3878.961	0.65	0.517
	Treatment	*60*				
	Control	*820*				
ATE: Wave 2 – After receiving g/i	Total	880	10,764.56**	5024.869	2.14	0.032
	Treatment	*60*				
	Control	*820*				

Notes: This table reports Average Treatment Effect (ATE) results of a propensity score matching (PSM) approach with nearest neighbors using Stata's *teffects psmatch* command. The PSM approach excludes households that (i) are retired, (ii) switched their Financially Knowledgeable Person or (iii) received a gift or inheritance (>10k EUR) before wave 1 (2010/2011). Treatment group contains all households (N=60) that did receive a gift or inheritance (>10k EUR) for the first time between wave 1 and wave 2 (Note: before exclusion of any potential outliers). Results for the ATE are shown at point in time wave 1 (2010/2011) and point in time wave 2 (2014). ATE shows the difference in *private pension EUR amount* invested by each group of households (treatment vs. control group). Robust standard errors are calculated following Abadie & Imbens (2011). ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

Table 4

Main results: Impact of gift and inheritance on private pension

	Dependent variable: ΔPrivate pension EUR amount				*Dependent variable: ΔPrivate pension ownership (in %)*	
	(1)	(2)	(3)	(4)	(5)	(6)
Gift/inheritance received	18456.9**	15267.7**			0.00849	
	(7276.5)	(6845.9)			(0.0580)	
Gift/inheritance EUR value			0.104***	0.0751***		-0.000000121
			(0.0300)	(0.0280)		(0.000000209)
Household net income		1.734		1.662	-0.0000124	-0.0000120
		(1.733)		(1.780)	(0.0000136)	(0.0000134)
Household members		6326.8		6802.1	0.193***	0.197***
		(4755.3)		(4415.0)	(0.0517)	(0.0518)
Self-employed		26831.4**		21406.6*	0.267*	0.284*
		(12532.4)		(12144.1)	(0.144)	(0.151)
Financial advice received		14080.0		14492.0	0.0240	0.0252
		(11696.0)		(12097.2)	(0.0829)	(0.0829)
Household FE	YES	YES	YES	YES	YES	YES
N	236	236	236	236	236	236
R^2 (within)	0.067	0.134	0.057	0.117	0.140	0.140
F-test	6.434	3.453	12.00	5.019	3.536	3.568
F-test p-value	0.0125	0.0060	0.0007	0.0003	0.0052	0.0049

Notes: This table reports coefficient estimates obtained from an OLS regression model applying a 'first difference' approach (Johnson, 2005; Vaisey & Miles, 2014) of the generic form:

$$\Delta Private\ pension_i = \beta_0 + \beta_1\ Gift/inheritance_i + \gamma\ \Delta Controls_i + Fixed\ effects_i + \varepsilon_i$$

Calculation is executed via Stata's *xtreg, fe* command and uses the matched sample of N=118 households at point in time wave 1 and wave 2. Outliers for gifts/ inheritances with EUR values beyond 3 times the standard deviation are removed. Specification (1)-(2) show the effect of *gift/ inheritance received* (dummy variable) on the change in *private pension EUR amount* invested by each household. Specification (3)-(4) show the effect of the *gift/ inheritance EUR value* (continuous variable) on the change in *private pension EUR amount*. Applying a Linear Probability Model (LPM), specification (5)-(6) show the effect of *gift/ inheritance received* (dummy variable) and *gift/ inheritance EUR value* (continuous variable) on the change in the probability of *private pension ownership*, respectively. All specifications are estimated with robust standard errors, displayed in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

Table 5

Heterogeneous treatment effects

Panel A: Heterogeneous treatment effects - Heir-household characteristics

		Dependent variable: ΔPrivate pension EUR amount							
		Set (a):				**Set (b):**			
		Explanatory independent variable: gift/ inheritance received ("0/1-view")				**Explanatory independent variable: gift/ inheritance EUR value ("EUR-to-EUR")**			
Indicator variable	N	β_1	$\beta_1 + \beta_2$	β_2	R^2	β_1	$\beta_1 + \beta_2$	β_2	R^2
Household net income_high	236	1,446.3 (5,464.5)	24,093.6** (10,992.0)	22,647.3* (13,069.0)	0.1578	0.0057 (0.0214)	0.1178*** (0.0438)	0.1122** (0.0500)	0.1322
Household net wealth_high	236	4,287.6 (7,352.3)	25,536.5** (12,487.5)	21,248.9 (15,575.2)	0.1545	0.0077 (0.0258)	0.1157*** (0.0418)	0.1080** (0.0480)	0.1303
Household male	236	11,224.1* (6,453.9)	20,545.2 (13,061.5)	9,321.1 (14,339.6)	0.1383	0.0278 (0.0192)	0.1263** (0.0509)	0.0986* (0.0511)	0.1293
Household married	236	4,423.5 (5,844.4)	20,288.1** (12,956.3)	15,864.6 (11,563.3)	0.1447	0.0643** (0.0285)	0.0850 (0.0549)	0.0208 (0.0664)	0.1172
Household age_high	236	71.2 (5,107.8)	26,558.1** (11,659.7)	26,487.0* (13,410.2)	0.1639	-0.0028 (0.0217)	0.1322*** (0.0477)	0.1350*** (0.0503)	0.1383
Household university degree	236	14,975.4 (10,653.5)	15,670.5** (7,730.6)	695.1 (13,418.9)	0.1341	0.0685** (0.0303)	0.1199 (0.0790)	0.0515 (0.0839)	0.1182

Panel B: Heterogeneous treatment effects - Gift/ inheritance types

		Dependent variable: ΔPrivate pension EUR amount							
		Set (a):				**Set (b):**			
		Explanatory independent variable: gift/ inheritance received ("0/1-view")				**Explanatory independent variable: gift/ inheritance EUR value ("EUR-to-EUR")**			
Indicator variable	N	β_1	$\beta_1 + \beta_2$	β_2	R^2	β_1	$\beta_1 + \beta_2$	β_2	R^2
Gift/ inheritance inlc. real estate	236	3,561.4 (3,962.8)	29,908.4** (14,393.0)	26,347.0* (15,289.6)	0.1673	0.0289 (0.0404)	0.0855** (0.0342)	0.0566 (0.0573)	0.1191
Gift/inheritance already expected	236	14,938.9 (8,426.9)	16,007.4* (9,559.8)	1,068.5 (11,917.8)	0.1342	0.0779** (0.0326)	0.0627* (0.0319)	-0.0152 (0.0424)	0.1169

Notes: This table reports coefficient estimates obtained from an OLS regression model applying a 'first difference' approach (Johnson, 2005; Vaisey & Miles, 2014) of the generic form:

$$\Delta \textit{Private pension EUR amount}_i = \beta_0 + \boldsymbol{\beta_1}\, \textit{Gift/inheritance (received (0/1) or EUR value)}_i + \boldsymbol{\beta_2}\, \textit{Gift/inheritance (received (0/1) or EUR value)}_i \times [\textit{Indicator variable}_i] + \gamma\, \Delta \text{controls}_i + \textit{fixed effects}_i + \varepsilon_i$$

Calculation is executed via Stata's *xtreg, fe* command and uses the matched sample at point in time wave 1 and wave 2. Outliers for gifts/ inheritances with euro values beyond 3 times the standard deviation are removed. All metric variables are dichotomized via median splits of the subsample, where wave 1 values serve as the base for the split. Hence, the suffix *_high* functions as a dummy and denotes above-median values of the observation. Set (a) uses *gift/ inheritance received* (dummy variable) as the explanatory independent variable, Set (b) uses *gift/inheritance EUR value* (continuous). As an example: For the first indicator variable in Set (a), $\boldsymbol{\beta_1}$ reports the effect of receiving a gift or inheritance within 2011-2014 on the household's invested *private pension EUR amount* given the household is *below* the median net income of the matched sample. Conversely, $\boldsymbol{\beta_1 + \beta_2}$ reports the effect for the household *above* the median net income. As the coefficient of the interaction term, $\boldsymbol{\beta_2}$ shows the difference in the reported effects for low and high net income households, respectively. Panel A differentiates according to heir-household characteristics, which enter the equation as indicator variables as described. Panel B differentiates according to the gift/inheritance types in the same manner. The same time-variant controls as in the full model are taken into the equation. All specifications include household fixed effects and are estimated with robust standard errors, displayed in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

Table 6

Impact of expectation of gift and inheritance on private pension

	Dependent variable: ΔPrivate pension EUR amount	
	(1)	(2)
Gift/inheritance expected	12343.2***	4178.3
	(4501.7)	(6517.0)
Gift/inheritance received		12126.7
		(14085.0)
Household net income		7.583**
		(3.484)
Self-employed		37436.1
		(45157.2)
Financial advice received		14993.1*
		(7772.1)
Household FE	YES	YES
N	364	364
R^2 (within)	0.036	0.137
F-test	7.518	3.273
F-test *p-value*	0.0067	0.0075

Notes: This table reports coefficient estimates obtained from an OLS regression model applying a 'first difference' approach (Johnson, 2005; Vaisey & Miles, 2014) of the generic form:

$$\Delta Private\ pension\ EUR\ amount_i = \beta_0 + \beta_1\ Gift/inheritance\ expected_i + \gamma\ \Delta Controls_i + Fixed\ effects_i + \varepsilon_i$$

Calculation is executed via Stata's *xtreg, fe* command and uses a newly matched sample of N=182 households at point in time wave 1 and wave 2. Matching is based on households who state to expect a larger gift/ inheritance in the future. The matched sample excludes households that (i) are retired, (ii) switched their Financially Knowledgeable Person (FKP) or (iii) stated that they expected a gift/ inheritance already at point in time wave 1. Specification (1) shows the effect of *gift/ inheritance expected* (dummy variable) on the change in *private pension EUR amount* invested by each household in the matched sample. Specification (2) adds the controls *gift/ inheritance received* (>10k EUR, dummy variable) in the period 2011-2014 and changes in *household net income*, in *self-employment* status and for *financial advice received* by a bank agent. All specifications are estimated with robust standard errors, displayed in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

Table 7

Robustness checks on main results: Testing for alternative explanations

	Dependent variable: ΔPrivate pension EUR amount							
	Non-savers for a home		Non-bond owner		Non-investment fund owner		Non-stock owner	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Gift/inheritance received	14755.5*		15238.8**		13104.2*		15612.9*	
	(7737.4)		(7289.4)		(7597.6)		(8115.2)	
Gift/inheritance EUR value		0.0918***		0.0763**		0.0511*		0.0740***
		(0.0322)		(0.0316)		(0.0262)		(0.0272)
Controls	YES	YES	YES	YES	YES	YES	YES	YES
Household FE	YES	YES	YES	YES	YES	YES	YES	YES
N	208	208	224	224	179	179	183	183
R^2 (within)	0.152	0.145	0.141	0.125	0.190	0.176	0.141	0.126
F-test	2.503	4.579	3.440	4.855	2.313	4.477	2.018	4.328
F-test *p-value*	0.0350	0.0008	0.0062	0.0005	0.0492	0.0010	0.0829	0.0014

Notes: This table reports coefficient estimates obtained from an OLS regression model applying a 'first difference' approach (Johnson, 2005; Vaisey & Miles, 2014) of the generic form:

$$\Delta Private\ pension\ EUR\ amount_i = \beta_0 + \beta_1\ Gift/inheritance_i + \gamma\ \Delta Controls_i + Fixed\ effects_i + \varepsilon_i$$

Calculation is executed via Stata's *xtreg, fe* command with the change in *private pension EUR amount* invested as dependent variable. Outliers for gifts/ inheritances with euro values beyond 3 times the standard deviation are removed. Key independent variable is either the dummy variable *Gift/inheritance received* or the continuous variable *Gift/inheritance EUR value.* The respective number of observations for the regressions are in each case reduced to a subsample as specified in the headline (e.g. "*Non-savers for a home*") above the specification numbers. Specification (1) and (2) exclude households stating that they save for purchasing a house. In specification (3)–(8), households in the matched subsample who own the specified financial assets (bonds/ investment funds/ stocks) are excluded respectively. All specifications use the full set of controls as stated in the main regression analysis. All specifications are estimated with robust standard errors, displayed in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

Table 8

Robustness checks on impact of expectation of gift and inheritance: Instrumental variables approach

	Dependent variable: ΔPrivate pension EUR amount			
	(1)	(2)	(3)	(4)
Gift/inheritance expected (IV)	20627.9** (7961.7)	8714.7 (8746.2)	21682.5*** (7626.3)	9842.6 (7784.0)
Gift/inheritance received		10360.8 (14081.6)		9921.7 (13957.3)
Household net income		7.052** (3.500)		6.920** (3.442)
Self-employed		34716.8 (43789.5)		34040.8 (43298.6)
Financial advice received		14182.8* (7750.9)		13981.4* (7723.2)
Household FE	YES	YES	YES	YES
N	364	364	364	364
R^2 (within)	0.020	0.133	0.015	0.131
F-test	6.713	2.853	8.083	3.095
F-test *p-value*	0.0104	0.0167	0.0050	0.0105
Endogeneity test for main regressor Chi^2 p-value (H_0: exogenous)	0.1651	0.4032	0.1361	0.1393
F-test (First-stage)	160.06	117.63	79.59	58.04
F-test (First-stage) p-value	0.000	0.000	0.000	0.000
Kleibergen-Paap test Chi^2 p-value (H_0: underidentified)	0.000	0.000	0.000	0.000
Above "weak ID threshold" (Stock & Yogo, 2005)	YES	YES	YES	YES
Hansen J-statistic test *p-value* (H_0: correctly identified)	Not necessary (only 1 IV)	Not necessary (only 1 IV)	0.3021	0.3596

Notes: This table reports coefficient estimates obtained from a two-stages least square (TSLS) regression model applying a 'first difference' approach (Johnson, 2005; Vaisey & Miles, 2014). We use instrumental variable(s) for the key explanatory independent variable "gift/inheritance expected". Calculation is executed via Stata's *xtivreg, fe* command and uses the matched sample of N=182 households. The matched sample excludes households that (i) are retired, (ii) switched their Financially Knowledgeable Person (FKP) or (iii) stated that they expected a gift/ inheritance already at point in time wave 1. In Specification (1) and (2) the independent dummy variable "gift/inheritance expected" is instrumented by the dummy "*Households residence in 1989 was in West Germany*". Specification (3) and (4) add a second instrumental dummy variable "*Household never received any gift/ inheritance before interview date wave 1 (2011)*" to instrument jointly for "gift/inheritance expected". The table reports in the bottom part first-stage regressions statistics and tests for under- and overidentification. All specifications are estimated with robust standard errors, displayed in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

Appendix

Table A1
Variable description

Private pension EUR amount	Continuous variable of a household's total aggregated value of all private pension saving accounts (including state-subsidized private pensions, endowment life insurances and other non-subsidized private pension products; excluding all occupational pension plans and direct insurances); in EUR
Private pension ownership	Dummy variable equal one if household owns private pension products (as defined above), zero otherwise
Gift/ inheritance received	Dummy variable equal one if household has received a gift or inheritance with threshold value >10k EUR between survey wave 1 and 2 [2011-2014], zero otherwise
Gift/ inheritance EUR value	Continuous variable specifying the euro value of received gifts or inheritances between survey wave 1 and 2 [2011-2014]; threshold value for gifts/inheritances to be included is >10k EUR; in EUR
Gift/ inheritance expected	Dummy variable equal one if household expects to receive a large gift or inheritance in the future, zero otherwise
Household net income (ln)	Monthly net income of household in EUR (for the creation of propensity scores the natural logarithm of the variable is used)
Household net wealth (ln)	Total wealth less liabilities of household in EUR (for the creation of propensity scores the natural logarithm of the variable is used)
Household members	Total number of household members
Household members employed	Number of household members within household that are in employment
Male	Dummy variable for Financially Knowledgeable Person's (FKP) gender; equals one if respondent is male, zero for female
Married	Dummy variable equal one if FKP is married, zero otherwise
Age	Ordinal variable expressing the age of the FKP
Unemployed	Dummy variable equal one if FKP is unemployed, otherwise zero
Self-employed	Dummy variable equal one if FKP is self-employed, otherwise zero. [Note: As control variable in panel regression, this covariate can be interpreted as "change into/out of self-employment"]
Financial literacy	Ordinal variable expressing the number of correctly answered "big three" financial literacy questions; score ranges from 0-3, dependent on correct answers to following questions: Question 1 (compound interest effect): *"Let us assume you have a balance of € 100 in your savings account. This balance bears interest at an annual rate of 2%, and you leave it there for 5 years. What do you think: How high is your balance after 5 years?" ["Higher than €102 / Exactly €102 / Lower than €102"]* Question 2 (inflation): *"Let us assume that the interest paid on your savings account is 1% per year and the inflation rate is 2% per year. What do you think: After a year, will you be able to buy just as much, more or less than today with the balance in your savings account?" ["More / Just as much / Less than today"]* Question 3 (diversification): *"Do you agree with the following statement: 'The investment in the stock of a single company is less risky than investing in a fund with stock in similar companies'?" ["I agree / I do not agree"]*
University degree	Dummy variable equal one if FKP has a university degree, including university of applied sciences ("Fachhochschule") , otherwise zero
Financial risk tolerance	Ordinal variable measuring the households attitude towards financial risk; ranging from (1) "We are not ready to take any financial risks" to (4) "We take significant risks and want to generate high returns"
Financial advice received	Dummy variable equal one if FKP has used a consulting service at the FKP's principal bank in the past three years, otherwise zero

Notes: Upper part of table specifies key dependent and independent variables used in panel regressions. Lower part of table lists all covariates used either in propensity score matching approach and/or as control variables in panel regressions.

Table A2

Summary statistics: All households

Panel A: Demographics of relevant panel households

	Group A: Heirs Gift/ inheritance received during 2011-2014: Yes							**Group B: non-Heirs** Gift/ inheritance received during 2011-2014: No							t-tests	
	---------- Wave 1 ----------				---------- Wave 2 ----------			---------- Wave 1 ----------				---------- Wave 2 ----------			Difference in means (A vs. B)	
	N	Mean	Std.-Dev.	Median	Mean	Std.-Dev.	Median	N	Mean	Std.-Dev.	Median	Mean	Std.-Dev.	Median	Wave 1	Wave 2
Household net income (EUR)	111	3,270	3,063	3,600	3,637	3,865	4,000	1,143	2,407	1,856	2,600	2,609	1,785	3,000	2.81***	2.79***
Household net wealth (EUR)	111	223,683	552,790	180,000	283,205	450,213	300,000	1,143	126,149	489,637	74,400	131,604	264,370	100,000	1.97**	3.65***
Household members	111	2.179	1.068	3	2.343	1.201	3	1,143	2.272	1.265	2	2.348	1.281	2	-0.58	-0.03
Household memb. employed.	111	1.507	0.752	2	1.503	0.711	2	1,143	1.307	0.808	2	1.370	0.764	2	1.65*	1.17
Male	111	0.540	0.501	1	0.540	0.501	1	1,143	0.533	0.499	1	0.533	0.499	1	0.08	0.08
Married	111	0.511	0.502	1	0.599	0.492	1	1,143	0.462	0.499	1	0.495	0.500	1	0.62	1.29
Age	111	44.014	10.759	47	47.227	10.688	50	1,143	42.090	11.229	47	45.402	11.242	50	1.08	1.03
Unemployed	111	0.001	0.032	0	0.037	0.189	0	1,143	0.081	0.273	0	0.087	0.281	0	-6.78***	-1.96**
Self-employed	111	0.156	0.364	0	0.205	0.406	0	1,143	0.090	0.286	0	0.091	0.288	0	1.02	1.62
Financial literacy	111	2.668	0.523	3	2.794	0.585	3	1,143	2.535	0.769	3	2.555	0.726	3	1.65*	2.91***
University degree	111	0.429	0.497	0	0.438	0.498	1	1,143	0.195	0.396	0	0.230	0.421	0	3.17***	2.78***
Financial risk tolerance	111	1.667	0.663	2	1.551	0.582	2	1,143	1.442	0.584	1	1.407	0.575	1	2.34**	1.76*
Private pension ownership	111	0.792	0.408	1	0.833	0.375	1	1,143	0.622	0.485	1	0.640	0.480	1	2.70***	3.04***
Private pension EUR amount (unconditional of ownership)	111	24,506	46,073	13,900	38,497	38,497	18,000	1,143	16,696	54,445	5,940	17,893	34,725	8,660	1.58	2.62***

Panel B: Private pension saving in Germany

Wave 1 figures - conditional means displayed	**Group A: Heirs** (total N=111)					**Group B: non-Heirs** (total N=1,143)				
		Asset amount in EUR *(conditional on owning asset)*					Asset amount in EUR *(conditional on owning asset)*			
	Ownership %	N	Mean	Std.-Dev.	Median	Ownership %	N	Mean	Std.-Dev.	Median
Private pension products	79.2%	87	30,949	49,858	20,000	62.2%	779	26,845	67,047	17,332
t/o state-subsid. private pension	48.9%	52	9,405	33,661	7,050	37.1%	438	6,810	37,894	3,000
t/o endowment life insurance	56.3%	66	33,803	45,512	30,000	42.2%	593	28,276	41,321	23,000
t/o other private pension	23.9%	28	22,223	16,874	15,750	19.0%	254	22,645	70,984	10,030

Notes: This table reports descriptive statistics of our overall sample of panel households. Households that are retired and households in which the Financially Knowledgeable Person (FKP) has switched during the survey are excluded. Group A includes households who *did* receive a gift/ inheritance >10k EUR during period 2011-2014, Group B includes those who did *not* receive a gift/ inheritance during this period. Note that households, who received a gift/ inheritance in the years *before* wave 1 (2010/2011) are not excluded in this summary statistic yet (thus, the larger number of 'Heirs'). Panel A displays demographics for wave 1 and wave 2 of both groups. T-tests are calculated for the differences in means between Group A and B as displayed in last and second-to-last column. Panel B shows wave 1 (2010/2011) figures and displays conditional means. Taylor-linearized standard errors are used to estimate standard deviations. Data is weighted and representative of the German non-retired population, equal in representation to ~27M households. ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

Table A3

Robustness checks on main results: Panel weights and time fixed effects

	Dependent variable: ΔPrivate pension EUR amount			
	--------- Applying panel weights ---------		---------- Applying Time FE ----------	
	(1)	(2)	(3)	(4)
Gift/inheritance received	10897.8**		15173.9	
	(5132.5)		(9304.6)	
Gift/inheritance EUR value		0.0846***		0.0588**
		(0.0238)		(0.0279)
Household net income	2.552	1.386	1.731	1.503
	(3.463)	(3.338)	(1.756)	(1.677)
Household members	1559.1	2492.2	6322.6	6308.9
	(3331.9)	(2492.9)	(4835.8)	(4852.9)
Self-employed	27832.0	11760.8	26808.8**	21165.2
	(22036.8)	(10327.8)	(12787.0)	(13167.9)
Financial advice received	11226.8	10758.9	14064.5	13572.7
	(12268.1)	(12094.5)	(11810.4)	(11841.9)
Wave 2			96.78	4733.1
			(5280.3)	(3928.7)
Panel weights	YES	YES	NO	NO
Time FE	NO	NO	YES	YES
Household FE	YES	YES	YES	YES
N	236	236	236	236
R^2 (within)	0.151	0.194	0.134	0.124
F-test	2.238	8.288	3.599	4.586
F-test p-value	0.0551	0.0000	0.00261	0.000324

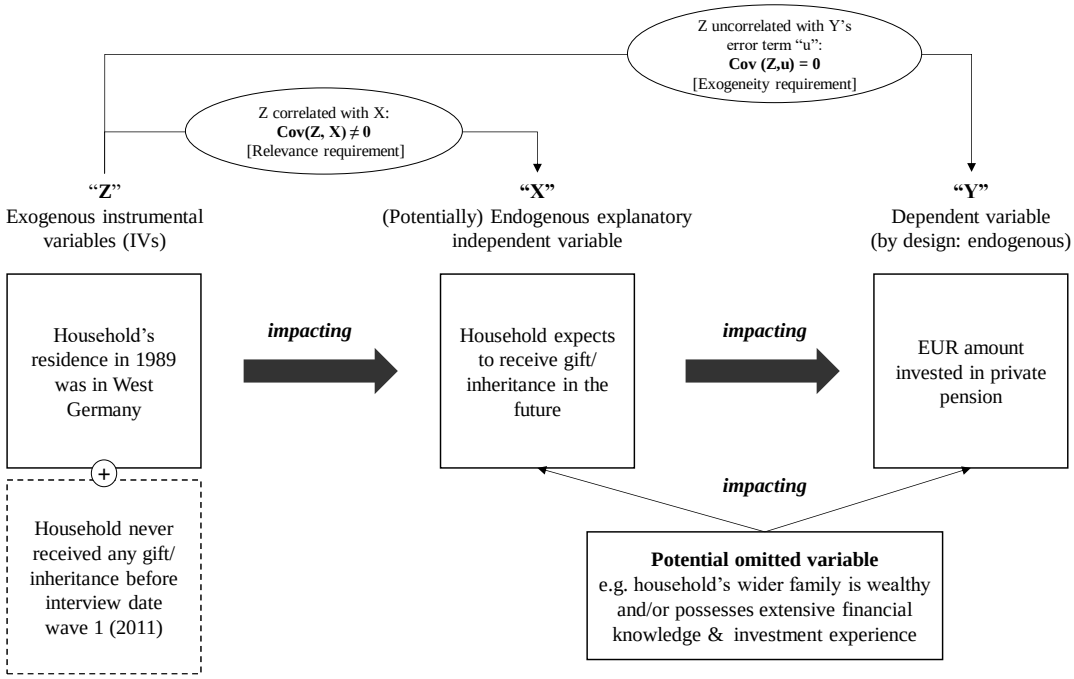
Notes: This table reports coefficient estimates obtained from an OLS regression model applying a 'first difference' approach (Johnson, 2005; Vaisey & Miles, 2014) of the generic form:

$$\Delta Private\ pension\ EUR\ amount_i = \beta_0 + \beta_1\ Gift/inheritance_i + \gamma\ \Delta Controls_i + Fixed\ effects_{i[t]} + \varepsilon$$

Calculation is executed via Stata's *xtreg, fe* command. Outliers for gifts/ inheritances with euro values beyond 3 times the standard deviation are removed. For specification (1) and (2) panel weights ("wlong") are applied. Specification (3) and (4) controls for time fixed effects. Robust standard errors are displayed in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

Figure A1

Potential endogeneity within "gift/ inheritance expected" and instrumentation framework



Notes: Figure shows instrumental variable (IV) strategy for instrumentation of "gift/ inheritance expected", due to potential endogeneity concerns (omitted variable). Underlying general theory on IV adopted from Angrist and Pischke (2008, Chapter 4.1.).