The impact of inheritance on the distribution of wealth: Evidence from the UK

Eleni Karagiannaki

Contents

CASE/148
June 2011

Centre for Analysis of Social Exclusion
London School of Economics
Houghton Street
London WC2A 2AE
CASE enquiries – tel: 020 7955 6679

Centre for Analysis of Social Exclusion

The Centre for the Analysis of Social Exclusion (CASE) is a multi-disciplinary research centre based at the London School of Economics and Political Science (LSE), within the Suntory and Toyota International Centres for Economics and Related Disciplines (STICERD). Our focus is on exploration of different dimensions of social disadvantage, particularly from longitudinal and neighbourhood perspectives, and examination of the impact of public policy.

In addition to our discussion paper series (CASEpapers), we produce occasional summaries of our research in CASEbriefs, and reports from various conferences and activities in CASEreports. All these publications are available to download free from our website. Limited printed copies are available on request.

For further information on the work of the Centre, please contact the Centre Manager, Jane Dickson, on:

Telephone:	UK+20 7955 6679
Fax:	UK+20 7955 6951
Email:	j.dickson@lse.ac.uk
Web site:	http://sticerd.lse.ac.uk/case

Editorial Note and Acknowledgements

Eleni Karagiannaki is a Research Officer at the Centre for Analysis of Social Exclusion, London School of Economics (email e.karagiannaki@lse.ac.uk). Data were made available by the UK Data Archive. Financial support from the Nuffield Foundation is gratefully acknowledged. The author is also grateful to Tom Sefton for the calculation of housing wealth data in the British Household Panel Survey. Also the author would like to thank John Hills, Frank Cowell, Howard Glennerster, Abigail McKnight, Tom Sefton, Tania Burchardt, Francesca Bastagli as well as members of our Advisory Committee (including Athena Bakalexi, James Banks, Chris Curry, Joanna Littlechild, Karen Rowlingson, Holly Sutherland and Steve Wilcox) for useful comments and suggestions. All errors and ambiguities are the author's responsibility.

Abstract

In this paper we examine how the distribution of wealth has been changing in UK over the period 1995 to 2005 and how the sum of inheritance received between 1996-2004 contributed to the observed trends in wealth accumulation and wealth inequality. Using data from the British Household Panel Survey we find that the period 1995-2005 was a period of substantial growth in net worth and of a substantial decrease in wealth inequality recorded in the survey. The main driver behind both trends was the rise in house prices and the resulting increase in the housing equity of middle wealth-holders. Inheritances received between 1996 and 2004 contributed about 10 to 15 per cent (depending on the capitalisation assumption) of the average household wealth accumulation that occurred during 1995-2005 and somewhere between 26 and 30 per cent of the wealth accumulation of inheriting households (and possibly more if we could account for the rate of returns on early inheritance used by some to finance house purchase). Inheritances were highly unequal and had a positive (but rather small) correlation with pre-inherited wealth. This meant that inherited wealth accounted for part of the observed inequality of net worth in 2005. However, some significant inheritors started with low initial wealth (and this was true within each age group). Inheritance in the period therefore weakened the relationship between non-inherited wealth and the final total. The net effect was therefore that inheritances in the previous decade had a mild equalizing impact on 2005 net worth inequality. However given the small magnitude of these effects and the uncertainty about the behavioural responses to inheritances, inheritance can probably best be seen as maintaining wealth inequalities rather than either narrowing or widening them.

Keywords: Inheritance, wealth, intergenerational transfers, inequality
JEL numbers: D10, D31

1. Introduction

Levels of inequality in income and wealth are topics which have attracted considerable interest from both economists and policymakers. Although bequests and other intergenerational transfers have been suggested as a major source of inequality, the impact of inheritance on wealth accumulation and wealth inequality is a largely unresolved issue.

In an accompanying paper (Karagiannaki, 2011, sections 2 and 3) I discuss the previous literature on the contribution of inheritance to wealth levels and inequalities, surveying the conflicting evidence on both its scale and on whether it has an equalising or disequalising effect.[1] Using data from the Attitudes to Inheritance survey I estimate that inheritance accounts for between 16 and 28 per cent of total wealth in UK (depending on assumptions made about how its value has changed since it was received). I also found that patterns of inheritance were uneven, and receipts were associated with other forms of economic advantage. However, although both the probability and the value of inheritance are positively correlated with other forms of economic advantage, there was substantial variation in the value of inherited wealth across people with similar common characteristics (e.g. income, financial wealth, education), stressing the need for further analysis of the potential impact on wealth inequality.

The aim of this paper is therefore to examine how the distribution of wealth has been changing in UK during the ten year period from 1995 to 2005 and to account for the role played by inheritances on the observed trends in wealth accumulation and wealth inequality. Our analysis draws on data from the British Household Panel Survey (BHPS). Although BHPS is far from being ideal in studying the distributional impact of inheritances, the survey provides a valuable starting point for estimating the impact of inheritances on wealth inequality and more generally for addressing questions concerning intergenerational links in the transmission of inequality. The remainder of the paper is structured as follows. Section 2 begins by describing the BHPS, the methodology we used to impute wealth and the criteria we used to select our sample. In section 3 we present a general descriptive overview of the changing wealth levels and inequality in the UK over the period 1995 and 2005 while in sections 4 and 5 we present results concerning the impact of inheritance on wealth accumulation and inequality respectively. Section 6 concludes with a summary of the main findings of the paper.

[1] For an excellent review of the literature see Davies and Shorrocks (2000) and for two more recent studies of the impact of inheritance on wealth inequality see Gokhale et al. (2001) and De Nardi (2004).

2. Data

The data that I use in this paper are taken from the British Household Panel Survey (BHPS), which is an annual longitudinal survey of private households in Great Britain (England, Wales, and Scotland south of the Caledonian Canal) conducted annually since 1991. The initial sample in the survey was designed as a nationally representative sample of the adult population (aged 16 years and older) and included about 5,500 households (containing a total of about 10,000 adults). The first wave of the survey was conducted between September 1991 and April 1992.[2] The same individuals are re-interviewed in successive waves and if they split off from their original households they are also re-interviewed along with all adult members of their newly formed households. At the time of this research BHPS contained data from 16 waves with rich information on household structure and on a wide range of socio-economic characteristics.

In each wave BHPS contains sufficient information to allow us to estimate the value of housing wealth and other property and land owned by households, net of any outstanding mortgages or loans on these assets. The estimated value of housing wealth can be based either on self-reported values of the house as reported by respondents or on the value of house based on the original purchase price of the house uprated with for general movements in house prices since the purchase date using the CLG (Community and Local Government) regional price index. As with the house value, the value of outstanding mortgages can either be based on self-reported data on the total amount of outstanding loans on all property (from wave 3 onwards) or can be estimated using data on the size of the original mortgage and any additional mortgages (from wave 1, but only mortgages taken out against the main residence). Although we experimented with alternative methods to estimate housing equity, the estimates presented in this paper are based on the estimated current value of the house (as self-reported by individuals) net of the self-reported value of all outstanding loans on all property, as they appeared most reliable.

Unlike housing wealth data which are recorded annually, data on financial holdings are recorded by BHPS only in *three* waves – 1995, 2000 and 2005. In each of these waves individuals were asked whether they held assets falling in any of the three broad asset categories i.e. savings, investments and debt. Savings are defined as interest-bearing deposit accounts, investments include shares, unit trusts and Personal Equity Plans, while debt includes a wide range of products including loans, overdrafts and amounts outstanding on mail orders. Information for each type of broad asset is recorded on whether different types of assets are held and also on the total amount of savings, investments and debt. Financial wealth questions are asked at individual level and then each individual is asked if any savings or investments are held jointly with someone else (and in 2005 the household member with whom the investments are

[2] In addition to initial sample members the survey also includes new people who join panel households (i.e. babies, partners, lodgers). The initial selection of sample was based using a two-stage stratified clustered design (for details about the survey, see Taylor 2010).

held jointly). For both 2000 and 2005 respondents reporting sole and joint wealth holdings are asked to specify the amount of sole wealth holdings (and in 2005 the person with whom they hold their wealth jointly). Respondents who indicate that they have assets in any of the broad asset categories are asked for the exact amount of their wealth holding in each category. Respondents who either do not know or refuse to give an answer, are then routed to a series of questions that attempt to put bounds on their asset holdings. In our imputation we follow Banks et al.'s (2002) methodology and we impute missing or banded values in wealth holdings using a conditional hot deck imputation method at benefit unit level.[3] The main reason for defining wealth at benefit unit level is that wealth that is held by individuals may be owned jointly with other family members but also because the assumptions required for imputing wealth are best performed within the benefit unit level. This is especially so in the case of the benefit units which give incompatible answers about their joint wealth holdings. For each benefit unit with missing wealth value we impute their asset holdings (for each asset category separately) by assigning a random value from all observations with matching characteristics (defined in terms of age and employment status of the head of the benefit unit, and whether the head or his/her spouse have completed any higher education) and for benefit units with banded information with wealth in same wealth range. Similarly to Banks et al. (2002) when two adults in a benefit unit give incompatible answers in their joint wealth holdings we calculate the maximum and minimum value of wealth that reflects the answers of both respondents and then impute a value using the standard imputation procedure for households that give a banded value for the wealth. This imputation procedure is used to impute values separately for each financial wealth component (savings, investments, debt). Based on these imputed wealth data we construct measure of household financial wealth by summing up the financial wealth holding of all families in the household.

Every year since 1997 BHPS has collected data on inheritances as part of more general questions about windfall gains. Respondents are asked to indicate whether during the previous year they received any inheritance and to indicate the value of any reported inheritance. In our analysis we concentrate on inheritance data collected between wave 7 and wave 15 (nine waves) which broadly cover inheritance received between 1996 and 2004.[4] Therefore, depending on the number of interviews that each respondent has given, each respondent could have a maximum of 9 years of inheritance data. Among the 8,538 of 2005 respondents, 6,114 (72%) have been interviewed in at least 8 out of the 9 waves (among those 5,461 have been interviewed in all 9 waves). Respondents with less than 8 years of inheritance data are defined as having incomplete inheritance history.

---

3 Benefit unit is defined as a single adult or a married or cohabiting couple and any dependent children.

4 The BHPS interviews take place mainly in Autumn (with the majority of interviews taking place in September and October), so strictly speaking inheritance received in 1997 for instance relate to a period generally including the last quarter of 1996 and the first three quarters of 1997. For simplicity, we refer here to them as being for the year when the reporting period started.

In selecting the sample that we use to analyse inheritances we exclude households where *both* the household head and his/her spouse (in the case of married couples) have an incomplete inheritance history. 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 4,697 households in 2005, there are 4,061 households with complete inheritance history (Table 1). Excluding households with heads aged younger than 25 years old leaves us with 3,993 households[5]. Among those 3,674 households had non-missing wealth data in 2005, 3,252 had non-missing wealth data in 1995, of which 3,031 had non-missing wealth information in *both* 1995 and 2005. For some part of our analysis (for example when we examine wealth changes between 1995 and 2005) we restrict our sample to those respondents aged 25 years and older in 1995 who were not living with their parents. The reason for this restriction is that for some younger respondents the measure of wealth in 1995 would capture their parents' wealth.

Throughout the paper the unit of analysis is the household and the measure of wealth is total household net worth. This measure is available in 1995, 2000 and 2005 and includes total net financial wealth and net housing equity of the household (but not, for instance, pensions or consumer durables or other physical possessions). Given the structure of BHPS inheritance data the measure of inherited wealth that we use in our analysis is the sum of all inheritances received by all household members during the nine year period 1996-2004 valued in real 2005 prices using the Retail Price Index. We use a zero and a 3 per cent rate of return as alternative ways to estimate what past inheritances would have accumulated to.

3. Recent changes in the distribution of household wealth: 1995-2005

Before proceeding to examine the role of inheritance on the levels and the degree of inequality in wealth it is necessary to look at how wealth has changed between 1995 and 2005. As it will become clearer in the analysis of the next two sections the factors that determined the change in wealth during this period played a decisive role both for the role on inheritance on wealth accumulation patterns and in determining the role of inheritance in the inequality in wealth.

Table 2 depicts 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. As shown in this table the decade covered by BHPS, UK households increased their average net worth by some 115 per cent from just under £77,000 in 1995 to over £166,000 in 2005.[6] This increase was almost exclusively the result of the increase in

5 Note that the large majority of households with heads younger than 25 years old have already been excluded because of the restrictions on having full inheritance history.

6 Based on BHPS estimates of average household net worth and using a small accounting exercise we find that aggregate household wealth among UK households amounted to about

net housing wealth (according to the estimates in Table 2 this increased from an average of £51,700 in 1995 to £143,600 in 2005). In turn the main driver of the increase in housing equity was the growth in house prices and to a lesser extent the increase in the home ownership rate (which rose, for this sub-group which excludes the youngest households, from 68 per cent in 1995 to 76 per cent in 2005). To highlight the importance of house price growth on observed trends in household wealth note that the average house value among homeowners in BHPS increased in real terms from around £103,000 in 1995 to £233,000 in 2005 (or by 2.26 times). Comparable estimates produced by CLG, Nationwide and Halifax suggest that the mixed-adjusted average house prices increased in real terms during this period from about £86,000 in 1995 to £184,000 in 2005 (or by 2.10 times). [7] Net financial wealth played no particularly strong role in the observed change. In fact mean net financial wealth recorded in the survey fell slightly during the period mainly as a result of the increase in the value of debt especially at lower end of the distribution (reported net financial wealth decreased from – £2,300 in 1995 to about – £7,600 in 2005).

To characterise changes in net worth more clearly in Table 3 we present the mean value of total net worth and its components (i.e. net financial and net housing wealth and their sub-components) by decile group of total net worth. The most striking feature of this table is the significant decrease in net worth in the bottom wealth group (which became more indebted) and the dramatic increase in net worth across all other wealth groups. Worth noting is also the fact that although in absolute terms the increase was larger in upper wealth groups in percentage terms the most dramatic increase was experienced by low or middle wealth households. As expected given the general patterns described above the main driver of this increase was the substantial rise in gross housing wealth (reflecting mainly the influence of the house price growth).[8] The other main component of household wealth, namely gross financial wealth, increased only very moderately while at the same time financial debt increased in all parts of the distribution. The latter increase was particularly large for households in the bottom wealth group. Overall, the net effect of financial wealth on the change in total net worth over the particular period we examine here was either very small or negative.

Summarising the results presented so far suggests that the period 1995 to 2005 was a period of a striking increase in net worth. The main driver of this increase was the growth in house prices and the resulting increase in housing equity. Given that

---

£4 trillion in 2005. This compares to £5 trillion which is the HMRC estimates for total marketable wealth in that year. In interpreting the results in this paper it should be noted that BHPS therefore appears to have incomplete coverage. This appears particularly to affect reported financial wealth, and the very top of the distribution.

7 This index is produced by Communities and Local Government, Nationwide and Halifax and is available from www.communities.gov.uk/documents/housing/xls/141272.xls

8 In the bottom decile group average gross housing wealth decreased (reflecting the fact that homeowners in 2005 were much less likely to be at the bottom end of the net worth distribution).

housing wealth is the main asset of households at the middle of the distribution, the net result of all these changes over the whole period was that total net worth increased more in relative terms for households in the middle of the distribution than it did for households at the top of the distribution while for those households at the lower end of the distribution there was an increase in the value of net debt.

Overall, the above described changes resulted in a substantial decline in the inequality of total net worth reported to BHPS. This was reflected in a decrease in the Gini coefficient from 0.67 in 1995 to 0.57 in 2005 and a corresponding decrease in the coefficient of variation from 1.68 in 1995 to 1.24 in 2005 (Table 4). The decrease in the inequality of net worth reflects a decrease in the concentration at the top of the distribution (note that the richest 10 per cent of households decreased their share of aggregate net worth from 46 per cent to 38 per cent between 1995 and 2005) and an increase in the share of wealth accumulated by households at the middle of distribution.[9] Matching closely the patterns in net worth the statistics describing the distribution of net housing wealth across the net worth distribution suggest a decrease in the percentage of housing equity held by households in the top 30 per cent of the net worth distribution, and a corresponding increase in the share of housing wealth that is held by low and middle wealth households. On the other hand there was a decrease in the share of financial wealth reported by households in the top 10 per cent of the net worth distribution, but a corresponding increase in the share of financial wealth accumulated by households between the 5th and 9th quintile groups (with greater increase for the higher wealth groups) and an increase in the accumulation of net debts by households in the bottom 10 per cent of the net worth distribution.

4. The impact of inheritance on wealth accumulation

In this section we examine the relative importance of inheritances on wealth accumulation. We start our analysis with Table 5 where we present various statistics characterising the 1995 and 2005 net worth distributions and the distribution of inheritances received in the nine years between 1996 and 2004. Statistics are presented for all households and by whether the household received an inheritance or not. The sample used in the analysis in this table is restricted to those households with non-missing wealth data in both 1995 and 2005 for which we have full inheritance data (as defined in the data section) and whose heads were 25 years or older in 1995 (2,571 households). Total net worth for this restricted sample during the period from

9 By contrast, the HMRC estate-based series suggests that the Gini coefficient for the distribution of marketable wealth between all adults (rather than between households with heads over 25 discussed here) *rose* from 0.65 to 0.70 between 1995 and 2005 and that the share of wealth of the wealthiest 10 per cent of individuals increasing from 50 per cent of total marketable wealth in 1995 to 54 per cent in 2005 (HMRC, 2011). The difference is partly explained by the lower coverage in BHPS of financial assets, particularly affecting the top of the distribution. There are also, however, uncertainties surrounding the HMRC series, given the limitations of estimates based on estate data.

1995 to 2005 increased on average (in real terms) by about £103,000 (from about £85,000 in 1995 to about £188,000 in 2005) while the increment in inheritances received between 1996 and 2004 amounted to about £10,000 (£11,400 if we assume a 3 per cent rate of capitalization) which is equivalent to about 9 per cent of the overall wealth growth (11 per cent if we assume a 3 per cent rate of capitalization). This is apparently a rather small share of the overall change but we have to keep in mind that inheritances were received by just over a quarter of all households (27 per cent), and this was a period dominated by the effects of the house price boom on housing assets held at the start. For inheriting households only the change in total net worth was on average £154,000 while the value of inheritance was about £42,000 (£48,000 if we assume a 3 per cent rate of capitalization) equivalent to 27 per cent of total net worth change (and 31 per cent if we assume a 3 per cent rate of return).

To examine more closely the contribution of inheritance to wealth changes, in Table 6 we group households by quintile group of their 1995 net worth and for each group we report statistics describing the average change in net worth between 1995 and 2005, the average value of their reported inheritance and the value of inheritance as a share of the average wealth change. For each quintile group we present statistics for all households as well as by whether households have received an inheritance or not. A first thing to note from this table is that both the probability of receiving an inheritance and the value of inheritance increases with initial wealth (with the probability of receipt increasing from around 17 per cent in the bottom quintile group to around 38 per cent in the top group and the mean value of inheritance among inheriting households from £22,000 to £54,000).

A second thing to note from this table is that although all wealth groups experienced a substantial increase in their total net worth between 1995 and 2005, inheriting households experienced substantially larger increases. However, inheritance accounted for only a minority of the overall wealth change even of inheriting households. Differences across wealth groups in that respect are relatively minor (for example in the bottom quintile group on average inheritance accounted for about 23 per cent of the average wealth change experienced by inheriting households while for the top wealth group the average size of their inheritance accounted for 34 per cent of their average wealth change). One reason why inheritance did not make a greater contribution to average wealth change over this particular period is that changes in wealth were dominated by house price boom (note that the assumed 3 per cent rate of return in our alternative capitalisation assumption is considerably smaller than the average annual house price growth which during this period was about 10 per cent).

To isolate (partly) the impact of house price growth we can compare the wealth changes of inheriting and non-inheriting households and examine what share of the differential in their wealth changes is accounted for by inheritance. Results are reported in the last panel of Table 6. As can be seen here, although inheritances accounted for a substantial part of the differential in wealth growth between inheriting and non-inheriting households a considerable part of the differential remains unexplained. Under the no capitalisation assumption in the bottom wealth group

inheritances accounted for about 36 per cent of the differential in wealth growth between inheriting and non-inheriting households while in the 2nd 3rd and 4th wealth groups inheritances accounted somewhere between 52 and 66 per cent of the differential. Under the 3 per cent capitalisation assumption inheritances accounted for a higher share of the differential but still a considerable part of the differential remains unexplained. Given the dramatic increase in house prices some of the remaining part of the differential may reflect returns to inherited wealth invested in housing assets. On this point note that households that received an inheritance during the period under examination had considerably higher probabilities of becoming homeowners than non-inheriting households. This was particularly so for households in the bottom two quintile groups where the probability of becoming homeowners was almost twice as high among inheriting households as non-inheriting ones.[10] Another thing to note from this table is that on average the value of inheritance received by the top initial wealth group was actually larger than the differential in the average wealth growth between inheriting and non-inheriting households (under both capitalization assumptions). This possibly reflects that on average a large share of inheritance received by this group was not saved (as well as probable age differences between the two groups).

Overall the results discussed above suggest that although inheritance accounted for a relatively modest share of the average wealth change that occurred between 1995 and 2005 (9 per cent overall and 27 per cent among inheriting households) its contribution could be significantly higher if we could fully account the returns to inherited wealth. One thing we need to stress here is the patterns described above refer to the average change in wealth and the average contribution of inheritances to this change. Within each quintile group there would be substantial variation both with respect to how households save or spend their inheritance and by extension the rates of returns to their inheritances.

Because the patterns of wealth changes could be contaminated by possible changes in household structure and composition we implemented a similar analysis as the one described above but restricting our sample to 'intact' couples only. Intact couples are defined those in which there was no observable core changes in their composition with core changes defined those associated with change or death of a spouse. Generally, however, the results for intact couples are similar (see Table A1 in the appendix), with the exception that wealth grew *less* for inheriting than non-inheriting households in the top quintile group, a factor which may again reflect age difference between them.

10 More specifically in the bottom two quintile groups of the 1995 net worth distribution the average probability on becoming homeowners was 44 per cent among inheriting households compared to 22 per cent among non-inheriting ones.

5. The impact of inheritance on wealth inequality

Having examined the impact of inheritance on the change in wealth, in this section we turn to assess the contribution of inheritance to wealth inequality. This assessment is rather complex and in some respects constrained by the unobservability of the impact of inheritance on savings and consumption decisions of the households. We start our analysis with Table 7 where we present statistics describing the degree of inequality and the concentration of inheritance. The sample in this table is restricted to those households with heads aged over 25 years old in 2005 and which have complete inheritance data (3,826).[11] As can be seen from the statistics of this table inheritances are extremely concentrated: the top 1 per cent of inheritors received about 15 per cent of the total inherited wealth, while the top 5 and 10 per cent received 43 and 66 per cent of the total respectively. The coefficient of variation and the Gini coefficient of inheritance also reveal a substantial degree of inequality: the Gini coefficients among all households and among inheriting households are 0.94 and 0.76 respectively. The respective estimates for the coefficient of variation among all households and inheriting households are 4.86 and 2.20. By comparison the Gini coefficient for 2005 net worth in BHPS is 0.57 (Table 4). Given the substantial inequality in the distribution of inheritances an obvious question then is whether and to what extent inheritance makes a positive contribution to the observed levels of wealth inequality. In the rest of this section we attempt to address this question by examining the association between inheritances with 2005 net worth, 2005 net worth excluding the value of inheritance received between 1996 and 2004 and 1995 net worth.

Table 8 presents the probability of inheriting, as well as the mean, the median and the share of accumulated inheritances (valued in real terms and assuming a zero and a 3 per cent rate of return) received in the previous nine years by each quintile group of the 2005 net worth distribution. For comparison in the same table we also present the average value and the share of total net worth that is held by each wealth group. The main result to be taken from this table is that there is a strong correlation between inheritance and one's position in the final net worth distribution (households in the top 20 per cent of the net worth distribution received about 65 per cent of all accumulated inheritances while those in the bottom 60 per cent of the distribution received less than 15 per cent of the total inheritances).

Informative as this is, it does not capture how inheritances contribute to observed levels of inequality in net worth. It is not so surprising that people who have received the largest inheritances also tend to end up with the largest wealth in 2005. To make inferences about the contribution of inheritance on total wealth inequality we need to examine its correlation with a proxy of pre-inherited wealth. The 2005 net worth distribution deducting the value of inheritances received between 1996 and 2005 (valued in real terms) provides one possible basis for such an analysis. The advantage

[11] Note that the value of inheritance is missing for 167 inheriting households (the full sample of households with heads aged 25 years old or over and full inheritance history 3,993 households).

of this measure is that it is exogenous to inherited wealth in the sense that it excludes inheritances. On the other hand its main disadvantage is that its validity (as an exogenous proxy of pre-inherited wealth) depends on the assumption that all inheritances that have been received have been saved and probably more crucially given the results presented in the previous section that the returns to the inheritance are equal across households.[12] This is obviously a rather restrictive assumption. However, as stressed by Wolff (2002), it is not possible to simulate the effects of eliminating wealth transfers on the size and the distribution of wealth without a full behavioural model of household savings. This is beyond the scope of the present paper. However, we have to keep in mind that our conclusions would be dependent on the assumption that inheritance does not change households savings and consumption behaviour.

In Table 9 we group households by quintile group of the 2005 net worth deducting the value of the sum of inheritance received between 1996 and 2004 (valued in real terms and assuming in turn a zero and 3 per cent rate of return). For each of these wealth groups we report the probability of inheriting, as well as the mean, the median and the share of accumulated inheritances received during this period. According to the statistics in this table, although the probability of inheriting decreases monotonically as we move down the 2005 net worth distribution (exclusive of inheritances), the patterns in terms of the average amount of their inheritance (among inheriting households) are not as clear: the value of inheritance is higher in the top wealth group than in the next three wealth groups but increases again as we move down to the bottom wealth group. An inspection of the mean and the median value of inheritance within each wealth group suggests that the distribution of inherited wealth is highly skewed. This is especially the case for the bottom wealth group (for this group mean inherited wealth is over £50,000 compared to a median of just above £5,000). The high degree of skewness of inherited wealth in the bottom wealth group suggests that a small number of large inheritors end up with wealth in 2005 that is all – or even more than – accounted for by their inheritances. This reflects both a genuine contribution of inheritance to household wealth accumulation for households with very low pre-inherited wealth (echoing the evidence in the previous section about the importance of inheritance on wealth accumulation patterns of low wealth households) but also to some extent it is an artefact of the zero behavioural response assumption (reflecting the fact that some – a minority – rich households spend or transfer their large inheritance). Overall as can be seen in Table 9 inheritances are more equally distributed across the wealth groups than non-inherited wealth itself (compare figures in the second and last rows of each panel in Table 9). For example note that while the top wealth group received about 36 per cent of total inheritances they own more than 56 per cent of total net worth (excluding inheritance). On the other hand the bottom wealth group received about 15.3 per cent of total inherited wealth while they had a negative share of total net worth (excluding recent inheritance).

[12] And also, implicitly, that the value of what results from the inheritance increases only at the inflation rate (or by 3 per cent per annum in the alternative specification).

Despite these patterns inheritances are positively correlated with non-inherited wealth (see bottom of each panel in Table 9). This might be expected to mean that their receipt would have a *dis*equalising effect. However, they are more equally distributed across the non-inherited wealth distribution than non-inherited wealth itself. On this basis inheritances would be expected to *reduce* wealth inequality, because they weaken the relationship between non-inherited wealth and the final total of net worth: some inheritors have very low or negative non-inherited wealth. The overall impact of inheritance on wealth inequality will depend on the relative magnitude of these effects.

To quantify the contribution of inheritance to wealth inequality we decompose the inequality in 2005 net worth into the share of inequality attributable to inheritances (IW) and that attributable to the distribution of net worth excluding inheritances (NWX). Suppose that total net worth (NW) can be written as the sum of f_1 and f_2 where f_1=NWX and f_2=IW. To decompose inequality in total net worth attributable to each of these components we resort to the decomposition of the coefficient of variation based on Shorrocks' decomposition rule (Shorrocks, 1982) using the formulation proposed by Jenkins (1995). Based on this decomposition method the coefficient of variation of total net worth I can be factorised as:

$$I = \sum_{f=1}^{2} s_f I \tag{1}$$

Where I is the inequality of total net worth and s_f is the proportionate contribution of wealth component f to total wealth inequality:

$$s_f = \rho_f \chi_f \frac{I_f}{I} \tag{2}$$

In equation (2) ρ_f is the correlation between component f and total net worth and χ_f is the share of wealth component f in total net worth (i.e. $\chi_f=\mu_f/\mu$ where μ_f, μ denotes the mean of each wealth component and total net worth respectively). The absolute contribution of each wealth component to total wealth inequality (S_f) is equal to its proportional contribution to total wealth inequality times the inequality in total net worth.

Table 10 presents the results of this decomposition exercise. A first thing to be noted from this table is that wealth inherited over the previous nine years contributes positively to observed 2005 net worth inequality – accounting for about 5 per cent of it (or 6 per cent if we use the 3 per cent rate of return to accumulate past inheritances).[13] The relatively small magnitude of this contribution reflects both the low share of recent inheritance in 2005 total net worth as well as the weak correlation

[13] The decomposition of the squared coefficient of variation as proposed by Wolff (2002) suggests very similar results for the contribution of inheritance on total wealth.

between inheritance and total worth (note that the somewhat higher contribution of inheritance in total net worth inequality under the 3 per cent rate of return assumption is exclusively due to the higher wealth share of inheritances rather than a stronger correlation between inheritance and net worth). However, one can also note from Table 10 that the coefficient of variation of net worth excluding recent inheritance is *higher* than that of total net worth (1.26 compared to 1.24 for total net worth). This suggests that the inclusion of inheritance has a very small effect on reducing net worth inequality. Referring to the discussion above (concerning the patterns in Table 9) this finding suggests that the *dis*equalising impact which arise from the positive correlation between inheritance with total net worth (measured in the final three columns of Table 10) has been outweighed by the way in which inheritances weaken the relationship between non- (recently) inherited wealth and final net worth.

An issue of relevance here is whether the house price growth weakened the contribution of inheritance to total wealth inequality. There are two main reasons why this may be the case. First, if it has not been the house price growth and the resulting increase in housing equity (which as we discussed in section 2 increased by more than 100 per cent) inheritance would account a much larger share of final wealth. Secondly, and probably more crucially the lower dispersion of wealth which resulted from house price growth may have weakened the correlation between inheritance and net worth.

To assess the robustness of our conclusions concerning the contribution of inheritance to the observed levels of wealth inequality but also to assess the importance of house price growth on the conclusion about the contribution of inheritance on wealth inequality in the remaining of this section we examine the correlation of inheritances with 1995 net worth – a measure that can also considered as exogenous to inherited wealth. As before we start by examining how inheritance is distributed across different wealth groups (defined in terms of the distribution of 1995 net worth) and then we look at the contribution of inheritance to the level of inequality that would (hypothetically) have prevailed if all inheritances had been saved and there have been no wealth accumulation (arising from either active saving/dissavings or capital gains). Clearly this method is equally susceptible to the assumption about the behavioural response to inheritance since it also assumes that all inheritances have been saved (although it is less sensitive than 2005 net worth to large negative wealth for some outlier rich households who spend or gave away their big inheritances). However, the results based on this measure fail to capture the impact of inheritances on later wealth accumulation (which for the particular period could be substantial if inheritance used to finance house purchase)[14].

Having these considerations in mind, in Table 11 we present statistics describing the distribution of inherited wealth by quintile group of 1995 net worth for all people aged

[14] For instance an inheritance received early in the period may have allowed some households to increase their net housing equity and then to benefit from the increase in house prices by 2005.

25 and over in 1995.[15] As it is evident from this table, and as we saw in Table 6, people who start with higher wealth levels are more likely to inherit – almost twice as likely comparing the top and bottom wealth groups – and when they do inherit they inherit larger amounts. As a result of the combination of the two factors, there is a high degree of concentration of inheritances at the upper part of the wealth distribution. Again unequal as this is, it is less so than the inequality of 1995 net worth itself. However, note that the correlation coefficient between inheritance and 1995 net worth is positive (0.09) and substantially higher than that of 2005 net worth excluding inheritance (Table 9). To characterise further the distributional impact of inheritance in Table 12 we examine the inequality that would have prevailed if the distribution of 1995 net worth was augmented by the sum of inheritance that have been received between 1997 and 2005 and we decompose this inequality into the part attributable to 1995 net worth and to that attributable to inheritances using the decomposition described by equation (2).

Again the results from the decomposition exercise suggest that inherited wealth accounts for a positive part of the inequality of the total combined with initial wealth. However, in comparison with the earlier results based on 2005 net worth the contribution of inherited wealth to total wealth inequality is much higher (depending on the capitalisation assumption this ranges 12.60-15.40 per cent). This is because inherited wealth accounts for a larger share of 1995 net worth but also equally importantly because there is a much stronger correlation between inheritance and 1995 net worth. However, once again we find that overall inequality is lower when inheritance is introduced (the coefficient of variation falls from 1.69 to 1.63) due to the substantially weaker relationship between initial wealth (1995 net worth) and the combined total (1995 net worth plus the sum of inheritance received between 1996 and 2004). The latter effect outweighs the disequalising effect arising from the positive correlation between inheritance and 1995 net worth. The net effect of inheritance would therefore again be to reduce slightly the level of wealth inequality. These findings suggest that although the house price boom may have weakened the impact of inheritance on total net worth the conclusions concerning the distributional consequence of inheritance do not change.

6. Age group analysis of the impact of inheritance on wealth inequality

The analysis above tells us how inheritances affect the distribution of wealth across a given population at a given point in time (i.e. in 2005). Given the lifecycle differences in wealth accumulation and in the timing of inheritance receipt a snapshot cross-sectional analysis may give a misleading picture of the distributional impact of

[15] Some small differences between the statistics in this table and the statistics in Table 6 are due to differences in samples (in particular the sample in Table 6 is restricted to households with non-missing wealth data in both 1995 and 2005 while the sample in this table does not exclude households with missing wealth in 2005).

inheritance. Ideally in order to assess the contribution of inheritance of total wealth inequality one would need the full inheritance history for a cohort of people.

Age group analysis partly controls for lifecycle differences in wealth accumulation and allows us to look at how inheritances affect the inequality in the distribution of wealth for a given cohort of people. It does not however allows us to examine how inheritances affect the inequality of wealth across different cohorts of people nor can it be used to safely infer the distributional impact of inheritances. The analysis is particularly problematic for younger cohorts of people given that for those people inheritance history is far from complete. Mortality differences between richer and poorer people mean that this may be particularly important especially for younger age groups. Probably the age groups for whom we can more safely assess the impact of inheritance on wealth inequality are the middle and older age groups (those aged 45-75) which can be considered to be at the peak of their lifecycle wealth accumulation.

In Table 13 we present several statistics concerning the distribution of inherited wealth by quintile group of the 2005 net worth excluding recent inheritances for different age groups. Age group analysis reveals a picture roughly similar to the one revealed for the whole population in Table 9. Within each age group people in the top quintile group inherit a larger share of total inherited wealth (larger than their population share) but the degree of concentration is smaller than for total net worth. Interestingly, the degree of concentration of inherited wealth in the top wealth groups has a U shaped relation with age: it is relatively high for the younger two age groups, decreases for the middle age group (those aged 45-54) and increases again for people aged 65 and older. Although it may be tempting to conclude from this that inherited wealth is becoming more unequal for younger cohorts of people, differences in the lifecycle patterns of inheritance receipt mean that inheritances received in a nine year window give a very incomplete picture about the lifetime intergenerational receipt of wealth transfers.

To further analyse the impact of inheritances on wealth inequality, Table 14 presents results of the decomposition of the coefficient of variation for each age group separately. According to this, recently inherited wealth accounts for a positive proportion of the inequality of total wealth for all age groups. This is particularly important for those aged 25-44 and 65-74 but much weaker for those aged 55-64 (who are the largest inheritors) and those aged 75 or over. However, final inequality for most age groups is *lower* than that of non- (recently) inherited wealth, again reflecting the way that inheritances weaken the relationship between non-inherited wealth and the combined total. The most sizeable difference is for the age groups 45-54 and 55-64. By contrast with the other groups, inheritances had a mild effect in increasing wealth inequality for the youngest age group, while it had no effect for the 65-74. Broadly, the results based on 1995 net worth (presented in Table 15 and 16) are similar.

7. Conclusions

As shown in this paper during the period 1995-2005 there was a striking increase in household net worth and a significant decrease in the level of net worth inequality as reported to the survey we are using (BHPS). House price growth and the resulting increase in housing equity of middle wealth-holders had a critical effect on both these trends.

Inheritance received in the nine years 1996 to 2004 contributed between 9 to 11 per cent (depending on capitalisation assumption) of the average household wealth accumulation that occurred between 1995 and 2005 and somewhere between 27 and 31 per cent of the wealth accumulation of inheriting households. These estimates are based on the assumption that all inheritances were saved. They might be expected to provide an upper bound for the contribution of inheritance to the change in wealth. However they are based on either a zero or a three per cent assumed rate of return. For some households which used an early inheritance as a house purchase down-payment the rate of returns to their inheritances over the particular period under examination could have been substantially higher. Although it is not possible to estimate the exact rate of returns for each household we found suggestive evidence that on average the rates of return of inherited wealth may have been substantially higher than the assumed 3 per cent rate. The contribution of inheritance to wealth accumulation was particularly important for initially low wealth, credit-constrained, households.

Inheritances were highly unequal and had a positive (but small) correlation with wealth that had not been recently inherited. Recently inherited wealth accounted for a positive proportion of the observed inequality of wealth in 2005. However, the addition of inheritances weakened the relationship between non-inherited wealth and the final total. This meant that inheritances actually had a small equalising impact. The same was true looking within age groups (apart from the youngest).

Although the growth in house prices weakened the correlation between inheritance and final total net worth, the conclusions concerning the distributional impact of inheritance do not appear to be affected by the house price boom (using 1995 net worth as a basis of analysing the distributional consequences of inheritance does not change the qualitative conclusion). In direction, our results are similar to empirical studies from the US (Wolff, 2002, 2011), Japan (Horioka, 2009) and Sweden (Klevmarken, 2004) which also suggest that inheritance can have an equalising effect on net worth inequality. However unlike the former two studies we find that the equalising impact of inheritance is due to the way it weakens the relationship between pre- and post-inheritance wealth rather than a negative correlation between inheritance with other types of wealth (in all our results inheritances had a small but positive correlation with non-inherited wealth).[16]

[16] Klevmarken (2004) does not report the correlation between inheritance and pre-inherited wealth.

But given the small magnitude of the estimated effects and the uncertainty about the behavioural responses to inheritance, probably the best way of interpreting our results is that inheritance received during 1996-2004 maintained existing wealth inequalities rather than either narrowing or widening them.

References

Banks, J. Smith, Z. and Wakefield, M. (2002), 'The distribution of financial wealth in the UK: Evidence from 2000 BHPS data' IFS WP02/21

Davies, J.B., and A.F. Shorrocks (2000), 'The Distribution of Wealth,' in *Handbook of Income Distribution*, ed. by A.B. Atkinson and F. Bourguignon, vol. 1, Elsevier: Amsterdam, 605–675.

Gokhale, J., Kotlikoff, L., Sefton, J. and Weale, M. (2001), 'Simulating the transmission of wealth inequality via bequests', *Journal of Public Economics*, 79: 93-128

De Nardi, M. (2004), 'Wealth Inequality and Intergenerational Links', *Review of Economic Studies*, 71: 743-768

Jenkins, S.P. (1995) 'Accounting for Inequality Trends: Decomposition Analyses for the UK, 1971-86', *Economic*a, 62: 29-63.

HMRC (2011), 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

Horioka, Y. C. (2009) "Do bequests increase or decrease wealth inequalities?" Economic Letters, vol.103, pp.23-25

Karagiannaki, E. (2011), *Recent trends in the size and the distribution of inherited wealth in the UK*, Casepaper 146, London: London School of Economics

Klevmarken, A.N. (2004), 'On the wealth dynamics of Swedish families, 1984-98' *Review of Income and Wealth*, Vol. 50: 4

Shorrocks, A.F. (1982), 'Inequality Decomposition by Factor Components', *Econometrica*, 50(1), 193-211.

Taylor, M.F. (ed) (2010), *British Household Panel Survey User Manual. Volume A Introduction, Technical Reports and Appendices*, Colchester: University of Essex, Economic and Social Research Council.

Wolff, E.N. (2002) 'Bequests, savings and wealth inequality', *American Economic Association Paper and Proceedings*, 92(2): 260-264

Wolff, E.N. (2002) 'Bequests, savings and wealth inequality', *American Economic Association Paper and Proceedings*, 92(2): 260-264

Wolff, E.N. and Gittleman, M. (2011) "Inheritances and the Distribution of Wealth or Whatever Happened to the Great Inheritance Boom?" ECB Working Paper No. 1300

Table 1: Sample used in different parts of the analysis

	All	Non-missing wealth
Number of households in wave 5	5,031	
Number of households in wave10	4,916	
Number of households in wave 15	4,697	
Number of households in wave 15		
with complete inheritance history	4,061	
and with heads older than 25 years old	3,993	3,674
and observed in wave 5	3,631	3,252 (3,031 with both years)
and were observed in wave 5 as independent benefit units (not living with parents)	3,066	2,768 (2,571 with both years)

Note: Author's calculation based on data from the BHPS.

Table 2: Summary statistics of total net wealth and its components in 1995, 2000 and 2005 (all financial values at 2005 £)

	1995	2000	2005
Total net worth			
P10	-100	-100	0
P25	2,600	5,600	25,500
P50	39,600	53,000	118,400
P75	96,900	121,800	222,300
P90	192,000	244,400	385,200
Mean	77,000	94,400	166,400
% of households with positive value	84	85	86
% of households with negative value	11	11	9
% with of households with zero value	5	5	5
Total net financial wealth			
P10	-2,300	-5,100	-7,600
P25	0	-100	-300
P50	2,600	2,300	3,000
P75	18,100	16,900	20,100
P90	65,600	53,000	67,100
Mean	25,500	17,900	22,900
% of households with positive value	70	66	64
% of households with negative value	23	25	27
% with of households with zero value	7	9	9
Total net housing wealth			
P10	0	0	0
P25	0	0	24,000
P50	32,200	45,100	108,000
P75	76,000	101,500	198,000
P90	122,400	191,700	310,000
Mean	51,700	76,500	143,600
% of households with positive value	68	73	77
% of households with negative value	2	0	0
% with of households with zero value	30	26	23

Note: Author's calculation based on BHPS data for households with heads aged 25 or more in waves 5, 10 and 15.

Table 3: Means of total net worth and its components in each decile group of the net wealth distribution (financial figures in thousands of 2005 £)

	Total net worth				Net financial wealth				Net housing wealth			
	1995	2000	2005	% Change	1995	2000	2005	% Change	1995	2000	2005	% Change
Bottom	-4.4	-5.8	-6.2	-40	-3.9	-7.3	-7.3	-90	-0.5	1.6	1.1	320
2	0.1	0.2	2.0	2000	0	-0.1	1.6	na	0.1	0.3	0.4	460
3	2.8	6.1	27.2	870	1.7	1.2	1.4	-20	1.1	5.0	25.8	2280
4	12.8	22.7	68.1	430	2.9	1.5	0.9	-70	9.9	21.2	67.1	580
5	30.2	43.1	101.1	230	5.4	5.0	7.0	30	24.8	38.0	94.1	280
6	49.5	63.4	135.4	170	7.9	8.3	10.6	30	41.6	55.2	124.8	200
7	70.5	89.5	174.4	150	11.2	12.7	14.0	20	59.2	76.8	160.4	170
8	98.2	123.6	224.3	130	18.0	21.9	27.6	50	80.1	101.8	196.7	150
9	148.4	190.8	315.5	110	42.5	34.9	49.4	20	105.9	155.8	266.1	150
Top	364.0	412.2	627.5	70	169.3	101.9	127.4	-20	194.7	310.4	500.1	160
	Gross wealth				Gross financial wealth				Gross housing wealth			
	1995	2000	2005	% Changes	1995	2000	2005	% Changes	1995	2000	2005	% Changes
Bottom	19.2	12.3	6.7	-70	0.8	0.6	0.4	-40	18.4	11.6	6.3	-70
2	2.0	2.0	7.0	250	0.1	0.3	2.3	1430	1.9	1.7	4.8	160
3	16.8	31.9	85.5	410	2.5	3.7	7.5	190	14.3	28.1	78.1	450
4	54.9	68.3	135.3	150	5.3	5.4	6.4	20	49.6	63.0	128.9	160
5	68.9	79.3	152.6	120	7.4	7.8	10.6	40	61.5	71.4	142.0	130
6	77.0	94.7	179.1	130	9.6	10.9	12.9	30	67.3	83.8	166.3	150
7	92.5	117.7	212.1	130	12.9	14.7	17.1	30	79.6	103.0	195.1	150
8	118.4	147.8	257.0	120	19.3	23.7	29.8	50	99.1	124.1	227.2	130
9	169.2	219.7	355.4	110	43.8	37.0	52.0	20	125.4	182.7	303.4	140
Top	385.4	446.1	676.1	80	170.8	104.0	130.7	-20	214.5	342.0	545.4	150

	Total debt				Financial debt				Housing debt			
	1995	2000	2005	% Changes	1995	2000	2005	% Changes	1995	2000	2005	% Changes
Bottom	23.6	18.0	12.9	-50	4.7	8.0	7.7	70	18.9	10.1	5.2	-70
2	1.9	1.8	5.0	160	0.1	0.5	0.7	370	1.8	1.4	4.3	140
3	14.0	25.8	58.3	320	0.8	2.6	6.1	630	13.2	23.2	52.2	300
4	42.1	45.7	67.2	60	2.4	3.9	5.5	130	39.7	41.8	61.7	60
5	38.7	36.2	51.5	30	2.0	2.8	3.6	80	36.7	33.4	47.9	30
6	27.5	31.3	43.7	60	1.8	2.6	2.3	30	25.7	28.6	41.4	60
7	22.0	28.3	37.8	70	1.7	2.0	3.1	80	20.3	26.2	34.7	70
8	20.2	24.1	32.7	60	1.3	1.8	2.2	70	18.9	22.4	30.5	60
9	20.7	28.9	39.9	90	1.3	2.1	2.6	110	19.5	26.8	37.3	90
Top	21.3	33.8	48.6	130	1.5	2.2	3.3	120	19.8	31.7	45.3	130

Note: Author's calculation based on BHPS data for households with heads aged 25 years or older in waves 5, 10 and 15.

Table 4: Summary inequality measures for total net worth and its components

	1995	2000	2005	1995-2005 Change (%)
Total net worth				
Gini coefficient	0.67	0.64	0.57	
Coefficient of Variation	1.68	1.44	1.24	
Decile group shares of total net worth (%)				
Bottom	-0.6	-0.6	-0.5	16.7
2	0.0	0.0	0.1	
3	0.3	0.5	1.6	433.3
4	1.7	2.6	4.1	141.2
5	4.5	4.9	6.1	35.6
6	6.6	7.1	8.1	22.7
7	9.2	9.8	10.5	14.1
8	12.5	13.1	13.4	7.2
9	19.7	20.1	18.9	-4.1
Top	46.2	42.1	37.7	-18.4
Net financial wealth				
Gini coefficient	0.89	0.92	0.97	
Coefficient of Variation	3.20	2.75	2.99	
Decile group share (%)				
Bottom	-1.4	-3.7	-4.2	-200.0
2	0.0	-0.1	0.4	
3	0.5	0.5	0.6	20.0
4	1.1	1.0	0.4	-63.6
5	2.3	2.9	2.9	26.1
6	2.8	4.4	4.4	57.1
7	4.0	7.0	5.8	45.0
8	6.5	11.5	11.4	75.4
9	15.7	18.4	20.4	29.9
Top	59.8	51.1	52.7	-11.9
Net housing wealth				
Gini coefficient	0.64	0.63	0.55	
Coefficient of Variation	1.46	1.42	1.20	
Decile group share (%)				
Bottom	-0.1	0.2	0.1	200.0
2	0.0	0.0	0.0	
3	0.2	0.6	1.7	750.0
4	1.8	2.9	4.6	155.6
5	5.3	5.3	6.5	22.6
6	8.2	7.4	8.6	4.9
7	11.2	10.1	11.1	-0.9
8	14.7	13.0	13.5	-8.2
9	20.4	19.8	18.3	-10.3
Top	35.8	38.2	34.4	-3.9

Note: Author's calculation based on BHPS data for households with heads aged 25 years or older in waves 5, 10 and 15.

Table 5: The association between inheritance and wealth change between 1995 and 2005

	% inheriting	1995 NW	2005 NW	Change in NW (DNW)	Mean IW	Mean IW (3% rate of return)	IW/DNW (%)	IW/DNW (3% rate of return)
All	27.0	85,100	187,900	102,800	10,000	11,400	9.0	11.0
Non inheriting households	0.0	74,000	157,500	83,600				
Inheriting households	100.0	114,700	269,000	154,300	42,000	48,000	27.0	31.0
Obs. 2,571								

Note: The sample used in the analysis in this table is restricted to those BHPS households with non-missing wealth data in both 1995 and 2005 for which we have full inheritance data (as defined in the data section) and whose heads were 25 years or older in 1995.

Table 6: The association between inheritance and wealth change between 1995 and 2005

	Proportion inheriting	1995 NW (£)	2005 NW (£)	Change in NW (DNW)	Mean IW (£)	Mean IW (3% rate of return) (£)	IW/DNW	IW/DNW (3% rate of return)
All households*								
Bottom fifth	0.17	-2,300	42,900	45,200	3,400	3,900	0.08	0.09
2nd	0.26	12,300	115,200	102,800	9,100	10,300	0.09	0.10
3rd	0.27	46,000	151,800	105,700	8,000	9,100	0.08	0.09
4th	0.29	91,500	221,900	130,400	13,200	15,100	0.10	0.12
Top	0.38	278,000	408,200	130,200	16,800	19,400	0.13	0.15
All	0.27	85,100	187,900	102,800	10,000	11,400	0.09	0.11
Obs. 2,571								
Non inheriting households								
Bottom fifth	0.0	-2,000	32,500	34,500				
2nd	0.0	12,000	94,700	82,700				
3rd	0.0	46,100	137,100	90,900				
4th	0.0	92,300	200,800	108,500				
Top	0.0	260,100	372,700	112,600				
All	0.0	74,000	157,500	83,600				
Inheriting households								
Bottom fifth	1.0	-3,800	92,400	96,100	22,400	25,600	0.23	0.27
2nd	1.0	13,400	174,600	161,100	40,500	45,800	0.25	0.28
3rd	1.0	45,700	191,000	145,300	32,200	36,800	0.22	0.25
4th	1.0	89,500	274,500	185,000	50,600	57,800	0.27	0.31
Top	1.0	307,900	467,300	159,400	53,900	62,300	0.34	0.39
All	1.0	114,700	269,000	154,300	42,000	48,000	0.27	0.31

Proportion of the difference in wealth growth between inheritors and non-inheritors accounted by inheritance	Non capitalised inheritance	Capitalised inheritances
Bottom fifth	0.36	0.41
2nd	0.52	0.58
3rd	0.59	0.68
4th	0.66	0.75
Top	1.15	1.33
All	0.59	0.68

Note: The sample used in the analysis in this table is restricted to those households with non-missing wealth data in both 1995 and 2005 for which we have full inheritance data (as defined in the data section) and whose heads were older than 25 years old in 1995. All quintile groups are defined from the distribution of all households in our sample (inheriting and non-inheriting).

Table 7: The distribution of inherited wealth- for all households and inheriting households only (2005 £)

	All households	Inheriting households
P25	0	1,700
P50	0	7,500
P75	0	33,600
P90	11,200	97,100
P95	41,300	157,100
P99	176,300	466,400
Mean	8,500	36,100
Gini coefficient	0.94	0.76
Coefficient of variation	4.86	2.20
Share of inheritance (%) received by		
top 10%	95	66
Top 5%	81	43
Top 1%	40	15
Sample size	*3,826*	

Note: Sample includes all wave 15 households with head aged 25 years old or over in 2005 with complete inheritance data (see text for details).

Table 8: The distribution of inheritances (IW) by quintile of 2005 net worth (NW05)

	Quintile of 2005 net worth						All
	Top	4th	3rd	2nd	Bottom	Missing	
Inheritances in real 2005 prices with no capitalisation							
Mean net wealth (£)	460,000	197,000	117,000	47,500	-3,000		163,500
Quintile share of net worth (%)	56.2	24.1	14.3	5.8	-0.4		100.0
% inheriting	39.4	28.1	23.4	17.4	10.6	48.4	26.6
Mean IW (£)	29,500	8,000	3,500	2,000	500	4,000	8,500
Mean for IW>0 (£)	75,000	29,000	14,500	12,000	7,000	20,500	36,000
Median IW>0 (£)	23,500	10,000	5,000	3,000	3,000	6,000	7,500
Quintile share of IW (%)	64.9	17.9	7.3	4.5	1.6	3.8	100.0
Inheritances in real 2005 prices with 3 per cent capitalisation							
Mean net wealth (£)	460,000	197,000	117,000	47,500	-3,000		163,500
Quintile share of net worth (%)	56.2	24.1	14.3	5.8	-0.4	0.0	100.0
% inheriting	39.4	28.1	23.4	17.4	10.6	48.4	26.6
Mean IW (£)	34,000	9,500	4,000	2,500	1,000	4,500	9,500
Mean for IW>0 (£)	85,500	33,000	16,500	14,000	8,000	23,500	41,000
Median IW>0 (£)	28,500	11,500	5,500	3,500	3,500	6,500	9,000
Quintile share of IW (%)	64.8	17.9	7.4	4.6	1.6	3.8	100.0

Note: Net wealth includes housing equity and financial assets minus financial debt. Inherited wealth is the sum of all inheritances that the household received during the period 1996 to 2004. The sample in this table includes all wave 15 households with heads aged 25 or older in 2005 who had full inheritance history. Wealth figures are expressed in constant 2005 prices.

Table 9: The distribution of inheritances (IW) by quintile of 2005 net worth excluding inheritance (NWX05)

	Quintile of 2005 net worth excluding inheritance						All
	Top	4th	3rd	2nd	Bottom	Missing	
Inheritances in real 2005 prices with no capitalisation							
Mean NWX05 (£)	438,000	187,500	111,000	43,500	-6,000		155,000
Quintile share of NWX05 (%)	56.6	24.2	14.4	5.6	-0.8		100.0
% inheritors	35.0	24.8	25.5	19.7	13.7	48.4	26.6
Mean IW (£)	16,500	6,500	8,000	6,000	7,000	4,000	8,500
Mean for IW>0 (£)	47,000	26,500	31,000	31,000	50,500	20,500	36,000
Median IW>0 (£)	13,500	6,500	6,000	5,000	5,500	6,000	7,500
Quintile share of IW (%)	36.0	14.4	17.2	13.4	15.3	3.8	100.0
Corr(IW,NWX)	0.043						
Inheritances in real 2005 prices with 3 per cent capitalisation							
Mean NWX05 (£)	436,000	187,000	110,500	42,500	-7,500		153,500
Quintile share of NWX05 (%)	56.8	24.3	14.3	5.6	-1.0	0.0	100.0
% inheritors	34.5	24.8	24.9	19.7	15.0	48.4	26.6
Mean IW (£)	18,000	7,000	6,500	7,500	11,500	4,500	9,500
Mean for IW>0 (£)	52,000	28,000	26,000	38,000	75,000	23,500	41,000
Median IW>0 (£)	15,000	8,000	6,500	5,500	8,500	6,500	9,000
Quintile share of IW (%)	34.4	13.3	12.4	14.4	21.7	3.8	100.0
Corr(IW,NWX)	0.010						

Note: Net wealth includes housing equity and financial assets minus financial debt. Inherited wealth is the sum of all inheritances that the household received during the period 1996 to 2004. The sample in this table includes all wave 15 households with heads aged 25 or older in 2005 who had full inheritance history. Wealth figures are expressed in constant 2005 prices.

Table 10:The contribution of inheritance (IW) to 2005 net worth inequality based on the decomposition of coefficient of variation

	Share in total net worth (χ_f) %	**Correlation with total net worth (ρ_f)**	**CV**	**Factor's contribution to total wealth inequality**		
				Proportionate contribution (s_f) %	Absolute contribution y (S_f)	Per unit contribution s_f / χ_f
Zero rate of return						
Net wealth	100.00	1.00	1.24	100.00	1.24	1.00
Net wealth excluding inheritance	94.60	0.98	1.26	94.59	1.17	1.00
Inheritance	5.40	0.25	4.86	5.41	0.07	1.00
3 per cent rate of return						
Net wealth	100.00	1.00	1.24	100.00	1.24	1.00
Net wealth excluding inheritance	93.83	0.97	1.27	93.90	1.16	1.00
Inheritances	6.17	0.25	4.84	6.10	0.08	0.99

Note: The results in this table are based on Shorrocks' decomposition rule (Shorrocks, 1982) using the formulation proposed by Jenkins (1995). Net wealth includes housing equity and financial assets minus financial debt. Inherited wealth is the sum of all inheritances that the household received during the period 1996 to 2004. The sample in this table includes all wave 15 households with heads aged 25 or older in 2005 who had full inheritance history. Wealth figures are expressed in constant 2005 prices.

Table 11: The distribution of inheritance (IW) by quintile group of 1995 net worth (NW95)

	Quintile of 1995 net worth						All
	Top	4th	3rd	2nd	Bottom	Missing	
Zero rate of return							
Mean NW95 (£)	264,500	85,500	43,000	10,500	-2,500		80,000
Quintile share of NW95 (%)	65.8	21.5	10.7	2.7	-0.6		100.0
% inheritors	37.0	30.0	28.1	25.0	18.4	28.0	27.6
Mean IW (£)	17,000	12,500	7,500	8,000	4,000	5,500	9,500
Mean for IW>0 (£)	58,500	44,500	30,500	36,000	27,000	22,000	38,500
Median IW>0 (£)	16,000	12,000	8,500	6,500	5,000	6,000	9,000
Quintile share of IW (%)	32.0	23.7	14.5	14.7	8.0	7.2	100.0
Corr(IW,NW95)	0.09						
3 per cent rate of return							
Mean NW95 (£)	264,500	85,500	43,000	10,500	-2,500		80,000
Quintile share of NW95 (%)	65.8	21.5	10.7	2.7	-0.6	0.0	100.0
% inheritors	37.0	30.0	28.1	25.0	18.4	28.0	27.6
Mean IW (£)	20,000	15,000	9,000	9,000	45,000	6,500	10,793
Mean for IW>0 (£)	68,000	51,500	35,000	41,000	31,000	26,000	45,000
Median IW>0 (£)	18,500	14,500	10,000	7,000	6,000	7,000	10,500
Quintile share of IW (%)	32.3	23.6	14.4	14.5	7.9	7.2	100.0
Corr(IW,NW95)	0.09						

Note: Net wealth includes housing equity and financial assets minus financial debt. Inherited wealth is the sum of all inheritances that the household received during the period 1996 to 2004. The sample in this table includes all wave 15 households with heads aged 25 or older in 1995 who had full inheritance history. Wealth figures are expressed in constant 2005 prices.

Table 12: The contribution of inheritances to the degree of inequality in the hypothetical 1995 net worth distribution including inheritances based on the decomposition of coefficient of variation

	Factor share (χ_f) %	Factor correlation NW (ρ_f)	CV	Contribution of inheritance to total wealth inequality		
				Proportionate contribution (s_f) %	Absolute contribution (S_f)	Per unit contribution s_f / χ_f
Zero rate of return						
1995 net wealth	88.90	0.95	1.69	87.40	1.42	0.98
Inherited wealth	11.10	0.40	4.68	12.60	0.21	1.13
1995 net wealth including inheritance	100.00	1.00	1.63	100.00	1.63	1.00
3 per cent rate of return						
1995 net wealth	87.52	0.93	1.69	84.54	1.38	0.97
Inherited wealth	12.48	0.43	4.66	15.46	0.25	1.24
1995 net wealth including inheritance	100.00	1.00	1.63	100.00	1.63	1.00

Note: The results in this table are based on Shorrocks' decomposition rule (Shorrocks, 1982) using the formulation proposed by Jenkins (1995). Net wealth includes housing equity and financial assets minus financial debt. Inherited wealth is the sum of all inheritances that the household received during the period 1996 to 2004. The sample in this table includes all wave 15 households with heads aged 25 or older in 1995 who had full inheritance history. Wealth figures are expressed in constant 2005 prices.

Table 13: The distribution of inheritance (IW) by quintile of 2005 net worth excluding inheritance (NWX05) and age group

	Quintile of 2005 net worth excluding inheritance						All
	Top	4th	3rd	2nd	Bottom	Missing	
25-34							
Mean NWX05	192,000	73,500	33,500	4,000	-9,500		58,500
Quintile share of NWX05	65.4	25.2	11.4	1.3	-3.3		100.00
% inheritors	27.4	22.8	18.6	8.8	20.2	42.3	21.5
Mean IW	10,000	1,000	2,500	1,500	1,500	3,500	3,500
Mean for IW>0	36,500	5,000	14,500	17,000	6,500	19,500	17,000
Median IW>0	3,000	2,500	3,000	15,000	3,500	1,000	3,000
Quintile share of IW	55.9	6.7	14.9	8.3	7.5	6.7	100.0
35-44							
Mean NWX05	364,000	145,000	88,500	40,500	-8,000		125,500
Quintile share of NWX05	57.6	23.1	14.1	6.4	-1.2		100.0
% inheritors	37.4	22.3	22.3	22.3	13.5	42.2	25.9
Mean IW	13,500	7,000	3,000	6,500	7,500	1,500	7,000
Mean for IW>0	35,500	32,500	13,500	28,500	54,500	8,000	29,500
Median IW>0	5,000	4,500	4,000	5,000	4,000	3,000	4,500
Quintile share of IW	35.0	19.0	7.8	16.7	19.4	2.2	100.0
45-54							
Mean NWX05	470,000	210,500	135,500	70,000	-6,000		175,500
Quintile share of NWX05	53.4	23.9	15.5	7.9	-0.7		100.0
% inheritors	35.5	37.0	28.1	26.8	19.4	48.6	31.9
Mean IW	19,000	9,000	7,000	10,000	21,500	7,500	13,000
Mean for IW>0	54,000	24,500	24,500	37,500	111,000	32,500	44,500
Median IW>0	17,000	9,000	5,500	11,000	28,000	11,000	11,000
Quintile share of IW	27.1	12.7	9.8	14.3	30.7	5.3	100.0
55-64							
Mean NWX05	541,500	251,000	169,500	107,000	9,000		215,000
Quintile share of NWX05	50.0	23.4	15.8	10.0	0.9		100.0
% inheritors	48.7	36.2	26.7	36.2	16.4	64.6	38.0
Mean IW	16,000	13,500	11,000	15,000	11,000	7,000	13,000
Mean for IW>0	33,000	37,000	41,500	42,000	67,000	22,500	39,000
Median IW>0	12,000	17,500	12,000	7,000	32,000	10,500	11,500
Quintile share of IW	22.8	19.1	15.8	21.5	15.60	5.2	100.0

	Quintile of 2005 net worth excluding inheritance						All
	Top	4th	3rd	2nd	Bottom	Missing	
65-74							
Mean NWX05	536,500	269,000	170,500	85,500	-500		212,000
Quintile share of NWX05	50.4	25.3	16.2	8.1	0.00		100.0
% inheritors	32.6	24.4	27.6	22.1	12.6	54.5	26.0
Mean IW	19,500	14,500	5,500	13,000	500	1,000	10,500
Mean for IW>0	60,000	59,500	20,500	57,500	6,000	12,000	44,500
Median IW>0	13,500	22,000	11,500	11,500	3,000	12,000	11,000
Quintile share of IW	36.5	27.2	10.8	23.8	1.4	0.30	100.0
over 75							
Mean NWX05	422,500	197,000	130,500	50,000	-1,000		159,500
Quintile share of NWX05	52.9	24.7	16.4	6.1	-0.1		100.0
% inheritors	15.5	8.7	9.7	11.90	9.4	28.3	12.7
Mean IW	5,000	2,000	1,500	5,500	5,500	0	3,500
Mean for IW>0	32,000	20,000	16,000	46,000	57,000	0	34,000
Median IW>0	4,500	11,000	7,500	3,000	8,500	0	5,000
Quintile share of IW	25.9	9.1	8.2	27.9	28.9	0.0	100.0

Note: Net wealth includes housing equity and financial assets minus financial debt. Inherited wealth is the sum of all inheritances that the household received during the period 1996 to 2004. The sample in this table includes all wave 15 households with heads aged 25 or older in 2005 who had full inheritance history. Wealth figures are expressed in constant 2005 prices.

Table 14:The contribution of inheritances to 2005 net wealth inequality based on the decomposition of coefficient of variation

	Factor share (χ_f) %	Factor correlation NW (ρ_f)	CV	**Factor's contribution to total wealth inequality**		
				Proportionate contribution (s_f) %	Absolute contribution (S_f)	Per unit contribution s_f / χ_f
25-34						
Net wealth excluding inheritance	94.63	0.98	1.60	90.17	1.48	0.95
Inherited wealth	5.37	0.46	6.56	9.83	0.16	1.83
Net wealth	100.00	1.00	1.64	100.00	1.64	1.00
35-44						
Net wealth excluding inheritance	94.41	0.97	1.34	92.14	1.22	0.98
Inherited wealth	5.59	0.32	5.86	7.86	0.10	1.41
Net wealth	100.00	1.00	1.33	100.00	1.33	1.00
45-54						
Net wealth excluding inheritance	92.92	0.96	1.10	93.45	0.98	1.01
Inherited wealth	7.08	0.23	4.20	6.55	0.07	0.93
Net wealth	100.00	1.00	1.05	100.00	1.05	1.00
55-64						
Net wealth excluding inheritance	94.15	0.99	1.17	97.42	1.09	1.03
Inherited wealth	5.85	0.16	2.99	2.58	0.03	0.44
Net wealth	100.00	1.00	1.12	100.00	1.12	1.00
65-74						
Net wealth excluding inheritance	95.22	0.97	1.01	92.43	0.93	0.97
Inherited wealth	4.78	0.32	5.05	7.57	0.08	1.58
Net wealth	100.00	1.00	1.01	100.00	1.01	1.00
75+						
Net wealth excluding inheritance	97.65	0.99	1.15	98.19	1.11	1.01
Inherited wealth	2.35	0.13	6.64	1.81	0.02	0.77
Net wealth	100.00	1.00	1.13	100.00	1.13	1.00

Note: The results in this table are based on Shorrocks' decomposition rule (Shorrocks, 1982) using the formulation proposed by Jenkins (1995). Net wealth includes housing equity and financial assets minus financial debt. Inherited wealth is the sum of all inheritances that the household received during the period 1996 to 2004. The sample in this table includes all wave 15 households with heads aged 25 or older in 2005 who had full inheritance history. Wealth figures are expressed in constant 2005 prices.

Table 15:The distribution of inheritance (IW) by quintile of 1995 net worth excluding inheritance (NW95) and age group (with age defined as in 1995)

	Quintile of 1995 net worth excluding inheritance						All
	Top	4th	3rd	2nd	Bottom	Missing	
25-34							
Mean NW95 (£)	107,000	26,500	8,500	500	-6,000		27,000
Quintile share of NW95 (%)	78.5	19.4	6.2	0.4	-4.4		100.0
% inheritors	30.7	27.1	25.2	14.0	21.9	36.1	25.9
Mean IW (£)	17,500	7,000	5,500	1,500	6,500	2,500	7,000
Mean for IW>0 (£)	57,500	26,000	22,000	9,000	29,000	12,500	30,000
Median IW>0 (£)	6,000	10,000	3,500	2,000	5,000	3,000	5,000
Quintile share of IW (%)	43.9	17.8	13.8	3.1	16.6	4.9	100.0
35-44							
Mean NW95 (£)	215,500	61,500	34,500	13,000	-2,500		64,500
Quintile share of NW95 (%)	67.0	19.0	10.8	4.1	-0.8		100.0
% inheritors	36.3	28.1	28.1	28.9	20.0	51.6	31.9
Mean IW (£)	27,000	10,500	9,000	12,500	9,000	7,000	13,000
Mean for IW>0 (£)	75,000	36,500	33,000	42,500	44,000	22,000	44,500
Median IW>0 (£)	11,000	27,500	13,000	12,000	7,500	6,500	11,000
Quintile share of IW (%)	37.6	14.2	12.7	17.0	12.1	6.3	100.0
45-54							
Mean NW95 (£)	288,500	112,600	66,000	31,200	-200		99,500
Quintile share of NW95 (%)	57.9	22.6	13.3	6.3	-0.00		100.0
% inheritors	42.1	35.5	40.2	29.0	14.8	57.7	38.0
Mean IW (£)	16,600	21,900	12,500	10,400	5,600	10,200	12,900
Mean for IW>0 (£)	39,500	61,600	31,200	35,800	37,900	29,000	39,300
Median IW>0 (£)	16,100	21,500	13,400	6,800	7,300	7,600	11,900
Quintile share of IW (%)	21.6	28.5	16.3	13.5	7.4	12.7	100.00
55-64							
Mean NW95 (£)	363,000	151,000	89,000	46,500	2,000		130,000
Quintile share of NW95 (%)	55.8	23.2	13.6	7.1	0.3		100.0
% inheritors	40.5	22.8	24.1	15.2	15.0	40.6	26.0
Mean IW (£)	28,000	9,000	4,500	1,500	11,500	4,500	10,500
Mean for IW>0 (£)	68,500	40,500	19,500	11,000	77,500	22,000	44,500
Median IW>0 (£)	15,000	22,500	5,500	3,500	7,500	11,000	11,000
Quintile share of IW (%)	47.7	15.9	8.1	2.9	20.2	5.3	100.0

Note: Net wealth includes housing equity and financial assets minus financial debt. Inherited wealth is the sum of all inheritances that the household received during the period 1996 to 2004. The sample in this table includes all wave 15 households with heads aged 25 or older in 1995 who had full inheritance history. Wealth figures are expressed in constant 2005 prices.

Table 16: The contribution of inheritances on the degree of inequality in the hypothetical 1995 net worth distribution including inheritances based on the decomposition of coefficient of variation

	Factor share (χ_f) %	Factor correlation NW (ρ_f)	CV	Contribution of inheritance to total wealth inequality		
				Proportionate contribution (s_f) %	Absolute contribution (S_f)	Per unit contribution s_f / χ_f
25-34 (age as in 1995)						
1995 net wealth	78.09	0.82	2.17	62.32	1.40	0.80
Inherited wealth	21.91	0.66	5.84	37.68	0.84	1.72
1995 net wealth including inheritance	100.00	1.00	2.24	100.00	2.24	1.00
35-44						
1995 net wealth	82.59	0.93	2.11	83.74	1.61	1.01
Inherited wealth	17.41	0.43	4.20	16.26	0.31	0.93
1995 net wealth including inheritance	100.00	1.00	1.93	100.00	1.93	1.00
45-54						
1995 net wealth	88.21	0.96	1.33	89.31	1.12	1.01
Inherited wealth	11.79	0.38	3.02	10.69	0.13	0.91
1995 net wealth including inheritance	100.00	1.00	1.26	100.00	1.26	1.00
55-64						
1995 net wealth	92.19	0.94	1.12	83.80	0.97	0.91
Inherited wealth	7.81	0.48	5.07	16.20	0.19	2.07
1995 net wealth including inheritance	100.00	1.00	1.16	100.00	1.16	1.00

Note: The results in this table are based on Shorrocks' decomposition rule (Shorrocks, 1982) using the formulation proposed by Jenkins (1995). Net wealth includes housing equity and financial assets minus financial debt. Inherited wealth is the sum of all inheritances that the household received during the period 1996 to 2004. The sample in this table includes all wave 15 households with heads aged 25 or older in 1995 who had full inheritance history. Wealth figures are expressed in constant 2005 prices.

Appendix

Table A1: The association between inheritance and wealth change between 1995 and 2005: Intact couples

	% inheriting	1995 NW	2005 NW	Change in NW (DNW)	Mean IW	Mean IW (3% rate of return)	IW/ DNW	IW/ DNW (3% rate of return)
All intact couples*								
Bottom	24	-2,400	66,100	68,400	4,700	5,300	0.07	0.08
2nd	33	18,100	143,900	125,800	12,400	14,100	0.10	0.11
3rd	31	51,900	181,100	129,200	9,400	10,600	0.07	0.08
4th	36	102,500	270,900	168,400	19,200	22,000	0.11	0.13
Top	41	298,800	457,200	158,500	20,600	23,500	0.13	0.15
All	33	93,800	223,800	130,100	13,100	14,900	0.10	0.11
Obs. 1,475								
Non inheriting								
Bottom	0.0	-2,100	48,200	50,400				
2nd	0.0	17,600	124,500	106,900				
3rd	0.0	51,800	168,800	117,000				
4th	0.0	101,600	238,700	137,200				
Top	0.0	276,900	442,300	165,400				
All	0.0	81,600	193,700	112,200				
Inheriting								
Bottom	1.0	-3,100	123,400	126,500	22,200	24,900	0.18	0.20
2nd	1.0	19,000	183,500	164,300	43,600	49,400	0.27	0.30
3rd	1.0	52,200	209,100	156,900	32,200	36,500	0.21	0.23
4th	1.0	104,100	329,100	225,000	60,700	69,400	0.27	0.31
Top	1.0	329,700	478,400	148,700	58,800	67,300	0.40	0.45
All	1.0	-2,400	66,100	68,400	4,700	5,300	0.27	0.31

% of the difference in wealth growth accounted by inheritance	Non capitalised inheritance	Capitalised inheritances
Bottom	0.29	0.33
2nd	0.76	0.86
3rd	0.81	0.92
4th	0.69	0.79
Top	-3.53	-4.04
All	0.83	0.94