

THE IMPACT OF INHERITANCE ON THE DISTRIBUTION OF WEALTH: EVIDENCE FROM GREAT BRITAIN

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Using the British Household Panel Survey, we investigate the role of inheritance in shaping the distribution of household wealth in Great Britain during 1995–2005a period characterized by a substantial increase in wealth and an equally important decrease in wealth inequality. Abstracting from behavioral effects, we find that inheritances received during this period accounted for 30 percent of the increase in wealth of inheritors. Regression estimates of the effect of inheritance on wealth accumulation suggest that households spend 30 percent of their inheritances on average, and that there is substantial heterogeneity in household responses. Households that accumulated more wealth saved a larger share of their inheritances, as did middle aged households and those with lower initial wealth. Although inheritances are highly unequal they had a small impact on overall wealth inequality. This mainly reflected the fact that their size relative to other sources of wealth was very small.

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1. INTRODUCTION

In the UK, like in many other industrialized countries, the importance of wealth grew substantially over the last three decades, both in absolute terms and relative to national income (the ratio of personal wealth to national income increased from around 3 to 1 in the 1970s to more than 5 to 1 in 2010). The rising importance of wealth have stimulated discussions among policy makers and academic researchers about the extent to which this has led to an increase in inheritance (or whether it will do so in the future if current trends persist). Analysis of HMRC estates data shows that this was indeed the case: between 1984/85 and 2005/06 the annual flow of inheritance increased in real terms from around £24 billion to £56 billion (see Figure A1 in the online appendix). The rising flow of

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inheritance points to the increasing importance of inheritance as a source of wealth accumulation of inheriting households. This raises the further question of whether increasing inheritance as a source of wealth accumulation has in turn resulted in an increase in household wealth *inequality*.¹

This paper uses data from the British Household Panel Survey to examine how inheritance contributed to the wealth accumulation of inheriting households over the period 1995–2005 and how it affected household wealth inequality.² Given the nature of our data and, in particular, the rather incomplete coverage by BHPS of the upper tail of the distribution (top 1 percent) our estimates can best be seen as capturing the role of inheritance for all but the top of the distribution. Although this is a limitation given the potential concentration of inheritance at the upper tail of the distribution, we would still be capturing the impact of inheritance for the vast majority of the population.

As it will be discussed in later sections, there are a number of conceptual problems for accurately measuring the distributional impact of inheritance. Some of these are definitional and arise from the treatment of the appreciation of inheritance while others from the fact that we do not observe who saves or consumes their inheritances. Therefore, similarly to most studies which rely on survey data (e.g. Wolff, 2002; Klevmarken, 2004), our conclusions are subject to the assumption that inheritance has no behavioral effect (either prior to, or after, the inheritance receipt). Despite these limitations, the panel structure of the BHPS allows us to take a closer look at the effect of inheritance on net worth accumulation of inheriting households following inheritance receipt and to examine how the effects vary by age and initial wealth level.

The structure of the paper is as follows. Section 2 begins by describing the BHPS and the criteria we used to select our sample. Section 3 presents a general overview of how the distribution of household wealth changed during 1995–2005. Section 4 explores the contribution of inheritance to the wealth accumulation of inheriting households. Section 5 considers the impact of inheritance on wealth inequality. Section 6 concludes with a summary of the main findings of the paper.

¹Theoretical and empirical studies vary with respect to their conclusions on whether inheritance makes the distribution of wealth more or less equal. Depending on the assumptions used, different studies reach different conclusions. Some suggest that inheritance can be equalizing, reflecting the role of imperfect correlation of spousal backgrounds (Laitner, 1979a and b), the tendency of parents to either distribute their estates equally among children (Stiglitz, 1969) or to leave more to less well-off children (Becker and Tomes, 1979; Tomes 1981). Others however, point to ways by which inheritances can have disequalizing effects (Davies, 1982; Gokhale *et al.*, 2001; De Nardi, 2004). Evidence based on survey data suggests that although inheritances are larger for richer people, inheritance have an equalizing contribution to wealth inequality because inheritance is relatively more important to poorer people i.e. they make up a larger share of their wealth holdings (Wolff, 2002; Klevmarken, 2004; Wolff and Gittleman, 2014; Horioka, 2009).

²Wedgwood (1928,1929), Harbury (1962), and Harbury and Hitchens (1976,1979) using UK estate data found a very strong correlation between the value of the estates left by fathers and the ones left by their sons. While these results indicate a strong intergenerational wealth correlation, they fall short in establishing a direct link between inheritance and wealth inequality firstly because the data used in these studies relate to the estates of the father and not the amount inherited by the sons and secondly because they do not establish any causality in this relationship.

2. DATA

2.1. *Measurement of Wealth and Inheritance*

The data that we use in this paper are taken from the British Household Panel Survey (BHPS), an annual longitudinal household survey of around 10,000 adults in around 5500 households in Great Britain, conducted annually from 1991 until 2008. In waves 5, 10 and 15 (which correspond to years 1995, 2000, and 2005) the BHPS included supplementary wealth modules which collected information on whether the respondents had any wealth holdings falling in three broad asset categories (i.e. savings, investments, and debt) and the value of assets falling in each category. Using information on financial assets and liabilities along with information on housing assets and debt (which were recorded annually) we construct a continuous measure of total household net worth for 1995, 2000, and 2005. Because there is a high rate of non-response in financial asset holding data and to avoid dropping households (and introducing non-random bias) we impute financial wealth holdings for respondents who either do not report the value of their asset holding at all or give a banded answer for their asset holdings. The proportion of households with imputed financial wealth was around 30 percent, but for less than 10 percent of households financial wealth was imputed for all the three net financial wealth components (more details about the wealth measure used in the paper and the imputation of financial wealth are provided in the online Appendix).

From wave 7 onwards, respondents of the BHPS were asked whether they received any inheritance during the last twelve months prior to their survey and to indicate the value of any reported inheritance. In our analysis we concentrate on inheritance data collected between wave 7 and wave 15 which broadly cover inheritance received between 1996 and 2005 (see Karagiannaki, 2011a for discussion about the quality of BHPS inheritance data). The measure of inheritances we use includes all inheritance received by all household members during the period 1996–2005 valued in real 2005 prices using the Retail Prices Index. Because our focus is on the intergenerational effects of inheritances, from this measure we exclude inheritance received by persons who became widows/widowers between waves as an indirect way of excluding inter-spousal inheritance (BHPS does not record the donor of inheritance which could be used to determine inter-spousal inheritance more directly). This measure assumes that all inheritance has been saved and that any return to inherited wealth is counted as part of non-inherited wealth. Results that use a 3 percent rate of return to accumulate past inheritances yielded very similar results but are not reported here (available in Karagiannaki, 2011b).

2.2. *Sample Selection*

In different parts of the paper we apply different restrictions in selecting our sample. In section 3, where we analyze the distribution of household wealth and its changes over time, we select all households with heads aged over 25 with non-missing data on wealth. In sections 4 and 5, where we analyze the impact of inheritances on the distribution of wealth, we further exclude households where *both* the household head and his/her spouse (in the case of married couples) have an incomplete inheritance history. Individuals are characterized as having incomplete

inheritance history if they are not interviewed in 8 out of the 9 waves for which data on inheritance are recorded. Among the 8538 respondents in 2005, 6114 (72 percent) were interviewed in at least 8 out of the 9 waves for which data on inheritance is available and among those 5461 have been interviewed in all 9 waves (note that where new partnerships are formed we will be missing possible inheritances of new sample members that had been received prior to the partnership). In total among the 4697 households with full interviews in 2005, 4474 were headed by people aged 25 or over. Among those 3993 had full inheritance history and 3674 had non-missing wealth data in 2005. This sample is used in the analysis of the impact of inheritance on wealth inequality (section 5). In the analysis of the impact of inheritance on wealth accumulation (section 4) we apply two further restrictions to select our sample. The first, excludes respondents who were living with their parents and who were younger than 25 years old in 1995 (to avoid capturing parental wealth) while the second excludes those with missing wealth in 1995. Under the latter restrictions the sample size reduces to about 2571 households. This represents about 75 per cent of all households headed by people aged over 25 in 1995 and who are observed in both 1995 and 2005.

3. AN OVERVIEW OF CHANGES IN THE DISTRIBUTION OF HOUSEHOLD WEALTH: 1995 TO 2005

Table 1 reports various statistics describing the distribution of total household net worth and its two main components (i.e. net financial and net housing wealth) for 1995, 2000, and 2005 for the sample of households with heads aged 25 or over. According to the statistics in this table the decade covered by BHPS, British households increased their average net worth by some 115 percent (from just under £77,000 in 1995 to over £166,000 in 2005).

Comparing changes across the distribution, one can see that the growth in wealth over this period was larger at the middle and lower end of the distribution, indicating decreasing net worth inequality (see last column of Table 1). The main driver of the increase in net worth during this period was almost exclusively the result of the increase in net housing wealth which in turn was mainly driven by the substantial growth in house prices (Bastagli and Hills, 2013). The other main component of household wealth, namely net financial wealth, fell slightly during the period as a result of the increase in the value of debt at lower tail of the distribution, but the overall impact of this change on net worth was minor.

The changes described above resulted in a substantial decline in net worth inequality (see Table 2). This was reflected in a 10-point decrease in the Gini coefficient (from 0.67 in 1995 to 0.57 in 2005), a decrease in the concentration of wealth at the top of the distribution and a corresponding increase in the share of wealth accumulated by middle wealth households.³ Looking at the two components

³By contrast, the HMRC estate-based series suggests that the Gini coefficient for the distribution of marketable wealth (Series C) between all adults *rose* from 0.65 to 0.70 between 1995 and 2005 and that the share of wealth of the wealthiest 10 percent of *individuals* increased from 50 percent of total marketable wealth in 1995 to 54 percent in 2005 (HMRC, 2011). The difference is partly explained by the lower coverage in BHPS of financial assets as well as the difference in focus on distribution between individuals or between households. There are also, however, uncertainties surrounding the HMRC series, given the limitations of estimates based on estate data.

TABLE 1
SUMMARY STATISTICS OF TOTAL NET WEALTH AND ITS COMPONENTS IN 1995, 2000, AND 2005
(ALL FINANCIAL VALUES AT 2005 £)

	1995	2000	2005	% Change 1995–2005
Total net worth				
P10	-100	-100	0	100.0
P25	2,600	5,600	25,500	880.8
P50	39,600	53,000	118,400	199.0
P75	96,900	121,800	222,300	129.4
P90	192,000	244,400	385,200	100.6
Mean	77,200	94,400	166,400	115.5
% with zero or less	16	16	14	-12.5
Total net housing wealth				
P10	0	0	0	na
P25	0	0	24,000	na
P50	32,200	45,100	108,000	235.4
P75	76,000	101,500	198,000	160.5
P90	122,400	191,700	310,000	153.3
Mean	51,700	76,500	143,600	177.8
% with zero or less	32	26	23	-28.0
Total net financial wealth				
P10	-2,300	-5,100	-7,600	230.4
P25	0	-100	-300	na
P50	2,600	2,300	3,000	15.4
P75	18,100	16,900	20,100	11.0
P90	65,600	53,000	67,100	2.3
Mean	25,500	17,900	22,900	-10.2
% with zero or less	30	34	36	20.0

Source: Own analysis based on BHPS waves 1–15.

Note: The sample in this table includes all BHPS households with heads aged 25 or more in waves 5, 10, and 15 with non-missing wealth data. All wealth figures are expressed in constant 2005 prices (using the RPI).

of net worth, we see that the decrease in net worth inequality over this period was largely driven by a decrease in the dispersion of housing wealth, which in large part can be explained by the substantial growth in house prices benefiting households with relatively low or moderate wealth holdings.

4. THE IMPACT OF INHERITANCE ON WEALTH ACCUMULATION

Table 3 presents various statistics characterizing the 1995 and 2005 net worth distributions and the distribution of inheritances received in the years between 1996 and 2005. Statistics are presented for all households and by whether the household received an inheritance or not. As discussed in section 2 the sample used in the analysis in this table is restricted to households with non-missing wealth data in both 1995 and 2005, for which we have full inheritance data and whose heads were 25 years or older in 1995 (2571 households). Total net worth for this restricted sample during the time under examination increased on average (in real terms) by about £103,000 (or by 121 percent). The average value of their reported inheritance amounted to about £10,000 which is equivalent to 11 percent of 1995 net worth, 5 percent of 2005 net worth and about 10 percent of the average change

TABLE 2
SUMMARY INEQUALITY MEASURES FOR TOTAL NET WORTH AND ITS COMPONENTS

	Gini	% of wealth held by net worth decile group									
		Bottom	2	3	4	5	6	7	8	9	Top
Net worth											
1995	0.67	-0.6	0.0	0.3	1.7	4.5	6.6	9.2	12.5	19.7	46.2
2000	0.64	-0.6	0.0	0.5	2.6	4.9	7.1	9.8	13.1	20.1	42.1
2005	0.57	-0.5	0.1	1.6	4.1	6.1	8.1	10.5	13.4	18.9	37.7
% change	-14.9	16.7	na	433.3	141.2	35.6	22.7	14.1	7.2	-4.1	-18.4
Net housing wealth											
1995	0.64	-0.1	0.0	0.2	1.8	5.3	8.2	11.2	14.7	20.4	35.8
2000	0.63	0.2	0.0	0.6	2.9	5.3	7.4	10.1	13.0	19.8	38.2
2005	0.55	0.1	0.0	1.7	4.6	6.5	8.6	11.1	13.5	18.3	34.4
% change	-14.1	200	na	750	155.6	22.6	4.9	-0.9	-8.2	-10.3	-3.9
Net financial wealth											
1995	0.89	-1.4	0.0	0.5	1.1	2.3	2.8	4.0	6.5	15.7	59.8
2000	0.92	-3.7	-0.1	0.5	1.0	2.9	4.4	7.0	11.5	18.4	51.1
2005	0.97	-4.2	0.4	0.6	0.4	2.9	4.4	5.8	11.4	20.4	52.7
% change	9.0	-200	na	20.0	-63.6	26.1	57.1	45.0	75.4	29.9	-11.9

Source: Own analysis based on BHPS waves 1–15.

Note: The sample in this table includes all households with heads aged 25 years or older in waves 5, 10, and 15 with non-missing wealth data. The % change rows refer to the percentage change in wealth between 1995 and 2005.

in net worth that occurred during this period. This is apparently a rather small share of the overall change in net worth but we have to keep in mind that inheritances were received by just over a quarter of all households (27 percent), and this was a period dominated by the effects of the house price boom on housing assets held at the start (Hills *et al.*, 2013). For inheriting households, total net worth increased on average by around £154,000 and the average value of their inheritance was about £42,000. This is equivalent to around 37 percent of 1995 net worth, 16 percent of 2005 net worth and around 27 percent of the change in their net worth.

The next rows of Table 3 present the same statistics by quintile group of 1995 net worth. To account for age differences in wealth accumulation and inheritance patterns the quintiles in the table are defined for five age groups and then the separate quintiles of each age group are pooled together to obtain a distribution for the entire sample. For each quintile we present statistics for all households as well as by whether households have received an inheritance or not. In line with expectations, the statistics for all households suggest that the probability and the value of inheritance increase with wealth. However, looking at inheriting households only, one can note that mean receipts per inheritor are considerably less skewed across wealth groups than wealth is itself.⁴ Moreover, rather surprisingly the statistics also suggest that inheritances played a greater role in the wealth accumulation of low and high wealth households than that of middle wealth households.

⁴Multivariate models estimating the probability of inheritance receipt and the value of inheritance as a function of 1995 net worth quantile group and age suggest very similar patterns (see Table A1 in the online Appendix).

TABLE 3
THE ASSOCIATION BETWEEN INHERITANCE AND WEALTH CHANGE BETWEEN 1995 AND 2005

	Mean 1995 net worth (£)	Mean 2005 net worth (£)	Average change in net worth	% inheriting	Average inheritance (£)	Inheritance as a share of wealth change (%)
All households	85,100	187,900	102,800	27.0	10,000	9.0
Non inheriting	74,000	157,500	83,600	0.0		
Inheriting	114,700	269,000	154,300	100.0	42,000	27.0
All households						
Bottom fifth	-1,100	48,900	50,000	18.0	6,000	12.0
2 nd	25,400	99,800	74,400	21.0	6,300	9.0
3 rd	54,400	159,600	105,200	29.0	7,400	7.0
4 th	92,400	225,000	132,500	31.0	11,500	9.0
Top	255,400	408,000	152,600	38.0	19,300	13.0
Non inheriting households						
Bottom fifth	-900	33,400	34,300	0.0		
2 nd	24,900	89,600	64,600	0.0		
3 rd	56,100	150,100	94,000	0.0		
4 th	92,700	200,200	107,500	0.0		
Top	235,900	370,300	134,400	0.0		
Inheriting households						
Bottom fifth	-2,000	119,100	121,000	100.0	36,000	30.0
2 nd	27,200	137,900	110,800	100.0	34,200	31.0
3 rd	50,500	183,600	133,200	100.0	28,300	21.0
4 th	91,800	280,900	188,900	100.0	45,000	24.0
Top	287,400	469,800	182,500	100.0	58,700	32.0

Source: Own analysis based on BHPS waves 1–15.

Notes: The sample includes all BHPS wave 15 households with non-missing wealth data in both 1995 and 2005 with full inheritance data and whose heads were older than 25 years old in 1995. Quintile groups are defined from the distribution of all households in our sample (inheriting and non-inheriting). All wealth figures are expressed in constant 2005 prices (using the RPI).

However, the crucial assumption behind the estimates concerning the contribution of inheritance to net worth accumulation is that all households saved the total amount of their reported inheritances. In the rest of this section, we explore the validity of this assumption, estimating regression models which examine the effect of inheritance on the wealth accumulation of recipient households and investigating whether these effects vary for different types of households. It should be stressed, that our focus is on how inheritance received between 1995 and 2005 affected the net worth accumulation of inheriting households and not on the extent to which inheritance affect wealth levels at any point in time (which would require full inheritance history data). In addition, our analysis ignores the impact of anticipated inheritance on households' saving behavior prior the receipt of inheritance. To examine the effect of inheritance on saving behavior we specify the following model:

$$(1) \quad \Delta W_i = a_i + \beta I_i + \gamma X_i + \varepsilon_i$$

In this equation i indexes households, ΔW is the change in net worth between 1995 and 2005, I is the total amount of inheritance received during this period and X_i is a vector of additional controls for age, education and changes in the marital status of the household head, homeownership status in 1995, a variable indicating whether the household had any investment assets in 1995, household income in both 1995 and 2005, and 1995 net worth quintile. The estimate on inheritance from this model could be either less than one if an inheritance is not completely saved, or greater than one if inheritance is correlated with factors that lead to faster wealth accumulation (Gittleman and Wolff, 2004).

The OLS estimate on inheritance from this model (column 1 in Table 4) is 0.67 suggesting that wealth increases on average by £0.67 for every pound of inheritance received, or to put it differently, households consumed (or transferred) 33 percent of their reported inheritance between receipt and 2005. From this one could conclude that the contribution of inheritance to the 1995–2005 net worth accumulation of inheriting households would have been 33 percent lower than under the assumption that households saved the total amount of their inheritance. It should be stressed here, that because the timing of inheritance receipt differs across households in our sample (i.e. this can be any year between 1995 and 2005) the estimate of this model does not represent households' average propensity to consume out of inherited wealth over a whole ten year period. An estimate of this, however, can be obtained assuming that all households received their inheritances at the mid-point of the nine-year period that inheritance data were collected and dividing the estimate from the model by 4.5. This back-of-the-envelope calculation imply an average propensity to consume out of inherited wealth of around 7.3 percent per annum, which in turn mean that households spend, on average, around 73 percent of their inheritances over a ten year period.⁵ The crucial assumption behind this conclusion however, is that households do not adjust their saving behavior in anticipation of receiving an inheritance. If inheritances are not fully

⁵For the USA, Joulfaian (2006) gives estimates of the impact of bequests received in 1989 on 1988–1991 wealth accumulation in the range of 0.60 to 0.79 which implies an annual marginal propensity to consume of 6–13 percent.

TABLE 4
OLS AND QUANTILE REGRESSIONS OF THE CHANGE IN HOUSEHOLD NET WORTH ON INHERITANCE
(INHERITING HOUSEHOLDS)

	OLS	Quantile Regressions			Quantile regressions with interactions	
		Q(0.25)	Q(0.50)	Q(0.75)	Q(0.50)	Q(0.50)
<i>Age in 1995 ref. 25–34</i>						
35–44	9,560 (0.44)	32,274* (1.69)	3,190 (0.24)	–1,727 (–0.07)	3,705 (0.25)	4,363 (0.26)
45–54	35,458 (1.42)	59,313*** (2.71)	16,898 (1.11)	19,820 (0.75)	18,922 (1.10)	19,243 (0.99)
55–64	12,326 (0.39)	17,555 (0.64)	–7,354 (–0.39)	7,139 (0.21)	–454.91 (–0.02)	2,179 (0.09)
65+	1,398 (0.04)	42,137 (1.35)	–14,011 (–0.65)	–18,430 (–0.49)	–10,554 (–0.43)	4,292 (0.16)
<i>1995 Net worth ref. bottom quintile</i>						
2 nd Quintile	20,802 (0.77)	34,241 (1.44)	10,103 (0.61)	12,064 (0.42)	6,898 (0.35)	5,714 (0.30)
3 rd Quintile	11,909 (0.41)	9,758 (0.39)	12,115 (0.69)	14,207 (0.46)	8,976 (0.42)	7,130 (0.35)
4 th Quintile	41,675 (1.34)	19,650 (0.72)	24,080 (1.27)	41,876 (1.27)	30,335 (1.35)	19,294 (0.89)
5 th Quintile	–9,183 (–0.27)	–59,536** (–2.00)	14,494 (0.70)	59,653* (1.65)	23,648 (0.96)	13,990 (0.59)
Inheritance	0.67*** (7.43)	0.50*** (6.29)	0.62*** (11.16)	0.85*** (8.82)	0.78*** (4.00)	0.72*** (5.67)
<i>Inheritance* 1995 wealth quintile</i>						
Inheritance*Q2					–0.11 (–0.44)	
Inheritance*Q3					–0.12 (–0.44)	
Inheritance*Q4					–0.28 (–1.26)	
Inheritance*Q5					–0.32 (–1.42)	
<i>Inheritance* Age</i>						
Inheritance*35–44						–0.05 (–0.33)
Inheritance*45–54						–0.05 (–0.25)
Inheritance*55–64						–0.09 (–0.43)
Inheritance*65+						–0.45* (–1.70)
Constant	–27,945 (–0.77)	–79,048** (–2.49)	–24,891 (–1.13)	–5,370 (–0.14)	–23,396 (–0.93)	–29,248 (–1.15)
Observations	578	578	578	578	578	578
R-squared	0.229	0.17	0.20	0.23	0.20	0.20

Source: Own analysis based on BHPS waves 1–15.

Notes: The sample includes all BHPS households interviewed in wave 15 with non-missing wealth data in both 1995 and 2005, full inheritance data and whose heads were older than 25 years old in 1995. Quintile groups are defined from the distribution of all households in our sample (inheriting and non-inheriting). Additional variables included in all models are (1) four dummies indicating the change in marital status, (2) a dummy indicating homeownership status in 1995, (3) a dummy indicating whether the household had any investment assets in 1995, (4) household income in 1995 and 2005, and (5) a set of dummy variables indicating the educational level of the household head. ***, **, * indicate significance at 1, 5, and 10 percent levels.

unanticipated and/or if households do not fully adjust their saving behavior in anticipation of receiving an inheritance, the coefficient in equation (1) would give a biased estimate of the “true” marginal propensity to consume out of inherited wealth. Without further information about the effect of anticipated receipts on savings it is difficult to determine the extent of the bias. The empirical literature has so far produced mixed results on the effect of anticipated inheritances on household behavior, with some studies suggesting some significant effects (Weil, 1994; Brown *et al.*, 2010) and others no effects (Holtz-Eakin *et al.*, 1993).

To provide a more complete picture of the effects of inheritance across the distribution, we next estimate the model specified in equation (1) using quantile regression techniques. In addition to offering estimates of the effects across the distribution, quantile regression estimates are (fairly) robust to the presence of outliers and therefore are useful when handling highly skewed distributions such as the wealth change distribution. As shown in columns (2)–(4) of Table 4, which report quantile regression estimates for the twenty-fifth, fiftieth, and seventy-fifth quantiles, the effect of inheritance increases considerably across the (wealth change) distribution. It is around 0.50 at the twenty-fifth percentile, 0.62 at the median and 0.85 at the seventy-fifth percentile. This result suggests that households with higher wealth accumulation saved a larger proportion of their reported inheritances, which could either reflect differences in the propensity to save or in the return of inherited wealth. In columns (5) and (6) of Table 4 we report estimates from two variants of the model specified in equation (1). The first interacts the value of inheritance with the 1995 net worth quintile to examine whether the effect of inheritance varies by initial wealth level while the second interacts the value of inheritance with age dummies to account for possible age effects in this relationship. Coefficients are estimated using median regressions to mitigate the impact of outliers. Though the estimated coefficients on most interaction terms are not precisely estimated, the results suggest that the contribution of inheritance to the median change in wealth *decreases* with both age and initial wealth level.

5. THE IMPACT OF INHERITANCE ON WEALTH INEQUALITY

In this section we assess the contribution of inheritance to wealth inequality. In order to assess the contribution of inheritance to wealth inequality, one needs to simultaneously consider its size relative to other wealth components, its distribution and its correlation with pre-inherited wealth. In this paper, the proxy for pre-inherited wealth that we use is the 2005 net worth distribution deducting the value of inheritances received between 1996 and 2005.⁶ The main advantage of this measure is that it is exogenous for inherited wealth (in the sense that it excludes inheritances). On the other hand, its main disadvantage is that its validity depends on the assumption that all inheritances have been saved and that the returns to inherited wealth are equal across households. As suggested by the results in the previous section, these are rather restrictive assumptions. In addition, this

⁶In Karagiannaki (2011b) we used 1995 net worth as an alternative proxy for pre-inherited wealth. Results based on this measure are qualitatively similar to those reported in this paper.

approach assumes away any effect that anticipated inheritance may have on saving behavior prior the inheritance receipt.

With this caveat in mind in Table 5 we present the distribution of inheritance by quintile group of the 2005 net worth distribution which deducts the sum of inheritances received during 1996–2005. Similarly to the patterns in the previous section, the statistics in this table show that while there is a very strong wealth gradient in the probability of receiving an inheritance the average value of inheritance among inheritors is much less skewed between the wealth groups than wealth is itself. This reflects both a genuine contribution of inheritance to household wealth accumulation for households with low pre-inherited wealth but also, to some extent, it is an artefact of the zero behavioral response assumption. As a result of these patterns, the distribution of inheritance is also much less skewed across the wealth groups than the wealth distribution is itself (as can be seen comparing the second and last column of Table 5). From this standpoint, therefore inheritance can be considered as having an equalizing effect on the distribution of wealth.

The overall impact of inheritance on net worth inequality can be evaluated comparing the 2005 net worth distribution with the 2005 distribution excluding inheritances (Table 6). As will become clearer below, because the two distributions have different means, this evaluation depends on whether the concern is relative or absolute. Under a relative notion, inequality of a distribution remains unaffected when wealth increase (or decrease) by the same proportion (scale of invariance axiom). Under an absolute notion, on the other hand, the concern centers on the absolute value differentials and thus is invariant to equal absolute changes in their arguments (translation invariance axiom). As shown in column 3 of Table 6, the *proportionate* increase in wealth resulting from inheritance is above the population average for the lower two quintile groups and below it for the higher three quintile groups. Correspondingly, a comparison of the quintile shares in columns 1 and 2, shows that the wealth shares in bottom two quintiles are larger in the measure of wealth that includes inheritances than the one that excludes them, suggesting that

TABLE 5
THE DISTRIBUTION OF INHERITANCE BY QUINTILE OF HOUSEHOLD NET WORTH EXCLUDING INHERITANCE

	Mean wealth	Wealth shares	Inheritors (%)	Mean IW for IW > 0 (£)	IW shares (%)
All					
Bottom	-6,000	-0.8	13.7	51,000	15.3
Second	43,500	5.6	19.9	34,500	15.0
Third	111,000	14.4	25.4	28,500	15.7
Fourth	187,500	24.3	24.8	26,500	14.3
Top	438,000	56.6	35.0	47,000	35.9
All	154,500	100.0	26.6	36,000	100.0

Source: Own analysis based on BHPS waves 1–15.

Note: The sample in this table includes all BHPS households interviewed in wave 15 with heads aged 25 or older in 2005 that had had full inheritance history. The statistics for all households include households with missing information on wealth and those not reporting the value of their inheritance. The wealth quintiles for each age group are defined based on the age specific wealth distribution. All wealth figures are expressed in constant 2005 prices (using the RPI).

TABLE 6
RELATIVE AND ABSOLUTE INCREASE IN WEALTH RESULTING FROM INHERITANCE AND WEALTH SHARES
BY QUINTILES OF 2005 NET WORTH VERSUS 2005 NET WORTH EXCLUDING INHERITANCE

	Wealth shares		Proportionate increase in wealth including inheritance	Absolute increase in wealth including inheritance
	2005 net worth excluding inheritance	2005 net worth		
All				
Bottom	-0.8	-0.4	0.50	3,000
Second	5.6	5.8	0.09	4,000
Third	14.4	14.3	0.05	6,000
Fourth	24.3	24.1	0.05	9,500
Top	56.6	56.2	0.05	22,000
All	100.0	100.0	0.06	9,000

Source: Own analysis based on BHPS waves 1–15.

Note: The sample in this table includes all BHPS households interviewed in wave 15 with heads aged 25 or older in 2005 that had had full inheritance history. The statistics for all households include households with missing information on wealth and those not reporting the value of their inheritance. All wealth figures are expressed in constant 2005 prices (using the RPI).

TABLE 7
THE CONTRIBUTION OF INHERITANCES TO HOUSEHOLD NET WORTH INEQUALITY BASED ON THE
DECOMPOSITION OF COEFFICIENT OF VARIATION

	Factor share (χ_f) %	Factor correlation NW (ρ_f)	CV	Proportionate contribution (sf) %
All				
Non-inherited wealth	94.60	0.98	1.26	94.59
Inherited wealth	5.40	0.25	4.86	5.41
Net wealth	100.00	1.00	1.24	100.00

Source: Own analysis based on BHPS waves 1–15.

Note: The sample in the table includes all BHPS households interviewed in wave 15, with heads aged 25 or older in 2005 that had full inheritance history. Households who do not report a value for the inheritance are dropped from the analysis.

under a relative notion of inequality inheritance *reduces* the degree of inequality in net worth. On the other hand, however, as shown in column 4, the absolute increase in wealth resulting from inheritance is below the population average for the bottom two quintiles and above it for the upper two groups, suggesting that inheritance increases the absolute gaps in the wealth distribution.

In Table 7 we quantify the contribution of inheritance to wealth inequality using two methods. The first decomposes inequality in net worth using the Shorrocks' decomposition rule (Shorrocks, 1982), as formulated by Jenkins (1995) for the coefficient of variation. According to this decomposition, the proportional contribution of each component (in our case inheritances and net worth excluding inheritances) to total net worth inequality (s_f) can be written as the product of the correlation of each component with total net worth (ρ_f), the share of each component in total net worth (χ_f) times the ratio of the inequality of each component (I_f) to total net worth inequality (I): $s_f = \rho_f \chi_f \frac{I_f}{I}$. Components with a positive value for s_f make a disequalizing contribution to inequality while those with

negative values make an equalizing contribution. A second way to assess the contribution of inheritance on net worth inequality is to compare the inequality in the distribution of wealth excluding inheritances with the inequality in wealth including inheritances. If inheritance has a disequalizing effect on the distribution of net worth, then one would expect that the degree of inequality in the measure of wealth which excludes inheritances would be lower than in the measure of wealth that includes them.

As shown in Table 7 the two methods produce quite different results. As shown in the fourth column of Table 7, according to the Shorrocks decomposition, the proportional contribution of inheritance to net worth inequality as measured by the coefficient of variation is positive, suggesting that inheritances make a disequalizing contribution to total net worth inequality. The reason is that inheritance increases the absolute wealth gaps, which implies a positive correlation with wealth. By contrast, the comparison of the coefficient of variation of the two wealth measures that include and exclude inheritances—third column of Table 7—suggests that the addition of inheritances makes the distribution of wealth more equal. Since the coefficient of variation is one of the many measures of relative inequality, this result reflects that inheritances are relatively more important for less wealthy households than richer ones (i.e. their value is a higher percent of wealth at lower wealth levels). However, because the size of inheritance is small relative to other sources of wealth, both effects are rather small. The patterns described above hold within different age groups, which suggests that the results are not driven by age-related differences in wealth accumulation and inheritance patterns (see Tables A2, A3, and A4 in the online Appendix).

6. CONCLUSIONS

Analysis of the distribution of wealth in Great Britain shows that during the period 1995–2005 there was a striking increase in household net worth and an equally important decrease in the level of net worth inequality. House price growth and the resulting increase in housing equity of middle wealth-holders had a critical effect on both these trends.

Over the same period the average value of inheritance received by British households amounted to about £10,000. This is equivalent to about 10 percent of the average change in net worth over the period. Among households that received an inheritance (27 percent of all households) the average value of reported inheritance was about £42,000, which is around 27 percent of the average change in their net worth. Based on this result one could conclude that inheritance received during this period accounted for around a third of the overall wealth accumulation of inheriting households. This conclusion, however, is based on the assumption that all inheritances were saved and that when saved they grew at an interest rate equal to the inflation rate so that they remain constant in real terms. The caveat with this assumption, however, is that there may be quite heterogeneous behavior with respect to what households do with their inheritance and the rates of return on invested inherited wealth. Regression estimates of the impact of inheritance on 1995–2005 net worth accumulation suggest that, on average, inheriting households spend around 30 percent of their inheritance between receipt and 2005. This

implies that the contribution of inheritance to their 1995–2005 net worth accumulation would have been 30 percent lower than under the assumption that all inheritances are saved. Further examination of this effect using quantile regressions showed that this average effect masks important differences in household behavior across the (wealth change) distribution as well as across different age and wealth groups.

In line with expectations, we find that inheritances are highly unequal and greater for those with higher non-inherited wealth, widening absolute gaps in the wealth distribution. From this standpoint inheritance can be assigned as a factor that increases differences between the wealthy and others. However, because inheritance as a proportion of pre-inherited wealth is larger for less wealthy households than richer ones, their effect on net worth inequality was mildly equalizing. The size of either effect, however, was small.

The finding that inheritances are relatively more important to less wealthy households than richer ones and therefore can decrease net worth inequality is common among all studies which use survey data to examine the effect of inheritance on wealth inequality (see for example Wolff, 2002 and Wolff and Gittleman, 2014 for evidence for the USA; Horioka, 2009 for Japan; and Klevmarken, 2004 for Sweden). This finding, however, rests on the rather strong assumption that inheritances do not affect households' saving behavior either before or after the receipt of inheritances. Our evidence on the impact of inheritance on wealth accumulation points to the importance of such effects and indicates a significant heterogeneity in household responses. Future empirical research needs to examine in more detail the effects of inheritance on household savings behavior considering whether households change their wealth accumulation patterns in anticipation of receiving inheritances. Availability of data with more information about households' inheritance expectations and with better coverage of the upper tail of the distribution would help to better understand the distributional impacts of inheritance including the share of wealth that originates from inheritance. Developing dynamic lifecycle models to incorporate behavioral effects of both the anticipation and the receipt of inheritances on savings behavior are also crucial for understanding the distributional impacts of inheritance and their impact on wealth inequality.

REFERENCES

- Bastagli, F. and J. Hills, "Wealth Accumulation, Ageing and House Prices," in J. Hills, F. Bastagli, F. Cowell, H. Glennerster, E. Karagiannaki, and A. McKnight (eds), *Wealth in the UK: Distribution, Accumulation and Policy*, 63–91, Oxford University Press, Oxford, 2013.
- Brown, J. R., C. C. Coile, and S. J. Weisbenner, "The Effect of Inheritance receipt on Retirement," *Review of Economics and Statistics*, 92, 425–34, 2010.
- Becker, G. S. and N. Tomes, "An Equilibrium Theory of the Distribution of Income and Intergenerational Mobility," *Journal of Political Economy*, 87, 1153–89, 1979.
- Davies, J. B., "The relative impact of inheritances and other factors on Economic Inequality," *Quarterly Journal of Economics*, 97, 471–98, 1982.
- De Nardi, M., "Wealth Inequality and Intergenerational Links," *Review of Economic Studies*, 71, 743–68, 2004.
- Gittleman, M. and E. N. Wolff, "Racial Differences in Patterns of Wealth Accumulation," *Journal of Human Resources*, 39, 193–227, 2004.
- Gokhale, J., L. Kotlikoff, J. Sefton, and M. Weale, "Simulating the Transmission of Wealth Inequality via Bequests," *Journal of Public Economics*, 79, 93–128, 2001.

- Harbury, C. D., "Inheritance and the Distribution of Wealth in Britain," *Economic Journal*, 72, 845–68, 1962.
- Harbury, C. D. and D. M. W. N. Hitchens, "The Inheritance of top Wealth Leavers: Some further evidence," *Economic Journal*, 86, 321–6, 1976.
- , *Inheritance and Wealth Inequality in Britain*, George Allen and Unwin, London, 1979.
- Hills, J., F. Bastagli, F. Cowell, H. Glennerster, E. Karagiannaki, and A. McKnight, *Wealth in the UK: Distribution, Accumulation and Policy*, Oxford University Press, Oxford, 2013.
- HMRC, Distribution among the adult population of marketable wealth (Series C) (Table 13.5), accessed at http://www.hmrc.gov.uk/stats/personal_wealth/13-5-table-2005.pdf, 2011.
- Holtz-Eakin, D., D. Joulfaian, and H. S. Rosen, "The Carnegie Conjecture: Some Empirical Evidence," *Quarterly Journal of Economics*, 108, 413–35, 1993.
- Horioka, C. Y., "Do Bequests Increase or Decrease Wealth Inequalities?," *Economic Letters*, 103, 23, 2009.
- Jenkins, S. P., "Accounting for Inequality Trends: Decomposition Analyses for the UK, 1971–86," *Economica*, 62, 29–63, 1995.
- Joulfaian, D., "Inheritance and Saving," NBER Working Paper 12569, National Bureau of Economic Research, Cambridge Massachusetts, 2006.
- Karagiannaki, E., "Recent Trends in the Size and the Distribution of Inherited Wealth in the UK," Casepaper 146, London School of Economics, London, 2011a.
- , "The impact of Inheritance on the Distribution of Wealth: Evidence from Great Britain," Casepaper 148, London School of Economics, London, 2011b.
- Klevmarcken, A. N., "On the Wealth Dynamics of Swedish Families, 1984–98," *Review of Income and Wealth*, 50, 469–91, 2004.
- Laitner, J., "Household Bequests, Perfect Expectations, and the National Distribution of Wealth," *Econometrica*, 47, 1175–93, 1979a.
- , "Household Bequest Behaviour and the National Distribution of Wealth," *Review of Economic Studies*, 46, 467–83, 1979b.
- Shorrocks, A. F., "Inequality Decomposition by Factor Components," *Econometrica*, 50, 193–211, 1982.
- Stiglitz, J., "Distribution of Wealth among individuals," *Econometrica*, 37, 38297, 1969.
- Tomes, N., "The family, Inheritance, and the Intergenerational Transmission of Inequality," *Journal of Political Economy*, 89, 928–58, 1981.
- Wedgwood, J., "The influence of inheritance on the distribution of wealth," *Economic Journal*, 38, 38–55, 1928.
- , *The Economics of Inheritance*, George Routledge & Sons, London, 1929.
- Weil, D. N., "The Saving of the Elderly in Micro and Macro Data," *Quarterly Journal of Economics*, 109, 55–81, 1994.
- Wolff, E. N., "Bequests, Savings and Wealth Inequality," *American Economic Association Paper and Proceedings*, 92, 260–4, 2002.
- Wolff, E. N. and M. Gittleman, "Inheritances and the Distribution of Wealth or Whatever Happened to the Great Inheritance Boom?," *Journal of Economic Inequality*, 12, 439–68, 2014.

SUPPORTING INFORMATION

Additional Supporting Information may be found in the online version of this article at the publisher's web-site:

Appendix: Details about the definition of net worth and the imputation of financial wealth in BHPS

Figure A1: Trends in the value of estates passing on death 1984/85–2005/06 (£billion, 2005 prices)

Table A1: Models of inheritance receipt: The association between inheritance and 1995 net worth

Table A2: The distribution of inheritance by quintile of household net worth excluding inheritance, for all households and by age group

Table A3: Relative and absolute increase in wealth resulting from inheritance and wealth shares by quintiles of 2005 net worth versus 2005 net worth excluding inheritance, for all households and by age group

Table A4: The contribution of inheritances to household net worth inequality based on the decomposition of coefficient of variation, for all households and by age group