How much do lifetime earnings explain retirement resources?

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Abstract

We use a unique dataset, containing individual survey data from the English Longitudinal Study of Ageing linked to administrative data on earnings histories from administrative records, to construct measures of lifetime earnings and examine how these relate to financial resources in retirement. Retirement income and wealth at retirement is, as expected, positively correlated with lifetime earnings but there is also substantial dispersion in retirement income and retirement wealth among people with similar lifetime earnings. For example, we find that those with greater numerical ability and higher education tend to have greater retirement resources even after controlling for differences in lifetime earnings. The retirement resources of single women are far less well explained by their own lifetime earnings than those of couples or single men. We hypothesise that, as the vast majority of single women in the age group considered had previously been married and are now widowed or divorced, this reflects the fact that we do not observe the lifetime earnings of their former spouses.

Keywords: lifetime earnings, savings, wealth, retirement
JEL classification: D91, H25

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of the Labour Force Survey data has been permitted by the UK Data Archive. Responsibility for interpretation of the data, as well as for any errors, is the authors' alone.

1. Introduction

Recent years have seen greater-than-expected increases in life expectancies and weaker-than-expected investment returns. Furthermore, the level of income that an individual could expect to get from state pensions, if he was on average earnings throughout his working life, in proportion to his working life earnings, peaked for those reaching State Pension Age (SPA) in about 2000.[1] Private sector employers' provision of occupational pension schemes to their employees has also been declining.[2]

Against this backdrop it is perhaps unsurprising that the focus of UK pension policy has been the adequacy – or otherwise – of working age individuals' provision for their own retirement. Accurate and timely information on the level and distribution of retirement resources, and the characteristics of those who are at greater risk of not making appropriate retirement saving decisions, are therefore an important ingredient in determining which, if any, reforms might be sensible to pursue.

This paper builds on previous work funded by the Department for Work and Pensions (Bozio, Crawford, Emmerson and Tetlow, 2010), which provided some of the first recent analyses of the relationship between UK individuals' lifetime earnings and their subsequent retirement income. This paper presents a more detailed review of the evidence from the linkage of administrative data on earnings and survey data from the English Longitudinal Study of Ageing (ELSA).

The main difficulty in assessing the appropriateness of individual retirement provision comes from the need to understand the behaviour of wealth accumulation. Low wealth at retirement could be explained by a variety of reasons. First, it could simply represent a rational choice to save little during one's lifetime: for example, due to having low lifetime earnings, high consumption needs or a personal preference to consume a large proportion of lifetime earnings during working life rather than in retirement. Second, it could represent adverse shocks – to, for example, health, earnings or investment returns – reducing retirement incomes of some individuals. Third, it could be due to some individuals being myopic and therefore tending to spend too much during working life and leaving them with less spending capacity than they would like during retirement.

This reflects an old debate in economics on the respective influences of "choice" versus "chance" in wealth accumulation, and a more recent debate on whether decision makers

[1] Assertion relates to state pension income as a share of earnings at age 50. See, for example, Bozio, Crawford and Tetlow (2010): Figures 7.1 and 7.2 show state pension income as a share of age 50 earnings for individuals earning at the level of median male earnings in each year of their working life (under pre- and post-Pensions Act 2007 policy).

[2] See, for example, chapter 7 of ONS (2010) and Forth and Stokes (2010).

are "rational" or "myopic". Milton Friedman (1953, 1957) was the first to suggest that the fact that saving rates are observed to increase with current income should not lead to the conclusion that the "rich save more". He postulated that available evidence could not reject that saving rates could be constant across the *permanent income* distribution. If that were true, inequalities in ratios of lifetime wealth to lifetime earnings would simply reflect differences in preferences about risk taking or time preferences. More recently the debate has been renewed by the question on whether low rates of saving reflect myopic behaviour – in which case there might be a role for policy in encouraging greater saving – or rational choices – in which case there is likely to be less of a justification for policy intervention.[3] The policy debate focused on whether tax incentives for retirement saving vehicles were leading to genuinely new saving or were simply displacing other forms of saving (Poterba *et al*. 1996, Engen *et al*. 1996).

More recent research in the United States has renewed this debate. Using administrative data on earnings histories linked with the Health and Retirement Study (HRS), researchers have analysed how wealth in retirement is associated with levels of lifetime earnings (Gustman and Steinmeier 1999, Venti and Wise 2000). They found that ratios of retirement wealth to lifetime earnings were roughly constant across the lifetime income distribution, thus reinforcing Friedman's view. On the other hand, using recent data on consumption and wealth in retirement, other researchers have come to the opposite conclusion – in other words, that actually the rich do save more as a share of their income (Dynan, Skinner and Zeldes 2004).

In this paper we look at the wealth holdings of individuals aged 61 to 75 in England in 2002–03 and how these relate to their lifetime earnings, using a new dataset containing detailed information on both these items.[4] (Section 2 provides a detailed description of the data and measures used.) We examine the extent to which lifetime earnings can explain variation in wealth holdings in early retirement and how the ratio of wealth holdings to lifetime earnings differs across the distribution of lifetime earnings.

Earlier debate in the literature has been confined to the US, for lack of evidence on other countries. This paper extends the evidence base to England by using newly available information from ELSA on the lifetime earnings and a wide range of measures of current circumstances of a sample of older individuals living in households in England. We focus specifically on the cohort of individuals born between 1927 and 1941 (aged 61 to 75 in 2002–03). Information on lifetime earnings comes from National Insurance (NI)

[3] How much individuals save over their lifetimes and for what purposes also has important implications for the appropriate treatment of savings and wealth in the tax system. We will not address those issues here; interested readers may wish to refer to Banks and Diamond (2010) for a discussion.

[4] In this paper, we do not attempt to explain variation in lifetime earnings. Unpredictable events, such as adverse health shocks, may affect the level of wealth an individual holds at retirement because they actually reduce the individual's available resources by reducing their earning capacity. This is an interesting issue in its own right, but not one we address here.

records, which are collected by the government in order to keep track of individual entitlements to certain state benefits.

Though the level of lifetime earnings (at least for couples and single men) is strongly correlated with wealth holdings, we find that there is still considerable variation in the level of wealth holdings even among individuals (or households) with similar levels of lifetime earnings. Controlling for a number of other indicators of past circumstances and experience of "chance" events – such as, periods out of the labour market – explains some of the additional variation in wealth holdings, though some other past circumstances – in particular, number of children – are found to be unrelated to wealth holdings, once we have controlled for lifetime earnings. We also find that controlling for a potential indicator of investment performance (individuals' numeracy), an indicator of preferences (educational attainment), and expectations of future resource needs (as measured by expectations of surviving for the next 10 to 15 years) explain some of the remaining variation in wealth holdings. The residual variation in wealth holdings could be explained by unmeasured differences in resources (such as past receipt of inheritances and gifts, or past self-employment income), other differences in tastes for wealth accumulation or other shocks. Though we exclude those who are likely to have had substantial self-employment income, the dataset we use does not contain a comprehensive measure of gifts and inheritances or self-employment income so we cannot definitively distinguish between unmeasured variation in other resources and differences in tastes.

We do not here attempt to model explicitly the impact of shocks or decisions that could affect both lifetime earnings and the amount of income saved during the lifetime. For instance, the decision to have children might impact both the total amount of lifetime earnings and the savings rate of households. Other examples could include the age of retirement, health shocks, education level and numeracy. Our methodology takes lifetime earnings as given and assesses how characteristics are associated with higher or lower wealth accumulation for a given level of lifetime earnings. If shocks or choices also impact lifetime earnings, we cannot identify their causal effect on wealth accumulation independently from their direct impact on lifetime earnings.

Notwithstanding these caveats, our results are similar to those from US studies by Gustman and Steinmeier (1999) and Venti and Wise (2000) who follow a similar approach to that which we use here: that is, we find relatively constant ratios of wealth in retirement to lifetime earnings across the lifetime earnings distribution. At the same time, we unveil significant dispersion of retirement resources conditional on lifetime earnings.

Section 2 describes in detail the data we use and how we construct a measure of lifetime earnings using the administrative data. Section 3 presents some descriptive statistics of

how income and wealth at retirement vary, both by and within deciles of lifetime earnings. Section 4 presents multivariate analysis of the factors associated with dispersion in levels of wealth and ratios of wealth to lifetime earnings, examining other factors in addition to lifetime earnings. We present analysis by type of wealth, contrasting the redistribution occurring through state pension wealth with determinants of private wealth. Section 5 concludes.

2. Data

a. The English Longitudinal Study of Ageing

ELSA is a biennial longitudinal survey of a representative sample of the English household population aged 50 and over (plus their partners). The first wave was conducted between April 2002 and March 2003 and sampled 12,099 individuals (of whom 11,391 were core sample members, the remainder were individuals aged under 50 who were the partners of core sample members) from 7,934 households. There are currently four waves of data available (2002–03, 2004–05, 2006–07 and 2008–09). The third wave of ELSA (2006–07) also included a new sample of individuals aged 50–53 and the fourth wave (2008–09) included a refreshment sample of all ages 50–75.

ELSA collects a wide range of information on individuals' circumstances. This includes detailed measures of their financial situation: income from all sources (including earnings, self-employment income, benefits and pensions), non-pension wealth (including the type and amount of financial assets, property, business assets and antiques) and private pension wealth (including information on past contributions and details of current scheme rules). We also make use of estimates of state pension wealth that have been calculated using information from individuals' NI records (Bozio, Crawford, Emmerson and Tetlow 2010). Private and state pension wealth is expressed as the present discounted value of the future stream of pension income to which an individual is entitled. For further details on the calculation of private pension wealth in ELSA see Banks, Emmerson and Tetlow (2005). ELSA also collects information on individuals' physical and mental health, social participation and expectations of future events (such as surviving to some older age or receiving an inheritance).

The key outcomes from ELSA that we utilise in this paper are those relating to retirement resources. Specifically, we examine retirement income[5] (net of taxes) and wealth (net of outstanding debts) at or near retirement (from all sources) observed in

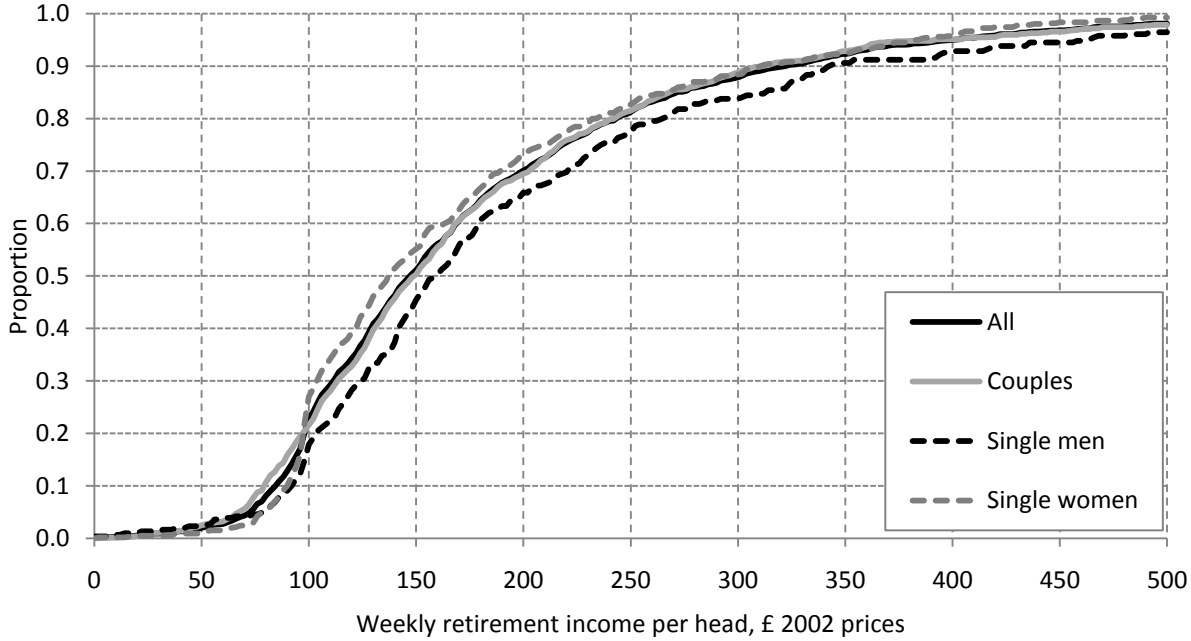
[5] For ease of exposition, throughout this paper we will use the term "retirement income" to refer to the total amount of income that the individuals we consider (namely those aged between 61 and 75 in 2002–03) had in 2002–03. Some of these individuals may not actually consider themselves to be "retired", and the income measure we describe includes any earned income that individuals may have had.

the first wave (2002–03) of ELSA.[6] We examine only those who were born between 1927 and 1941. The reason for choosing these particular cohorts is discussed in the next subsection. All the analysis presented in the remainder of this paper includes only the sample of ELSA respondents who were (or where the man in a couple was) born between 1927 and 1941, for whom data from NI records are available and who had had no more than five years in which they paid self-employed NI contributions (see below), and for whom measures of income and wealth are available from the ELSA data.

Throughout this paper, individuals are classified as being either in a couple or being single on the basis of their status when interviewed in 2002–03. The majority of men and women who were single when interviewed in 2002–03 (72.1% and 89.8%, respectively) had previously been in a couple but had subsequently separated, divorced or been widowed.

The measure of retirement income that we use is the sum of income from all sources, namely: private pension income, asset income (e.g. rental income from property and interest on investments), earnings, self-employment income, state pension income, and other state benefits. All these are measured net of taxes. Figure 2.1 presents the cumulative distribution of weekly net retirement income (per head), from the ELSA data. This is computed as total net weekly income divided by the number of people in the family (i.e. one for singles and two for couples).

Figure 2.1. Cumulative distribution of weekly retirement income (per head) in 2002–03



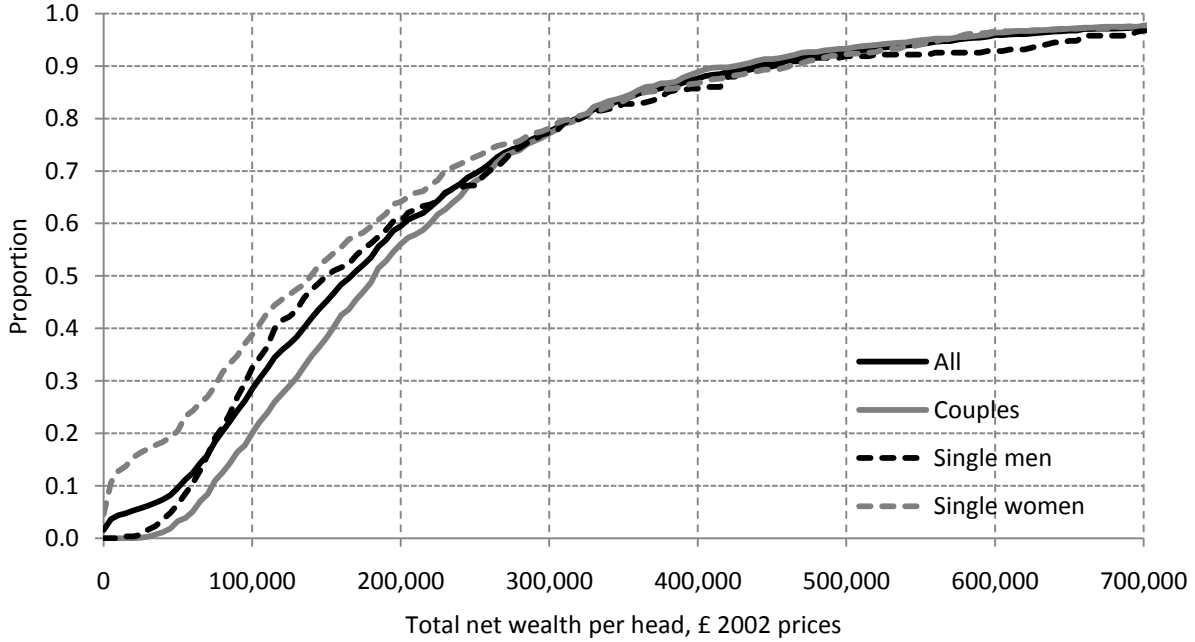
[6] We use the 2002–03 sample members and outcomes as measured in 2002–03 because, as discussed below, linked data from NI records are available for most of this group. It should be possible in future also to link new sample members from the third and fourth waves of ELSA to their NI records, where permission has been given and subject to resource constraints.

Note: The measure of income shown is total net family income per adult in 2002–03. Sample is individuals (or couples where the man was) born between 1927 and 1941. Excludes individuals for whom family wealth and income could not be calculated or for whom linked NI data are not available. Also excludes singles and couples who had (or where either partner had) more than five years in which they paid class 2 (self-employment) NI contributions. Sample size = 967 couples, 308 single men, 655 single women.

A greater fraction of single men have higher levels of income per person than couples; the converse is true for single women. The median (50th percentile) weekly retirement income among those in couples was about £149 per person, compared with about £159 among single men and £137 among single women. Of course, if there are returns to scale in households (that is, if two people do not need as much as twice the income of a single person to maintain the same standard of living), then a couple with a given income per head may be better off than a single person with the same income per head. All the results presented in Sections 3 and 4 consider couples and singles separately. This is partly to avoid the somewhat arbitrary nature of any attempt to account for returns to scale within households, but also (as is discussed below) because there is evidence that we may be missing an important component of the "lifetime resources" of singles due to the fact that we do not observe lifetime earnings of previous partners.

The measure of wealth that we examine in this paper is total wealth, net of outstanding debts. Specifically we include: wealth from private pensions, state pensions, owner-occupied housing, other property, business assets and financial assets. Wealth is measured net of outstanding secured and unsecured debts. Figure 2.2 shows the cumulative distribution of total net wealth per adult for the same group of singles and couples as shown in Figure 2.1. The figures shown in Figure 2.2 are per adult – that is, total family wealth divided by two for couples, and one for singles.

Figure 2.2. Cumulative distribution of total net wealth (per head) in 2002–03



Note: The measure of wealth shown is total net family wealth per head in 2002–03. Sample is individuals

(or couples where the man was) born between 1927 and 1941. Excludes individuals for whom family wealth and income could not be calculated or for whom linked NI data are not available. Also excludes singles and couples who had (or where either partner had) more than five years in which they paid class 2 (self-employment) NI contributions. Sample size = 967 couples, 308 single men, 655 single women.

The differences between the wealth distributions for couples and singles are rather different from the comparison above of incomes. A smaller fraction of couples have low levels of wealth than singles do. Median (50th percentile) wealth holdings per adult were about £185,000 per adult for couples, compared with about £150,000 for single men and £140,000 for single women.

b. National Insurance records

ELSA respondents were asked for permission to link to their NI records. These administrative data have been gathered by the UK Government since 1948 in order to establish individuals' contribution records and their rights to claim contributory benefits such as state pensions (see Bozio, Crawford and Tetlow (2010) for a history of state pensions in the UK). For the period 1948 to 1975, these data record the number of weeks' contributions paid (that is, the number of weeks in which an individual earned above the Lower Earnings Limit (LEL)). For each year since 1975, earnings between the LEL and the Upper Earnings Limit (UEL) have also been recorded.[7] Self-employed individuals pay a flat-rate contribution (known as class 2 contributions) for weeks in which their self-employment profits are sufficiently high.[8] The NI records, therefore, contain information on the number of weeks of self-employment that an individual had during any given year, but no measure of their actual self-employment income. We therefore exclude from our analysis any individuals who (or couples in which one individual) had more than five years in which they paid self-employed NI contributions.[9]

Among respondents to the first wave of ELSA, 79.0% ultimately gave their permission for a link to be made to their NI records and 71.8% have now been successfully linked. Among those not linked, the most common reason was that the respondent did not consent to the link being done, although there was a not insubstantial minority of respondents who gave consent but for whom a successful match was not possible. A small number of individuals were never asked for permission; in most of these cases this was because the survey was conducted by a proxy respondent, who (for obvious reasons) was not asked to provide consent for the link to NI records to be done. Table

[7] Before 1975, the NI data only reports the total number of weekly contributions made without detailing the years in which these contributions were made. From 1997 onwards, more detailed information on individual earnings above the UEL is also available from the NI records.

[8] Self-employed individuals also pay additional contributions in proportion to their profits, known as class 4 contributions. However, the value of these is not included in the NI records.

[9] As a result we exclude 16.4% of couples from the sample of ELSA respondents for whom NI records are available and, respectively, 10.8% and 1.7% of single men and single women.

2.1 describes the division of the ELSA wave 1 survey respondents into the various linkage groups.

Detailed analysis of the degree to which the matched sample is representative of the overall ELSA sample can be found in Section 2 of Bozio, Crawford, Emmerson and Tetlow (2010). They conclude that "the matched subsample is broadly representative of the entire ELSA sample". However, those at very old ages and the self-employed were both found to be underrepresented in the matched sample (with those at older ages being relatively more likely not to be matched due to data problems and the self-employed being relatively more likely not to consent to the matching being done). The under representation of these two groups is of less concern for this study: we examine those aged 61 to 75 (inclusive) in 2002–03 and therefore exclude the very old, and (as mentioned above) we exclude those with significant spells of self-employment.

Table 2.1. Summary of success in matching ELSA sample members to National Insurance records

	Frequency	Percentage
All (Full ELSA Sample)	11,391	100.0
Successfully Linked	8,177	71.8
Not Linked	3,214	28.2
Of Which		
Data Problems	824	7.2
Did not give consent	2,180	19.1
Were not asked	210	1.8

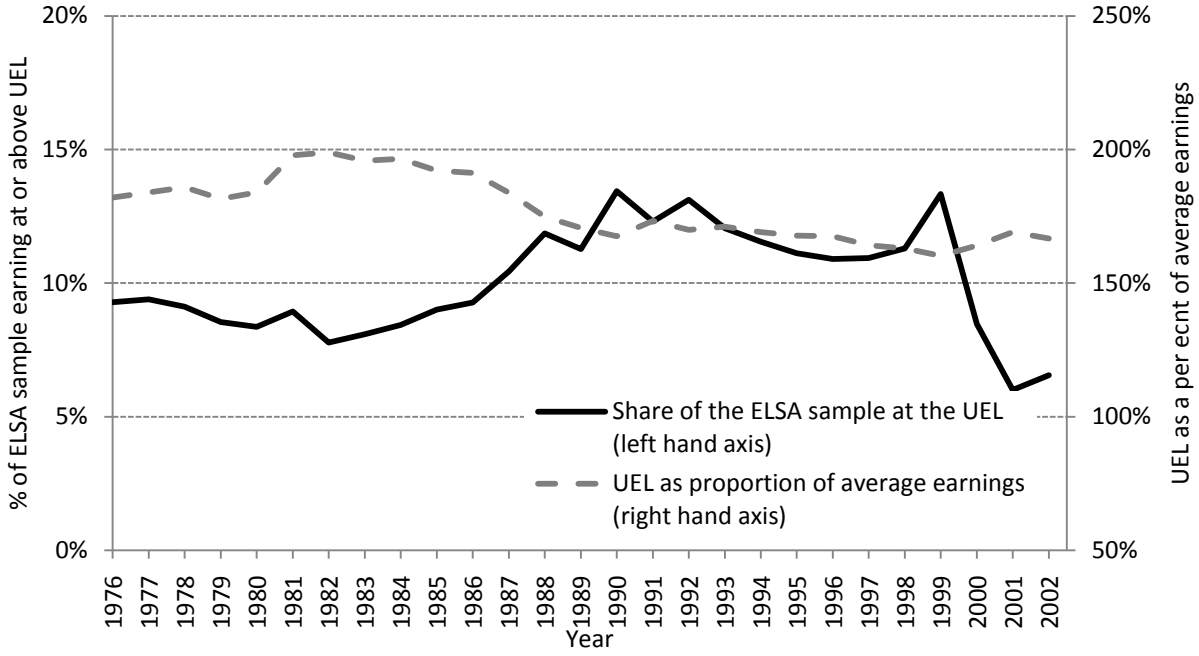
Source: Table 2.1 of Bozio, Crawford, Emmerson and Tetlow (2010).

For the purposes of this paper, we are interested in constructing a measure of total lifetime earnings. The NI records provide extremely detailed and accurate information on this that has never previously been available for the respondents to any household survey in Britain. However, they still do suffer from some limitations. First, earnings are recorded only if they were above the LEL, i.e. only if they gave rise to a liability to pay NI contributions. However, given the low level of the LEL, this will only marginally affect our estimates of lifetime earnings for most individuals. Second, prior to 1997 the NI data only record earnings up to the UEL. Third, the NI records only contain details of earnings back to 1975. Since the focus of this paper is individuals aged 61 to 75 (inclusive) in 2002–03, this means we will have earnings from age 48 for the oldest individuals in our sample and from age 34 for the youngest individuals in our sample. We now turn to describe how we address each of the last two problems in turn.

The solid line in Figure 2.3 (measured on the left-hand axis) shows the proportion of our chosen sample that had earnings at or above the UEL in each year from 1976 to 2002. This gives an indication of the extent to which the capping of earnings at the UEL

in the NI data is a problem in each year. The dotted line shows, on the right-hand axis, the level of the UEL relative to average earnings in each year. In the early 1980s, the UEL was equal to about twice average earnings. Since then the UEL has typically been increased in line with the Retail Price Index (RPI) whereas earnings have, on average, grown faster than this. This has led to the UEL falling relative to average earnings, reaching just above 1.6 times average earnings in 2002. In all years the majority of individuals in our sample are unaffected by the capping at the UEL, although the proportion whose earnings were capped increased from about 9% in the second half of the 1970s to between 11% and 13% in most years of the 1990s. This increase will in part be due to the value of the UEL declining relative to average earnings but also due to the fact that many of those born between 1927 and 1941 (inclusive) – the focus of this study – will have seen their earnings peak in the early 1990s (when most of them will have been in their fifties).

Figure 2.3. Fraction of individuals with earnings capped at the Upper Earnings Limit and the level of the UEL relative to average earnings: 1976 to 2002



Note: Sample is individuals born between 1927 and 1941. Excludes individuals for whom family wealth and income could not be calculated from the 2002–03 ELSA data or for whom linked NI data are not available. Sample size = 49,940 person-year observations.

In order to estimate earnings above the UEL, we use a multivariate regression technique that takes into account the fact that the variable of interest in our data – annual earnings – is censored at the UEL. This technique is known as a tobit regression and we use this to estimate how (log) earnings varies with age and its square in our data. This analysis is conducted separately for each year by sex and three different education levels

(defined based on formal qualifications).[10] Previous studies using the US Health and Retirement Study have followed the same technique to account for similar censoring in US administrative data (Gustman and Steinmeier 1999, Venti and Wise 2000).

The second stage of our estimation is to simulate earnings in years before 1975. From the NI data we know how many weeks the individual made NI contributions (i.e. earned above the LEL) between 1948 and 1975, but we do not know what was his/her earnings were in those years nor when exactly he/she made the contributions. Our estimation of earnings prior to 1975 proceeds in three steps:

i. For each individual we estimate what their earnings growth would have been in each year (based on their age, sex and education level) had they been in paid work. This is done taking average economy-wide earnings growth for each year (which are available from the ONS) and then adjusting this to account for the fact that individuals of different ages, sexes and education levels experience, on average, different increases in earnings. This adjustment was done using estimated coefficients on age and age squared from regressions using data from the Labour Force Survey from 1996 to 2006, split by educational qualifications and sex.[11]
ii. In order to get the *level* of possible earnings for each individual for each year prior to 1975, we backcast by applying the estimates of earnings growth from step (i) to the earliest estimate of the level of earnings available in the NI data. So, for someone who has earnings observed in 1975, we use these earnings together with estimated earnings growth from step (i) to impute potential earnings in earlier years. If earnings were not observed for an individual in 1975, we instead use the first observation of earnings after 1975 to impute potential earnings for all years before 1975.
iii. Finally, to obtain an estimate of actual earnings using the computed information on potential earnings from step (ii), we have made an assumption about which years the individual was in paid work. For men we have assumed that all contributing weeks between 1948 and 1975 occurred just before 1975 without any breaks. This is equivalent to assuming that all periods of unemployment (and other periods spent not in paid work) were at the start of the working life. For women we made the opposite assumption: i.e. we have assumed that periods of work (as captured by weekly NI contributions paid between 1948 and 1975) ran continuously from the year in which a woman left full-time education. This is equivalent to assuming that all periods of unemployment (and other periods spent not in paid work) were experienced directly prior to 1975. This seemed a more appropriate assumption for

[10] This is a total of 27 years times 2 sexes times 3 education groups = 162 separate tobits. In order to predict earnings using the estimated coefficients on age and age^2 from the tobit on log earnings, we include an adjustment – following equation 6.40 of Wooldridge (2002) – to allow for the change of focus from log earnings to earnings.

[11] We use the same methodology and same data as Disney, Emmerson and Tetlow (2009).

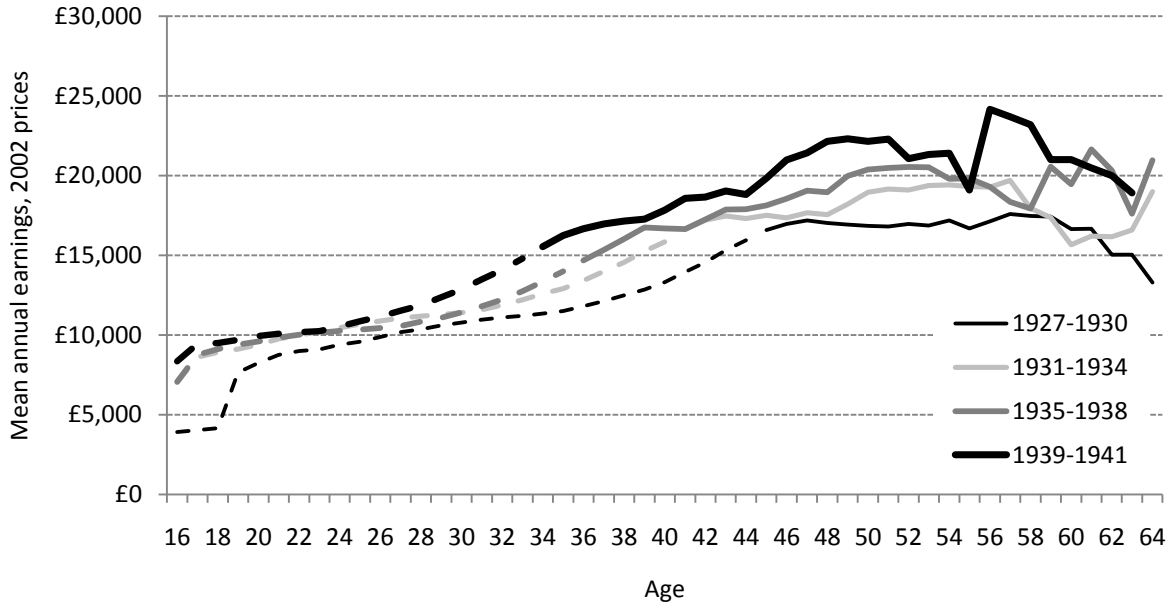
women, as they are more likely to have entered the labour market immediately after leaving school, but then left the labour market when they had their first child.[12] (Sensitivity analysis shows that making the same assumption for women as for men does not affect the results significantly.) We assume that individuals did not have any earnings prior to 1948 unless they are among the small minority of men and women who are recorded as having made contributions to the pre-1948 old age pension. For these individuals we estimate earnings from the exact date at which their contributions started.

Figure 2.4 shows average (mean) earnings for men who were in employment at each age based on the information in the NI records and adjusted for earnings above the UEL and for years prior to 1975 (as described above) – each birth cohort is shown separately. Similar figures for women are shown in Figure 2.5. All monetary values are shown in 2002 prices (inflated using the RPI). The years for which data have been backcast (as described above) are shown by dotted rather than solid lines. For analysis of the data on earnings up to the UEL – i.e. without the adjustment for earnings above the UEL – see section 4 of Bozio, Crawford, Emmerson and Tetlow (2010).

For men, in Figure 2.4, we can see that later cohorts tend to have higher earnings at a given age than earlier cohorts had. This reflects real economy-wide earnings growth over time. The profile is generally hump shaped, with earnings increasing with experience up to the mid-fifties and then earnings decreasing through the late-fifties and early sixties. This decrease in mean earnings towards the end of working life could reflect higher earning individuals retiring earlier or perhaps also a reduction in the average number of hours worked as individuals get older.

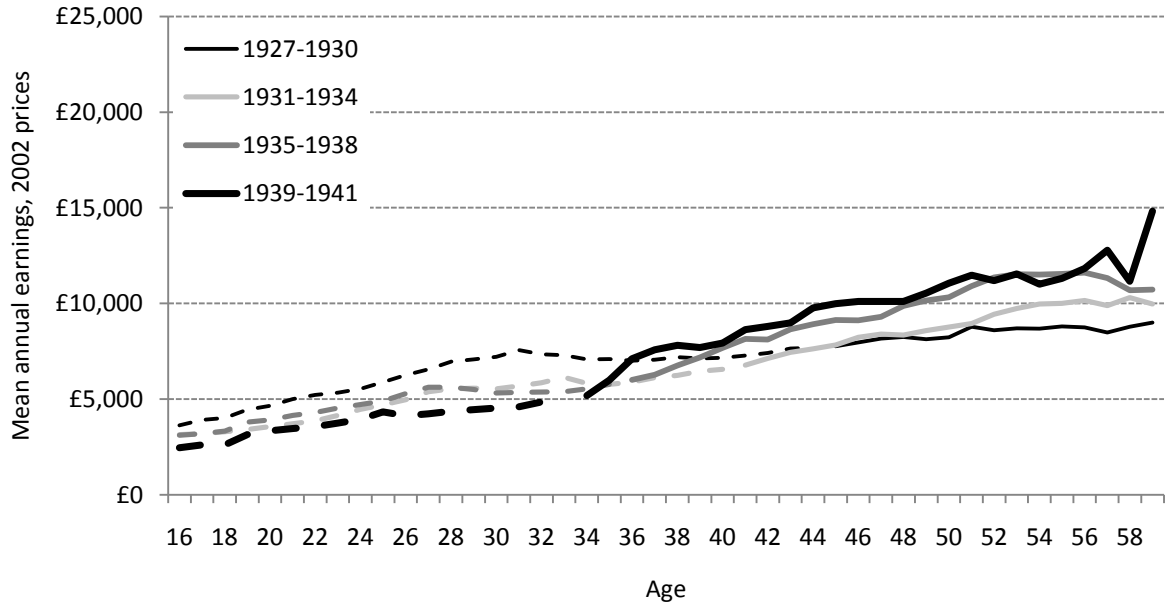
[12] Data from the ELSA life history interview suggest that the vast majority of women in this cohort (89.5%) had at least one child who was born alive and that these women were significantly more likely to have been in paid work before their first child was born than after they had had their first child. The median (mean) age of first births in this cohort from the ELSA life history data was found to be 24 (25.3) years old.

Figure 2.4 Average simulated annual earnings for men in employment, by cohort (in 2002 prices)



Note: Figures shown are mean earnings across all employed individuals. Sample is all individuals born between 1927 and 1941 observed in the 2002–03 wave of ELSA for whom information on family wealth and income in 2002–03, along with linked NI data, were available.

Figure 2.5 Average simulated annual earnings for women in employment, by cohort (in 2002 prices)



Note: Figures shown are mean earnings across all individuals. Sample is all individuals born between 1927 and 1941 observed in the 2002–03 wave of ELSA for whom information on family wealth and income in 2002–03, along with linked NI data were available.

For women, the age profile is flatter. This reflects in part the less steep age-earnings profile estimated for women, but also the fact that women are more likely to have

incomplete careers or to have had long periods of their life working part time. Our methodology relies on using annual earnings observed post 1975 – when these cohorts were aged 35 and over – and simulating backward their earnings using information on their participation in the labour market. These assumptions are more likely to be robust for individuals working continuously than for those who have changed their working pattern markedly. As a result our estimations of women's earnings in the beginning of their life should be treated with more caution than the estimates for their male counterparts.

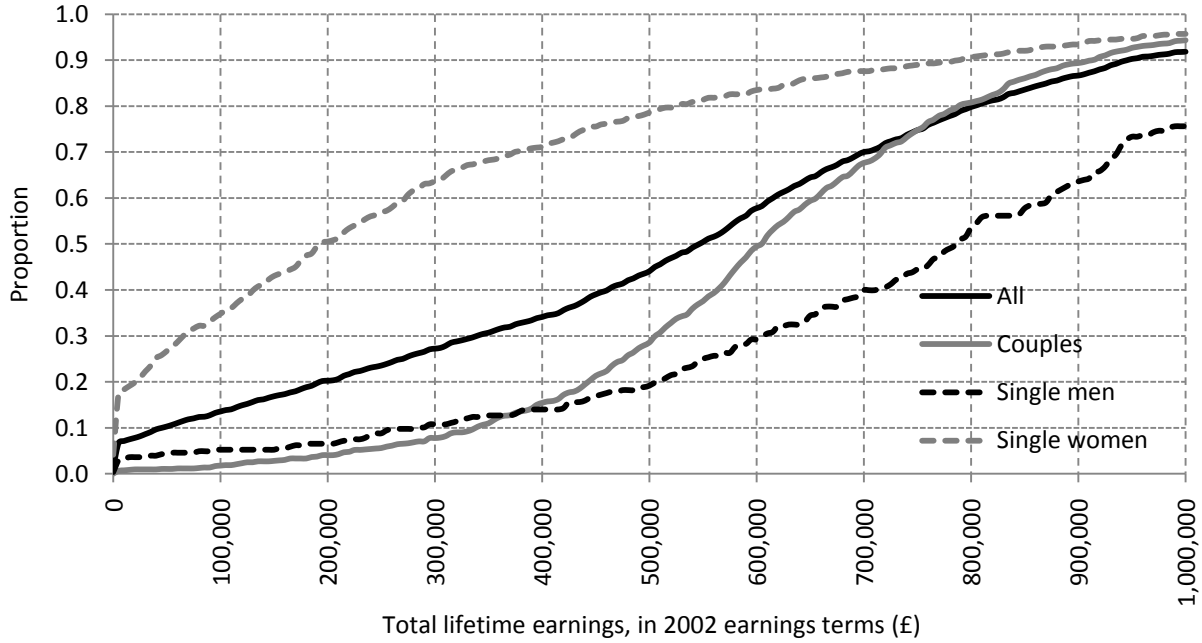
The final step necessary to construct the lifetime earnings measure is to sum the earnings for each benefit unit. First, we up-rate earnings from the year in which they were earned to 2002 using average earnings growth.[13] Then we sum, for each individual, all the earnings from age 16 to 59 (inclusive). For couples, we then add the earnings of both partners. This is the measure of lifetime earnings used throughout the remainder of this report.

Figure 2.6 presents the cumulative distribution of estimated lifetime earnings per head, decomposed by family type. For couples, the combined earnings of both partners have been divided by two in order to compare the per capita figures with those for singles.[14] Because many high earning individuals have partners who had lower earnings than they did, earnings per head are less dispersed among couples than among single men. Single men are found, on average, to have had much higher lifetime earnings than single women: for example, median total earnings between 1975 and 2002 for currently single men born between 1927 and 1941 amounted to £790,000 while for currently single women in the same cohort, median total earnings over this period were just £200,000.

[13] Average earnings growth is measured using the Average Earnings Index for 1963 onwards, and using figures from Alford *et al* (1973) for adult male manufacturing wages for the period 1929 to 1962. Another possibility would have been to use a constant discount rate. We have used average earnings growth over the period as the discount rate in order to be able to express lifetime earnings in 2002 earnings terms.

[14] If there are returns to scale in households (that is, if two people do not need twice as much income to maintain the same standard of living as a single person), then a couple with a given level of lifetime earnings per head may be better off than a single person with the same lifetime earnings.

Figure 2.6 Cumulative distribution of estimated total lifetime earnings per head (measured in 2002 earnings terms)



Note: Individuals born between 1927 and 1941. Lifetime earnings is the sum of earnings uprated by the average earnings growth.

Figures 2.1, 2.2 and 2.6 draw attention to several important aspects of the distribution of retirement income, wealth at retirement and lifetime earnings. First, we find that many currently single women have had very low lifetime earnings (Figure 2.6), even though their retirement incomes and retirement wealth are not so dissimilar from that of single men (Figures 2.1 and 2.2, respectively). One likely explanation is that, since the vast majority of these women were previously married, while they might have had low earnings during their careers (as shown in Figure 2.6), they might still have gained rights to pension income through their former partners' NI contributions and contributions to private pensions or inherited wealth from a deceased partner. On the other hand, even though the majority of currently single men have also previously been married, we find a less obvious discrepancy between the patterns of lifetime earnings in Figure 2.6 and the retirement income and retirement wealth shown in Figures 2.1 and 2.2. This may be because currently single men from the cohorts we consider here are much less likely to have gained pension income through a previous marriage. In the case of state pensions, this reflects the fact that men whose (former) wives reached SPA before 2010 gain no entitlement to additional state pension income on the basis of their wives' contributions, even if these were higher than their own. In the case of private pensions, men in this cohort are probably less likely to have inherited rights from their former wives simply because employment rates and earnings were lower on average for

married women in these cohorts than married men.[15] Therefore, we would expect single men in this cohort to have pension income much more in line with their lifetime earnings than single women. That this is indeed borne out by our results presented in the next section.

3. Distribution and composition of retirement income and wealth by lifetime earnings

If individuals want to smooth their level of consumption across their lifetimes, other things being equal, those who experience higher earnings during their working lives will tend to consume more in absolute terms during their working lives but will also need to accumulate a greater stock of wealth before they stop working than someone who had experienced lower lifetime earnings. We would also expect this greater stock of wealth to be reflected in a higher level of income in retirement. Thus we would expect, all else being equal, that those with higher lifetime earnings would have higher wealth (and higher retirement income) when they reach retirement. Of course, not all else is equal and individuals' differing experiences (e.g. having made fortuitous investments or having had high consumption needs during their lives) could have led individuals who had very similar lifetime earnings to end up with very different levels of wealth and retirement income.

This section starts by examining how retirement income and wealth in retirement varies by lifetime earnings. This is explored both in aggregate and for different components of income and wealth. We also document how much variation in wealth and income exists between individuals with similar levels of lifetime earnings. Section 3.1 examines those in couples, section 3.2 looks at single men and section 3.3 looks at single women. Section 4 looks at how much of the variation in retirement wealth and income – over-and-above that explained by differences in lifetime earnings – we can explain by other factors.

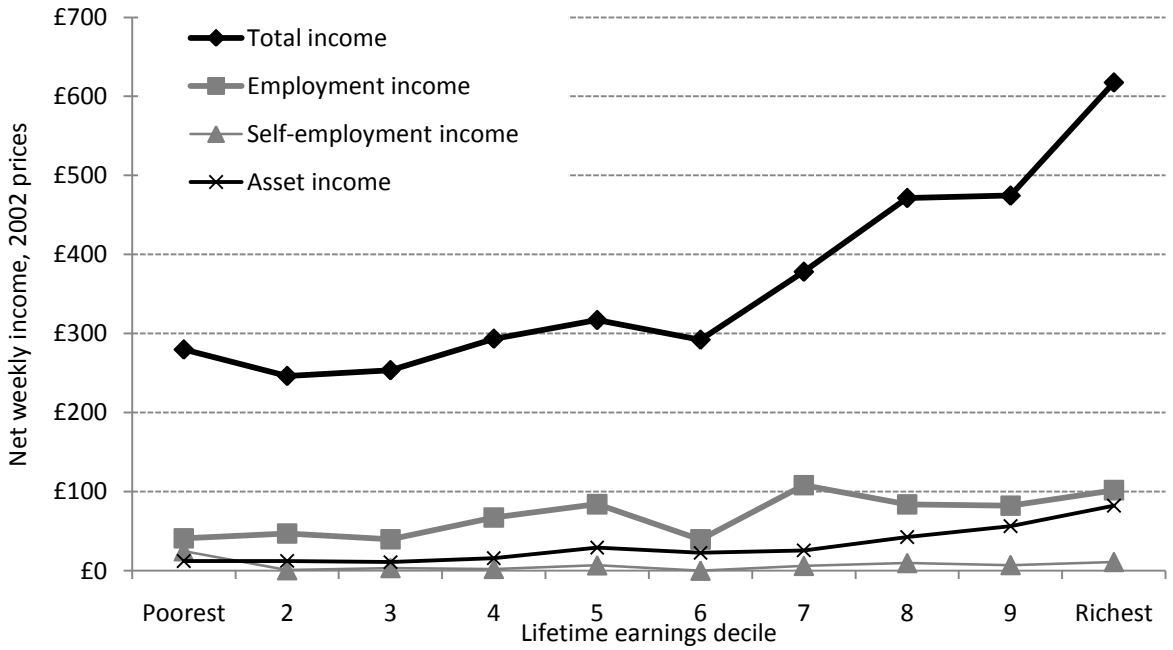
3.1 Distribution of wealth holdings and retirement income: couples

Figure 3.1 shows the average (mean) level of different components of retirement income among couples, split by decile of lifetime earnings – that is, the "poorest" group are the 10% of couples with the lowest combined lifetime earnings, while the "richest" are the 10% of couples with the highest combined lifetime earnings. Table A.1 in the Appendix presents figures for the mean and median level of lifetime earnings within

[15] Earlier cohorts of married women working part-time may also have been less likely to have built up occupational pension rights since, prior to the European Court of Justice ruling in May 1995, part-time employees could be excluded from their employer's pension scheme.

each of the deciles – in the 5th decile, for example, both mean and median lifetime earnings are equal to £1.2 million. (Unlike Figure 2.1, Figure 3.1 shows the total weekly income of the couple, rather than income per head.) Figure 3.1 clearly shows that average total income increases across the deciles of lifetime earnings. One exception to this pattern is between the poorest decile of lifetime earnings and the 2nd decile, when mean retirement income falls slightly. This might be due to measurement error – that is, some individuals have erroneously been included in the lowest decile of lifetime earnings as a result of their lifetime earnings having been mismeasured. One possible way in which this could arise is if some individuals had significant self-employment income that is not captured in our measure of lifetime earnings (we include here those with up to 5 years of self-employment income). Evidence in favour of this hypothesis can be seen in the fact that mean current self-employment income (at £25 per week) is highest in the bottom decile of lifetime earnings.

Figure 3.1. Mean retirement income, by lifetime earnings decile – couples



Note: Sample size = 967; one observation per couple. Figures shown are net weekly income of the couple, in 2002 prices. Total income includes pension income, which is shown separately in Figure 3.2. Asset income includes: interest income from bank accounts, bonds, tax-favoured savings accounts and unit trusts; dividend income from stocks and shares; income from property.

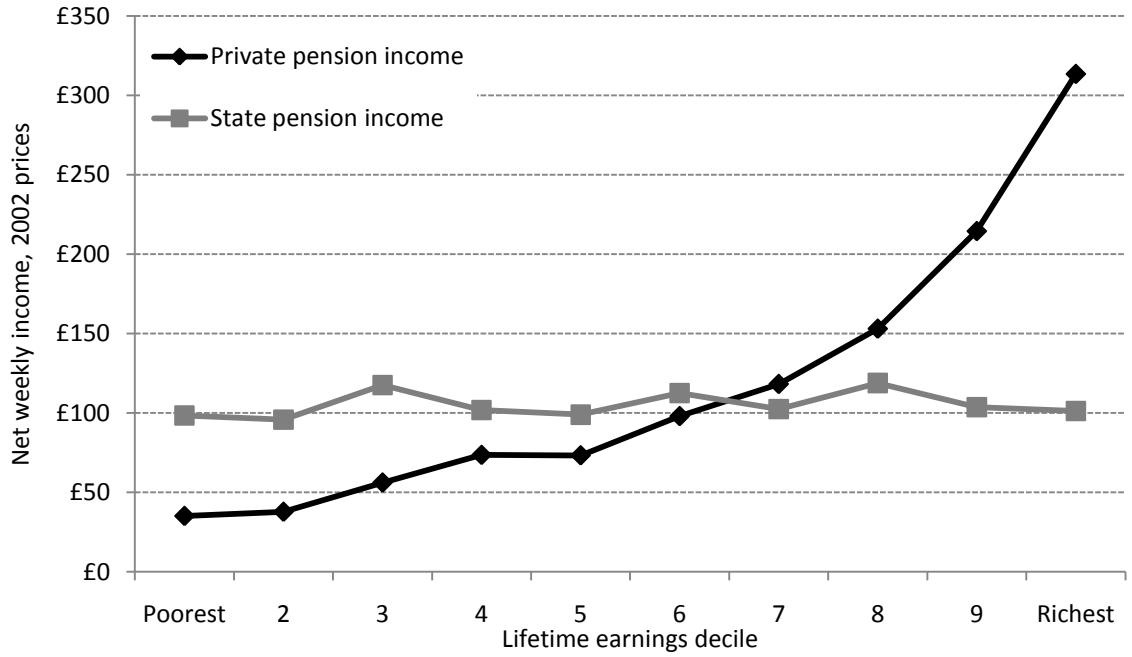
Across the rest of the distribution of lifetime earnings, average retirement income rises gradually between decile 2 and decile 6,[16] and then rises more quickly between decile 6 and the richest decile. Both earned income and, in particular, asset income is highest in

[16] The decline in mean income between the 5th and 6th deciles is not statistically significantly different from zero at the 5% level of significance.

the highest deciles of lifetime earnings. Total retirement income among couples in the richest decile of lifetime earnings is almost twice that of couples in the 5th decile, with asset income being 2.8 times larger.

Overall, higher employment income, self-employment income and asset income explains one-quarter of the increase in total income seen between the 5th decile of lifetime earnings and the richest decile. The remainder of the difference is explained by differences in pension income and, more specifically, private pension income, as shown in Figure 3.2.

Figure 3.2. Mean state and private pension income, by lifetime earnings decile – couples



Note: Sample size = 967; one observation per couple.

State pension income is defined here (as in the rest of the paper) as the sum of income from the BSP and the State Earnings-Related Pension Scheme (SERPS). Weekly state pension income is broadly flat across the lifetime earnings distribution. This suggests that the earnings-related component of the state pension system (which would tend to lead to state pension income rising with lifetime earnings decile) is being completely offset by the greater tendency of those who had higher lifetime earnings to have contracted out of this tier of state pension provision.[17] In contrast private pension income rises continuously and quite steeply across each decile of the lifetime earnings distribution, with the increases being particularly large between the top three deciles. While mean state pension income in the top decile is almost the same as that of the 5th

[17] We present evidence of this fact in Table A.4 in the appendix.

decile (and indeed that of all other deciles), private pension income in the top decile is 4.3 times that of the 5th decile and 8.9 times that of the poorest decile.

Taken together, Figures 3.1 and 3.2 suggest that lifetime earnings are more clearly related to some components of retirement income (private pension income and asset income) than others (self-employment income and state pension income). We now turn to examine how wealth among couples varies with lifetime earnings.

The average level of total net wealth and wealth excluding the value of owner-occupied housing, by decile of lifetime earnings, is shown for couples in Figure 3.3. For both of these measures of wealth, the pattern is extremely similar to that observed for retirement income. Both are slightly higher in the lowest decile of lifetime earnings than the second, both then increase steadily up to the upper-middle of the distribution of lifetime earnings (with the exception of a slight, not statistically significant, fall in non-housing wealth between the 6th and 7th decile of lifetime earnings) and then both increase more quickly up to the top of the lifetime earnings distribution. Total wealth is found to be 2.2 times greater in the top decile of the lifetime earnings distribution than in the 5th decile, with non-housing wealth being 2.3 times greater. In all lifetime-earnings deciles the ratio of non-housing wealth to housing wealth is remarkably constant at roughly 7:3.

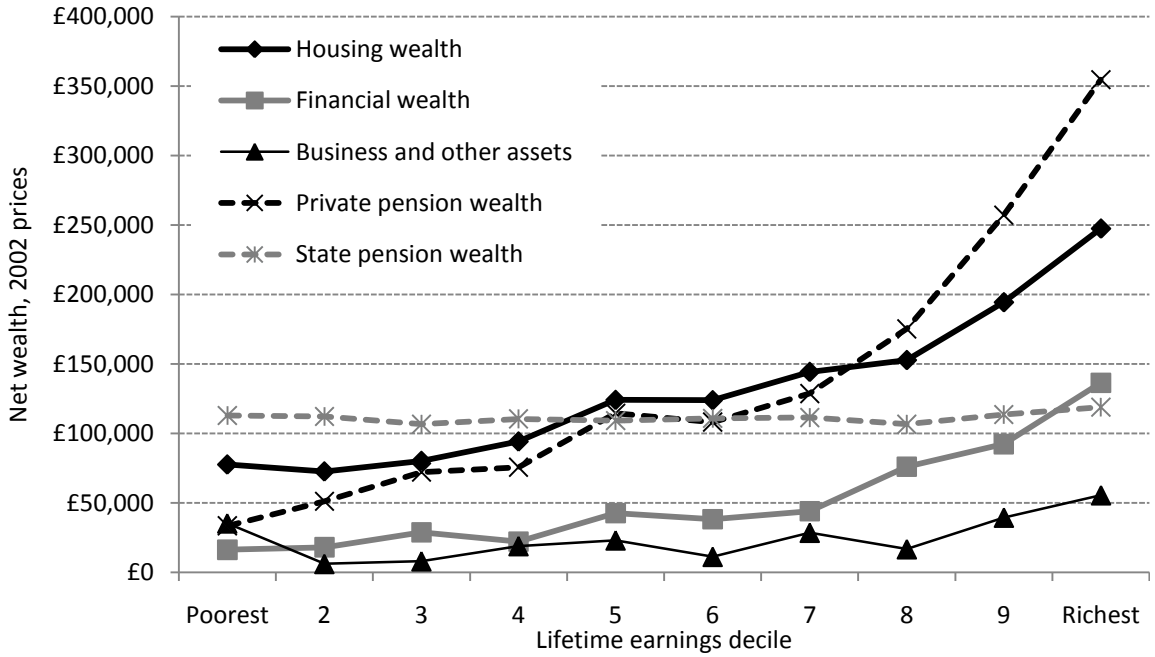
Figure 3.3. Mean total net wealth and net non-housing wealth, by lifetime earnings decile – couples

Note: Sample size = 967; one observation per couple. Total wealth is the sum of all financial, owner-occupied housing, state and private pension wealth, plus the value of any other physical assets (such as other property or business assets) held by the couple, less the value of any outstanding secured or

unsecured debts. Non-housing wealth is total net wealth, less the (net of any outstanding mortgage) value of owner-occupied housing.

The variation in broad components of wealth by decile of lifetime earnings, for couples, is shown in Figure 3.4. State pension wealth is broadly flat across the lifetime earnings distribution. This is consistent with the finding in Figure 3.2 that state pension income is flat across the lifetime earnings distribution. Private pension wealth is found to increase steadily from the lowest decile of lifetime earnings up to the 7th decile, and then increase more sharply up to the highest decile of lifetime earnings. This is exactly the same pattern as is seen for private pension income.[18] A similar pattern is observed with housing wealth.

Figure 3.4. Mean net wealth holdings, by lifetime earnings decile – couples



Note: Sample size = 967; one observation per couple. "Housing wealth" is the value of owner-occupied housing, less the value of any outstanding mortgage on the home. "Financial wealth" is the value of all financial assets, less the value of any unsecured debts. "Business and other assets" is the value of all business assets, non-owner-occupied property and physical assets (such as antiques), less the value of any loans secured on these assets. "Private (state) pension wealth" is the present discounted value of the expected future stream of income from any private (state) pensions to which the couple have entitlement.

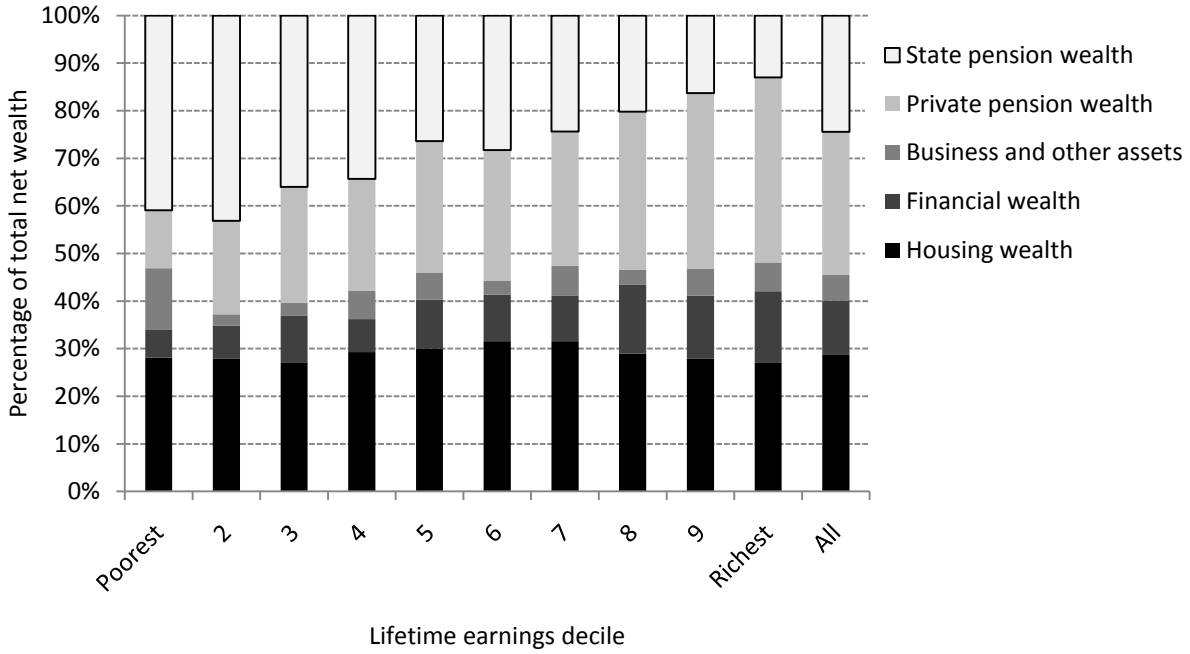
[18] The fact that both state/private pension income and state/private pension wealth are found to follow the same pattern with respect to lifetime earnings is not surprising but need not necessarily have been true. In both cases, wealth is the present discounted value of the expected future income stream. For those who have already started to receive all their state and private pension incomes, income and wealth will be very closely related to one another. However, some individuals in the cohort we are examining have not reached State Pension Age yet, and so will not be receiving their state pension income, while some will not yet have annuitised their private pension wealth. Another reason why state pension wealth and state pension income might differ is because the measure of state pension income shown here is that reported by the individuals in the ELSA survey, while state pension wealth is computed from NI records. The two might not be the same, perhaps because the respondent inaccurately reported their state pension income when questioned.

Financial wealth increases particularly sharply across the highest four deciles of lifetime earnings, with financial wealth of the top decile being nearly four times greater than the financial wealth of the 6th decile. The value of business assets does not increase monotonically with lifetime earnings decile, although the value of these assets in the highest lifetime earnings decile is significantly higher than in any other decile of lifetime earnings.

The same data from Figure 3.4 are repeated in Figure 3.5, but with the decomposition by earnings decile showing the share of wealth held in each form rather than the absolute amount held. This shows that housing wealth makes up about 30% of the total wealth of each decile. Although the share of housing wealth is constant across the lifetime earnings distribution, whether or not a couple has some housing wealth is markedly different. In Table A.3 in the appendix we report what proportion of couples in each quintile have no housing wealth at all. Among couples in the lowest quintile 40% report having no housing wealth, compared to only 2% of the top quintile.

Wealth held in business and other assets, when measured as a share of total wealth, is particularly high in the lowest decile of lifetime earnings. As suggested before, this could be indicative of some individuals who had significant amounts of self-employment income during their lives being wrongly classified as being in the lowest earning tenth of the population. In all other deciles of lifetime earnings, business assets are a relatively small share of total wealth. Financial wealth – outside of pensions – typically increases as a share of wealth as lifetime earnings increase. Conversely, the percentage of wealth held in pensions tends to be lower for those in the higher deciles of lifetime earnings than for those in the lower deciles. Though the share of wealth held in private pensions does increase across the lifetime earnings deciles, the share of wealth held in state pensions declines by more.

Figure 3.5. Composition of total net wealth, by lifetime earnings decile – couples

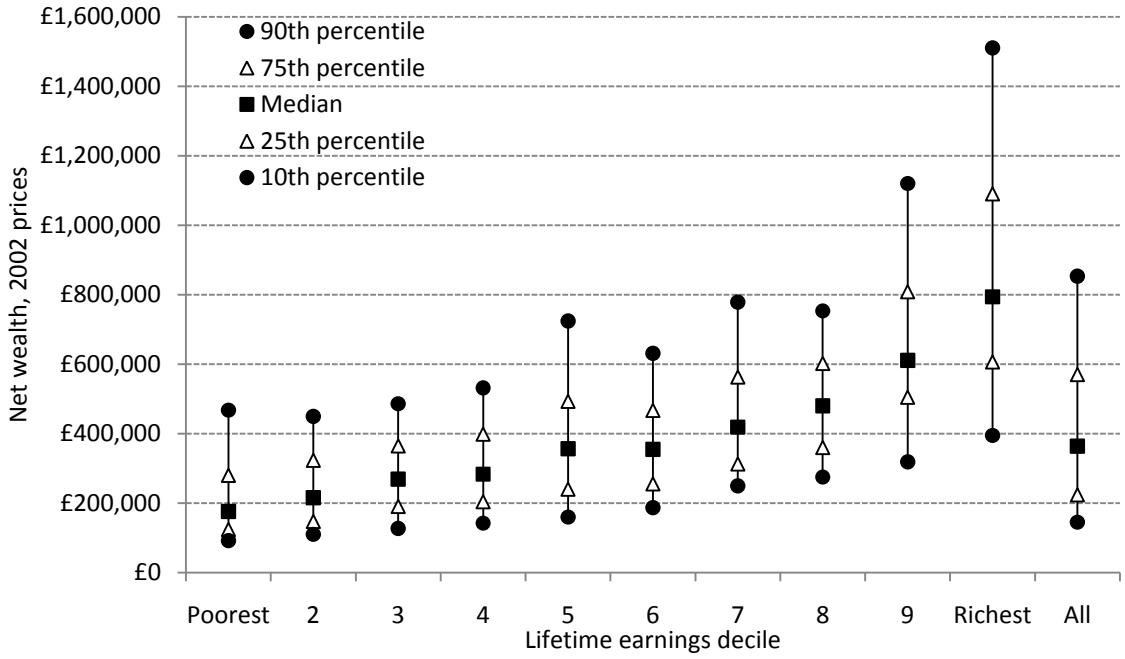


Notes: As Figure 3.4.

The average amount of income and wealth held by individuals within each decile of lifetime earnings, which has been discussed so far, disguises a considerable amount of variation in the amount of income received and wealth held by individuals in the same decile of lifetime earnings. Figure 3.6 shows the 10th, 25th, 50th (median), 75th and 90th percentiles of total net wealth in each decile of lifetime earnings. Median wealth – and indeed the 25th and 75th percentiles of wealth – is found to increase with lifetime earnings decile.[19] However, there is considerable variation in wealth holdings within each decile of lifetime earnings. A sizeable minority of couples who had relatively low levels of lifetime earnings actually hold relatively high levels of wealth: for example, within each decile of lifetime earnings, the 75th percentile of total wealth is about twice as large as the 25th percentile. Furthermore, in the 4th decile of lifetime earnings, one-in-four couples have total net wealth in excess of £400,000, while in the 8th decile of lifetime earnings, one-in-four couples have less than £360,000. In other words, (more than) 25% of those couples in the 4th decile of lifetime earnings are found to have more wealth than 25% of those in the 8th decile of lifetime earnings. Equivalent figures for housing wealth and non-housing wealth are shown in Figures A.1 and A.2 in the Appendix, respectively.

[19] Though the point estimate of the median and 75th percentile falls between the fifth and sixth deciles, we cannot reject at any standard level of significance the hypothesis that these quantiles are the same for the two groups.

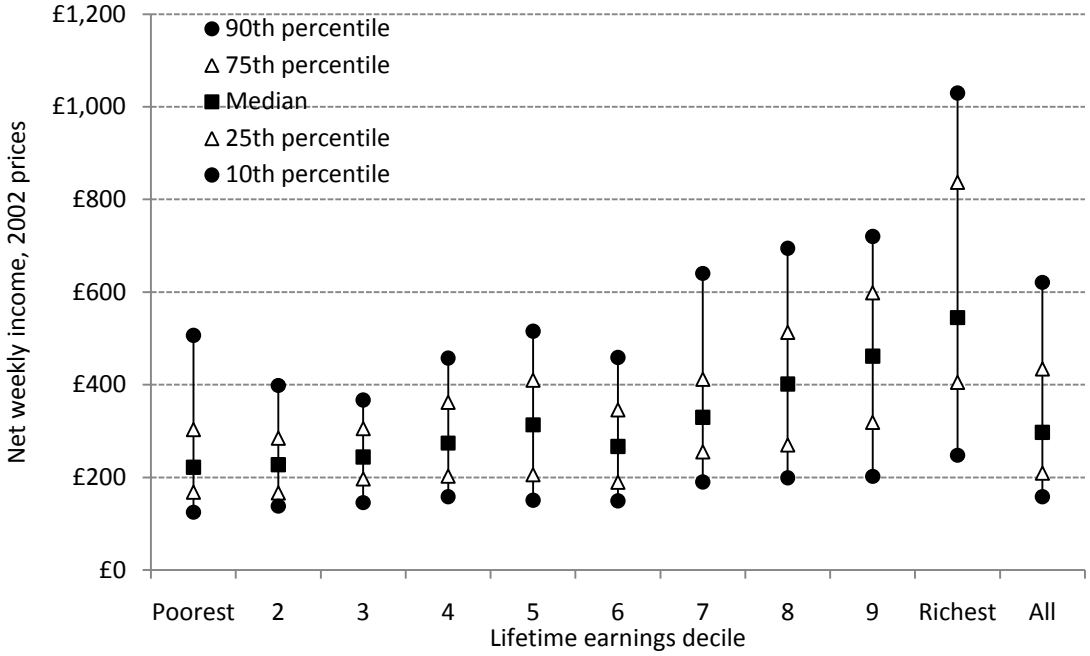
Figure 3.6. 10th, 25th, 50th, 75th and 90th percentiles of total net wealth, by lifetime earnings decile – couples



Note: As Figure 3.3.

Figure 3.7 shows the distribution of weekly net income across couples within each decile of lifetime earnings. The overall pattern is much the same as that seen for wealth – median weekly income increases across the deciles of lifetime earnings but within each decile there is considerable dispersion in the levels of income that couples have. One-in-four couples in the highest decile of lifetime earnings have income below £410 per week, while one-in-four couples in the 5th decile of lifetime earnings have income above £380 per week.

Figure 3.7. 10th, 25th, 50th, 75th and 90th percentiles of total weekly income, by lifetime earnings decile – couples



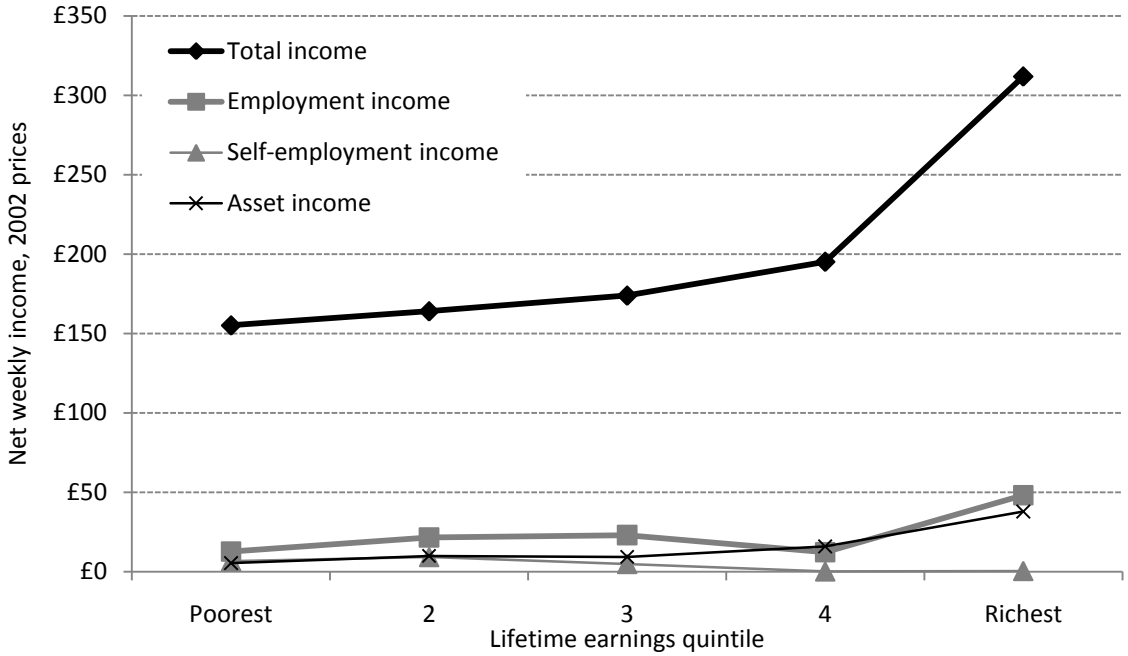
Note: As Figure 3.1.

3.2 Distribution of wealth holdings and retirement income: single men

We now present the results from equivalent analysis of single men. Many men who were single in 2002–03 had previously been married but had since separated, divorced or been widowed: 72.1% of the single men considered here had previously been married. As the sample size of singles is smaller than for couples, we present results for singles by quintile, rather than decile, of lifetime earnings.

Figure 3.8 shows average (mean) total retirement income by quintile of lifetime earnings. Total retirement income is found to be slightly increasing over the first four quintiles of lifetime earnings, and then increases sharply between the 4th quintile and the highest quintile of lifetime earnings. As was seen for couples, asset income increases relatively sharply over the top half of the lifetime earnings distribution, while self-employment income is found to be, on average, minimal in all five quintiles.

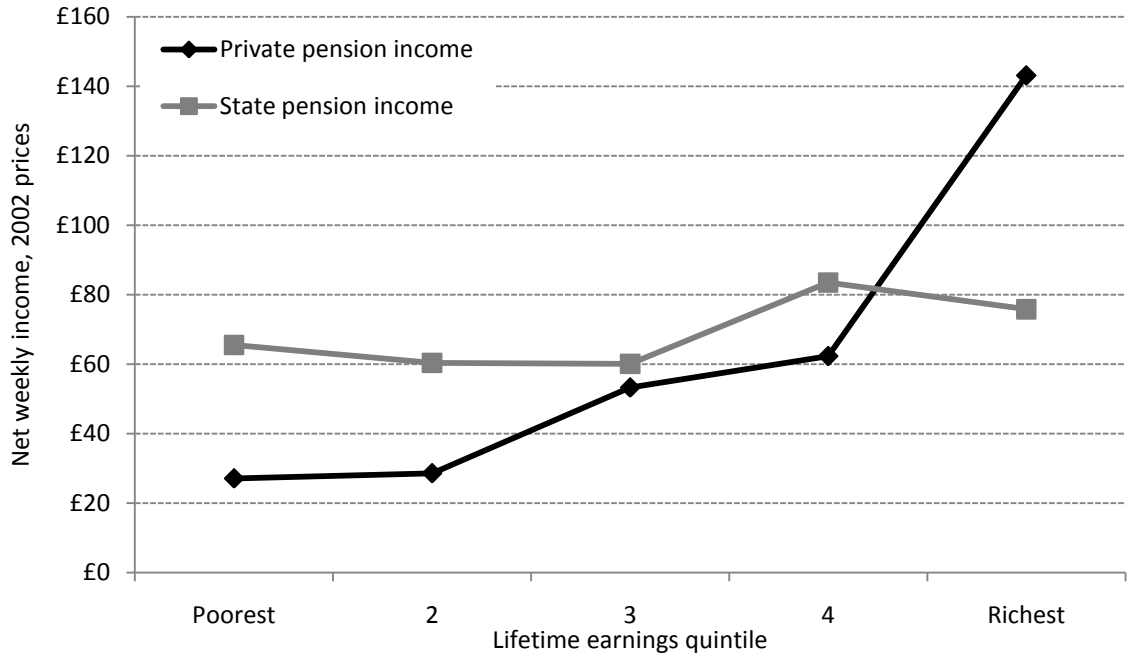
Figure 3.8. Mean retirement income, by lifetime earnings quintile – single men



Note: Sample size = 308. Also see notes to Figure 3.1.

Again as was found to be the case for those in couples, most of the increase in income between the middle and the top of the distribution of lifetime earnings reflects higher private pension income – this is shown in Figure 3.9. Average private pension income among single men in the richest quintile of lifetime earnings is found to be about three times that of those in the 3rd quintile of lifetime earnings. In contrast, state pension income is not found to increase monotonically with quintile of the lifetime earnings distribution and those in the top two quintiles enjoy only slightly more state pension income, on average, than those in the lowest quintile of lifetime earnings.

Figure 3.9. Mean state and private pension income, by lifetime earnings quintile – single men



Note: Sample size = 308. Also see notes to Figure 3.2.

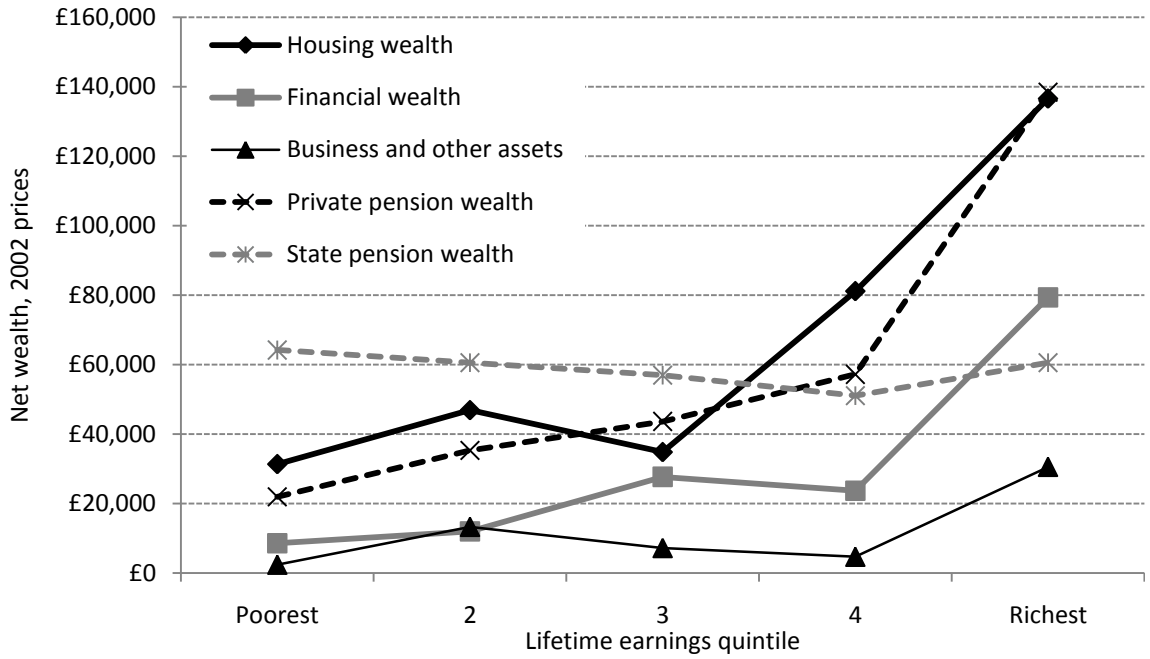
Figure. 3.10. Mean total net wealth and non-housing wealth, by lifetime earnings quintile – single men

Note: Sample size = 308. Also see notes to Figure 3.3.

Total wealth is also found to be much higher in the highest lifetime earnings quintile than in other quintiles, with this being true of both housing wealth and non-housing wealth (as shown in Figure 3.10).

These differences in total wealth holdings of single men by lifetime earnings quintile are decomposed further in Figure 3.11. As was the case for couples, the larger non-housing wealth of those at the top of the distribution of lifetime earnings distribution arises from greater holdings of financial assets, business assets and private pension wealth. The housing wealth of the highest fifth of lifetime earning single men is, on average, found to be about the same as the value of their private pension wealth. This is in contrast to the pattern for those in couples, where those in the highest fifth of lifetime earnings were found, on average, to have greater private pension wealth than housing wealth (Figure 3.4). State pension wealth is found to be broadly flat – or, if anything, declining – with quintile of lifetime earnings. This is slightly different from Figure 3.9 which showed a less clear pattern of state pension *income* by quintile of lifetime earnings.

Figure 3.11.Mean net wealth holdings, by lifetime earnings quintile – single men

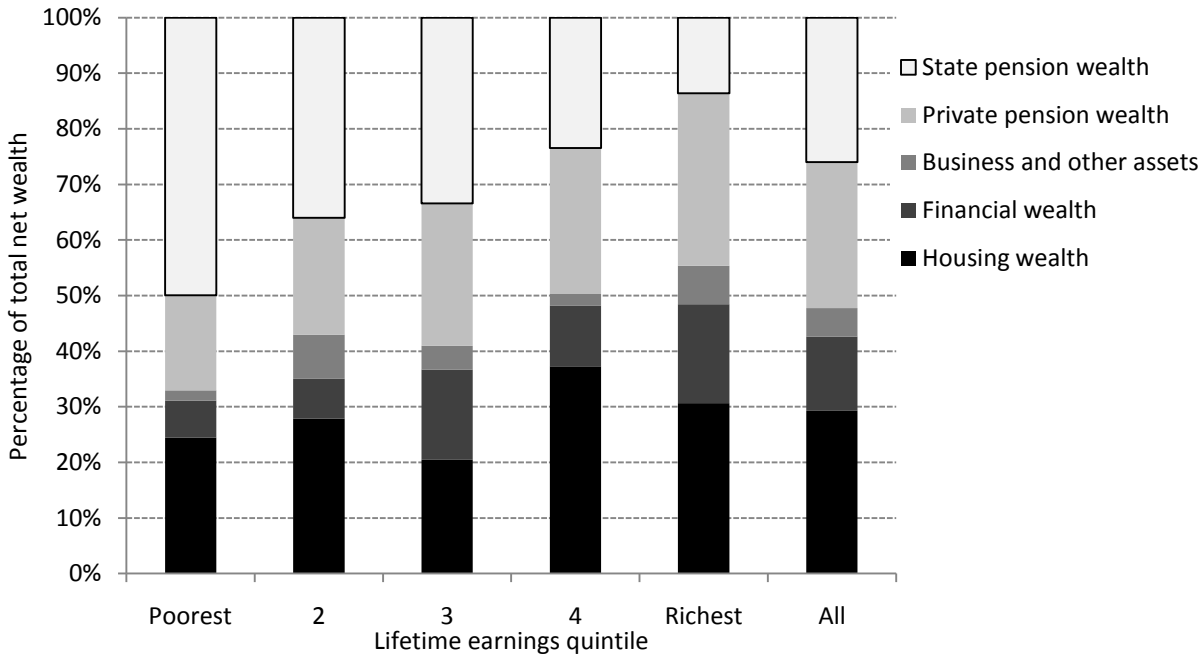


Note: Sample size = 308. Also see notes to Figure 3.4.

Variation in the portfolio composition by quintile of lifetime earnings is shown in Figure 3.12. As was the case for couples, pension wealth is found to be, on average, a smaller share of the total wealth of those in higher lifetime earnings quintiles than those in lower lifetime earnings quintiles, with the increase in the average share of wealth held in private pensions not being sufficient to offset fully the declining share held in state pensions. Unlike couples, the housing share of wealth does vary with quintile of lifetime

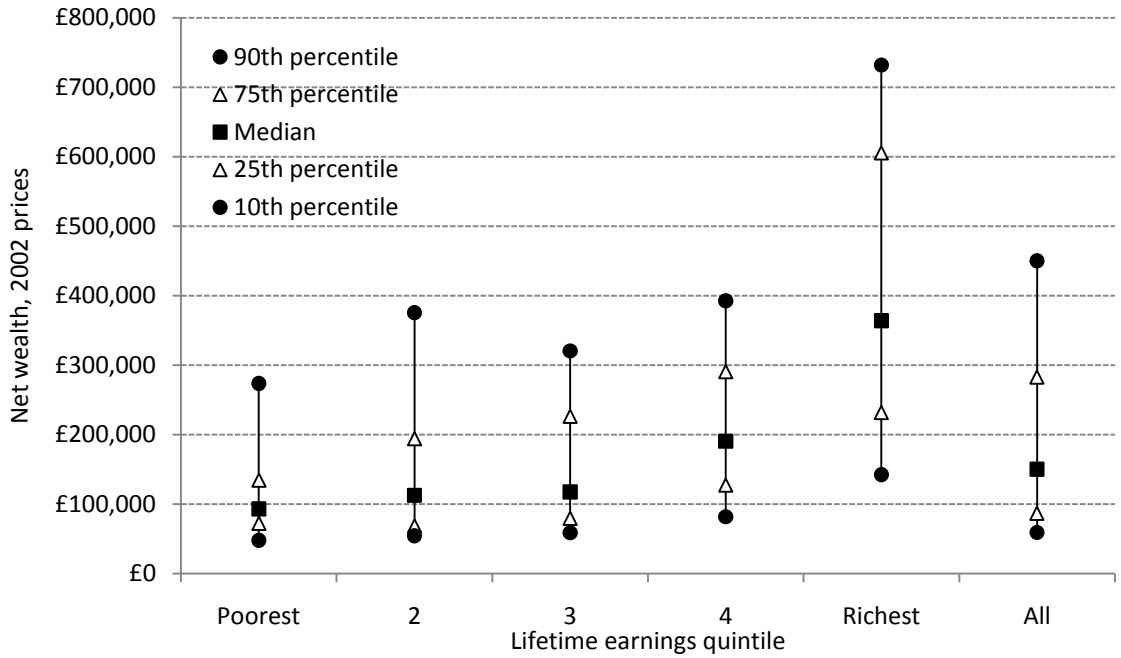
earnings: if anything, those with higher lifetime earnings are found to hold a larger share of their wealth in housing. Partly this pattern reflects differences in the prevalence of home ownership among the income quintiles. A very significant proportion of single men report no housing wealth at all: in the lowest earnings quintile, 66% declare no housing wealth and even 15% of the top quintile report no housing wealth. Further evidence on the prevalence of home ownership across the income quintiles is provided in Table A.3 in the Appendix.

Figure 3.12. Composition of wealth, by lifetime earnings quintile – single men



Note: Sample size = 308. Also see notes to Figure 3.5.

Figure 3.13. 10th, 25th, 50th, 75th and 90th percentiles of total wealth, by lifetime earnings quintile – single men



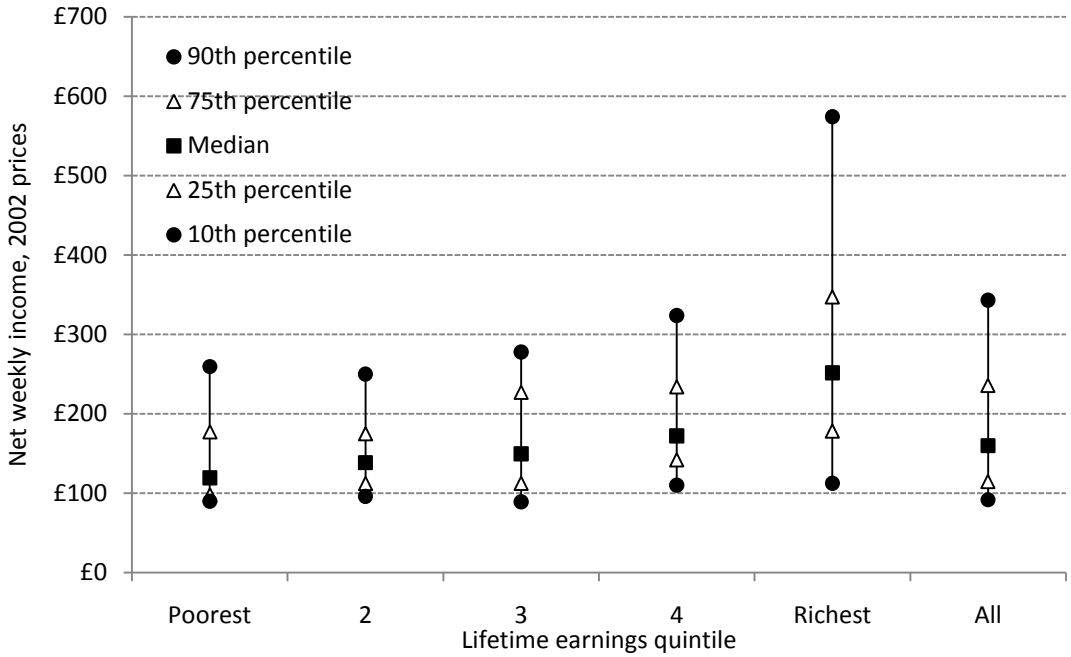
Note: Sample size = 308. Also see notes to Figure 3.6.

The amount of dispersion in the distribution of wealth among single men, by quintile of lifetime earnings, is shown in Figure 3.13.[20] The 25th, 50th (median) and 75th percentile of wealth holdings is found to increase across the quintiles of lifetime earnings. Within the 3rd (middle) lifetime earnings quintile, the 75th percentile of total wealth is 2.0 times the 25th percentile of total wealth. As for couples, there are not insignificant proportions of single men with relatively low lifetime earnings who are found to have greater wealth than some of those with much higher lifetime earnings.

Figure 3.14 shows the distribution of weekly net income across single men within each quintile of lifetime earnings. The overall pattern is much the same as that seen for wealth – median weekly income increases across the quintiles of lifetime earnings but within each quintile there is considerable dispersion in the levels of income that single men have. One-in-four single men in the highest quintile of lifetime earnings have income below £180 per week, while one-in-four single men in the lowest quintile of lifetime earnings have income above that amount.

[20] Similar figures showing the distribution of housing wealth and non-housing wealth within each quintile of lifetime earnings are shown in Figures A.3 and A.4, respectively, in the Appendix.

Figure 3.14. 10th, 25th, 50th, 75th and 90th percentiles of income, by lifetime earnings quintile – single men



Note: Sample size = 308.

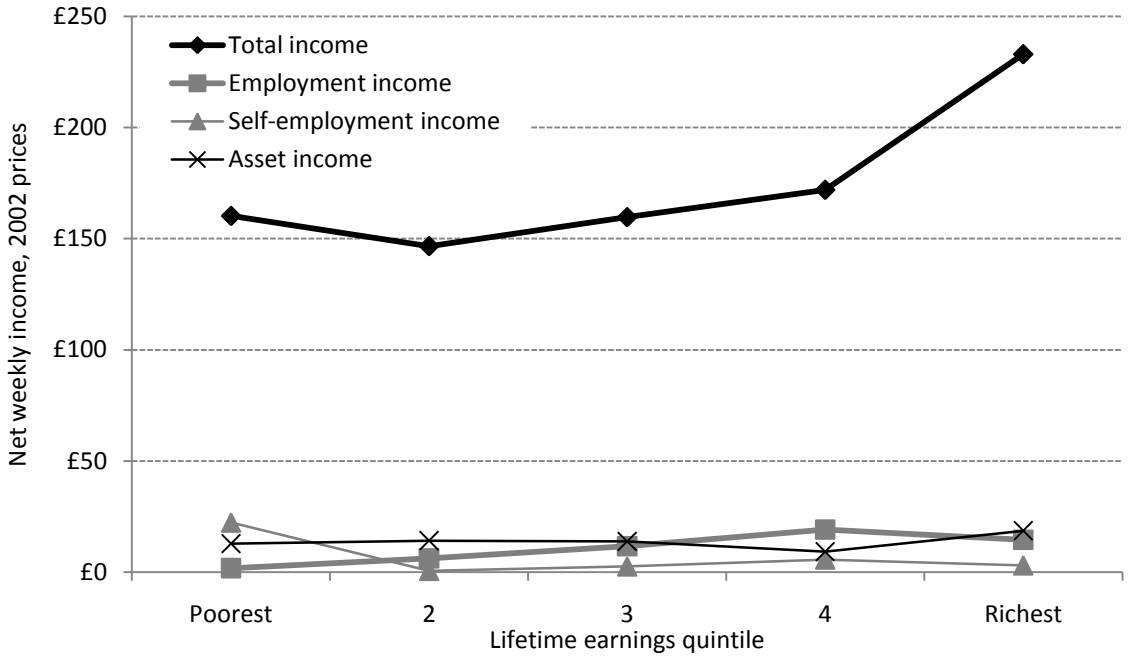
3.3 Distribution of wealth holdings and retirement income: single women

The vast majority of the single women considered here (89.8% of them) had previously been married but had since separated, divorced or been widowed. As we do not observe the lifetime earnings of their past partner, we miss a potentially very large share of their lifetime resources while we observe all their current wealth, which might reflect large amounts inherited from a previous partner. As Table A.1 and A.2 in the Appendix shows, average lifetime earnings of single women in the lower quintiles are very low (for example, median lifetime earnings are just £29 among women in the lowest lifetime earnings quintile) and certainly much lower than equivalent figures for single men. However, there is a small minority of single women who have never been married; these women tend to have worked and earned significant amounts during their lifetimes. The vast majority of never married women appear in the top quintile of lifetime earnings among single women; mean and median lifetime earnings within the highest quintile of lifetime earnings for single women are found to be not so dissimilar from those for single men (Table A.2). As a result of these concerns about the potential mismeasurement of the true lifetime resources of currently single women, the nature of the analysis we can perform for this group is very limited and we believe all the remaining analysis presented in this section should be interpreted with caution.

Figure 3.15 shows the variation in average (mean) total retirement income by quintile of lifetime earnings. On average, total retirement income is found to be slightly lower in

the 2nd quintile of lifetime earnings than in the 1st, reflecting the decline in average self-employment income between the first and second quintiles (though we cannot reject, at any standard level of statistical significance, the hypothesis that the mean income of these two groups is the same), but then increases with lifetime earnings. There is a particularly sharp increase in mean income between the 4th and the highest quintiles of lifetime earnings. Relatively low levels of asset income, employment income and self-employment income are observed, on average, among women in all quintiles of lifetime earnings.

Figure 3.15. Mean retirement income, by lifetime earnings quintile – single women



Note: Sample size = 655. Also see notes to Figure 3.1.

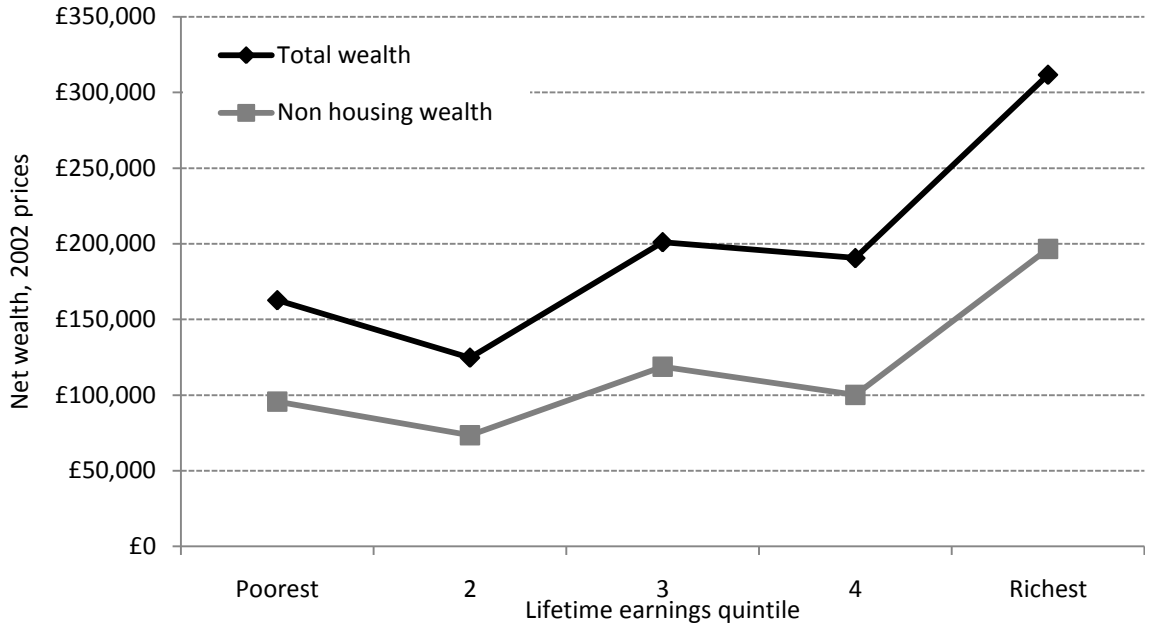
Mean levels of income from state and private pensions is shown in Figure 3.16. State pension income is found to be slightly higher in the lowest quintile of lifetime earnings than in the 2nd quintile (though, again, at any reasonable level of significance we cannot reject the hypothesis that mean state pension income is the same in the first and second quintiles). Across the whole distribution of lifetime earnings state pension income is found, on average, to be greater than private pension income. This is in contrast to the pattern found among couples and single men: among both of these other groups, those towards the top of the lifetime earnings distribution had higher average receipt of private pension income than state pension income. Private pension income of single women is, however, found to increase monotonically between the lowest and the highest quintile of lifetime earnings, with a particularly large increase between the 4th and the highest quintiles. State pension income is also found to be higher, on average,

among those in the highest quintile of lifetime earnings than among those lower down the lifetime earnings distribution.

Figure 3.16. Mean state and private pension income, by lifetime earnings quintile – single women

Note: Sample size = 655. Also see notes to Figure 3.2.

Figure 3.17. Mean total net wealth and non-housing wealth, by lifetime earnings quintile – single women



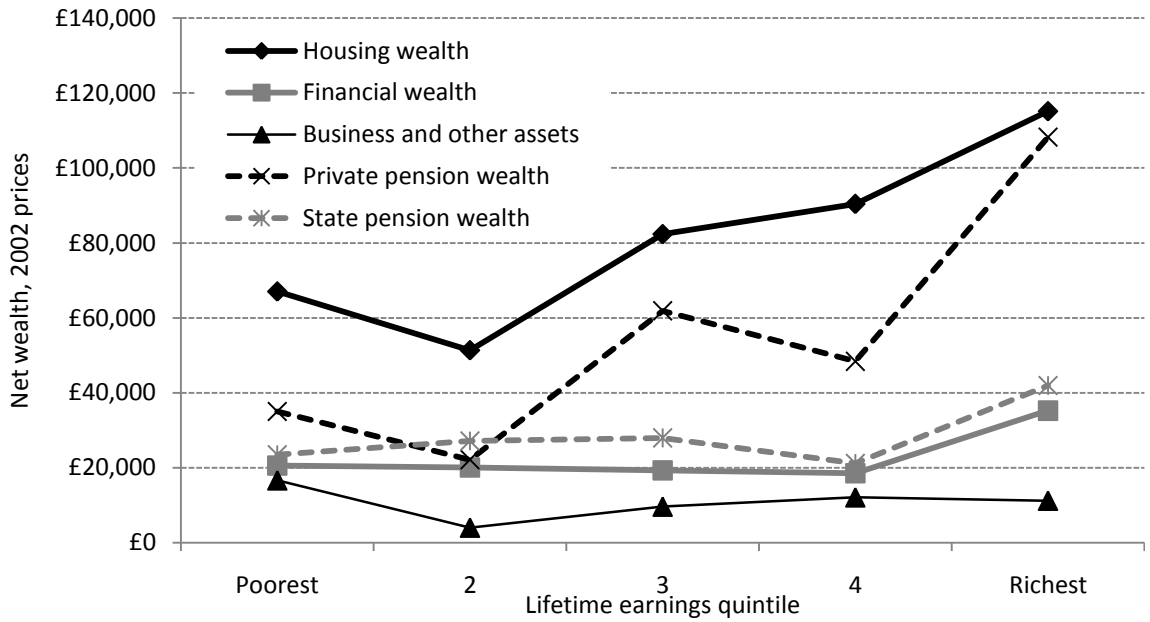
Note: Sample size = 655. Also see notes to Figure 3.3.

Wealth of single women is found to follow a similar pattern to that of retirement income. As shown in Figure 3.17, total net wealth is higher in the lowest quintile of

lifetime earnings than in the 2nd quintile, but is then found to increase across the higher quintiles of lifetime earnings. The mean level of non-housing wealth is found to be relatively flat across most of the lifetime earnings distribution but to be considerably higher in the highest quintile of lifetime earnings than in the 4th quintile.

The decomposition of wealth holdings, by lifetime earnings, of single women is shown in Figure 3.18. Greater wealth, on average, among those in the lowest quintile of lifetime earnings than those in the 2nd lifetime earnings quintile is explained by higher levels of private pension wealth, housing wealth and business assets. Higher private pension wealth despite lower earnings seems likely to be best explained by private pension entitlements having been inherited from a previous partner. Across the rest of the lifetime earnings distribution, both housing wealth and private pension wealth are found to increase sharply with increasing quintiles of lifetime earnings.[21] In contrast both financial wealth and state pension wealth are relatively flat across most of the lifetime earnings distribution, although those in the highest quintile of lifetime earnings are found, on average, to have greater amounts of wealth in these forms than those in other quintiles.[22]

Figure 3.18. Mean net wealth holdings, by lifetime earnings quintile – single women



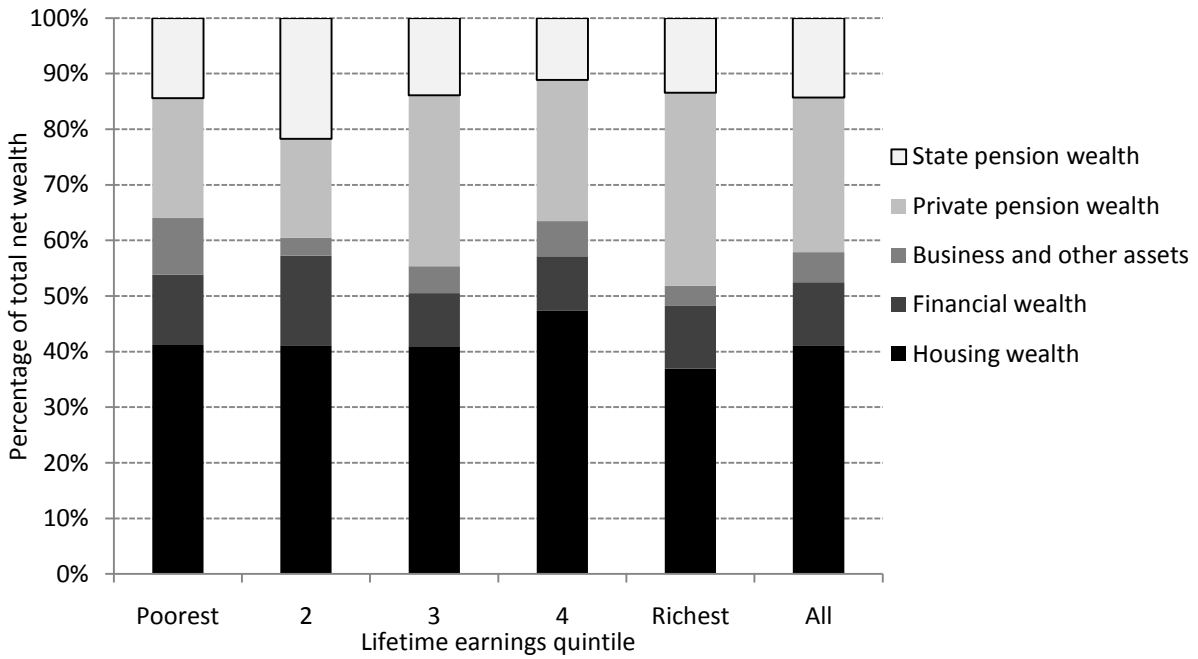
[21] The patterns of private pension wealth shown in Figure 3.18 differ somewhat from the patterns of private pension income shown in Figure 3.16. While private pension income reflects only those pensions that are currently in payment, private pension wealth also captures the value of any pensions from which an individual is not yet receiving an income. This could explain the different patterns.

[22] Figures for wealth are derived from different information than figures for income shown above. In particular, figures for state pension income are taken from survey responses to questions about income sources, while figures for state pension wealth are derived from individuals' NI records. Figures for income from a particular source and wealth held in the same assets need not, therefore, be entirely consistent with one another in these data.

Note: Sample size = 655. Also see notes to Figure 3.4.

The same data from Figure 3.18 are repeated in Figure 3.19, but with the decomposition by earnings quintile showing the share of wealth held in each form rather than the absolute amount held. As was the case with couples, the share of wealth held in housing is found, on average, to be relatively invariant to lifetime earnings although the share of wealth held in housing by single women (about 40%) is higher than that of couples (about 30%). There are, however, a large share of single women who have no housing wealth at all: 51% in the bottom quintile against 16% in the top quintile (see Table A.3 in the Appendix). Also similar to those in couples, those in the lowest quintile of lifetime earnings are found to hold a relatively large share of their wealth in business assets, which again could be indicative of a problem of mismeasuring lifetime earnings for those with significant amounts of self-employment income. Unlike both couples and single men, the proportion of wealth held in pensions is, if anything, greater at higher quintiles of lifetime earnings than at lower ones.

Figure 3.19. Composition of wealth, by lifetime earnings quintile – single women

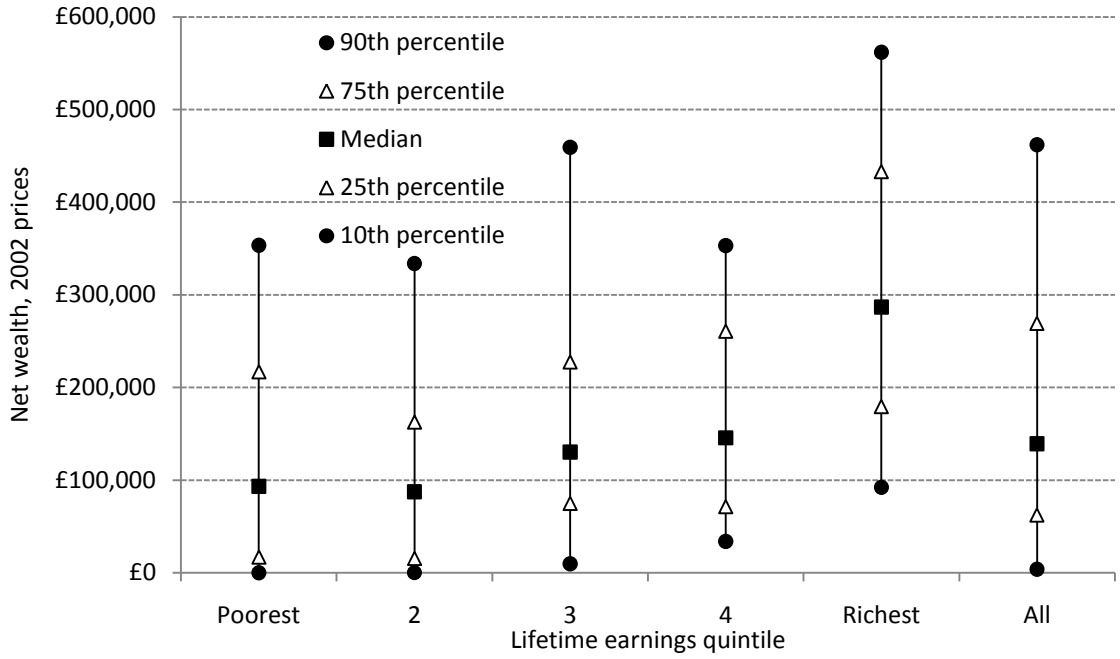


Note: Sample size = 655. Also see notes to Figure 3.5.

Among both couples and single men, significant amounts of dispersion in total wealth were found between individuals of comparable levels of lifetime earnings. Among single women we find even greater amounts of dispersion. Figure 3.20 shows the 10th, 25th, 50th (median), 75th and 90th percentiles of total wealth for each quintile of lifetime earnings. While median wealth increases across successively higher quintiles of lifetime earnings in much the same way as was found among couples and single men, there is somewhat more dispersion in the distribution of wealth among single women. The 75th

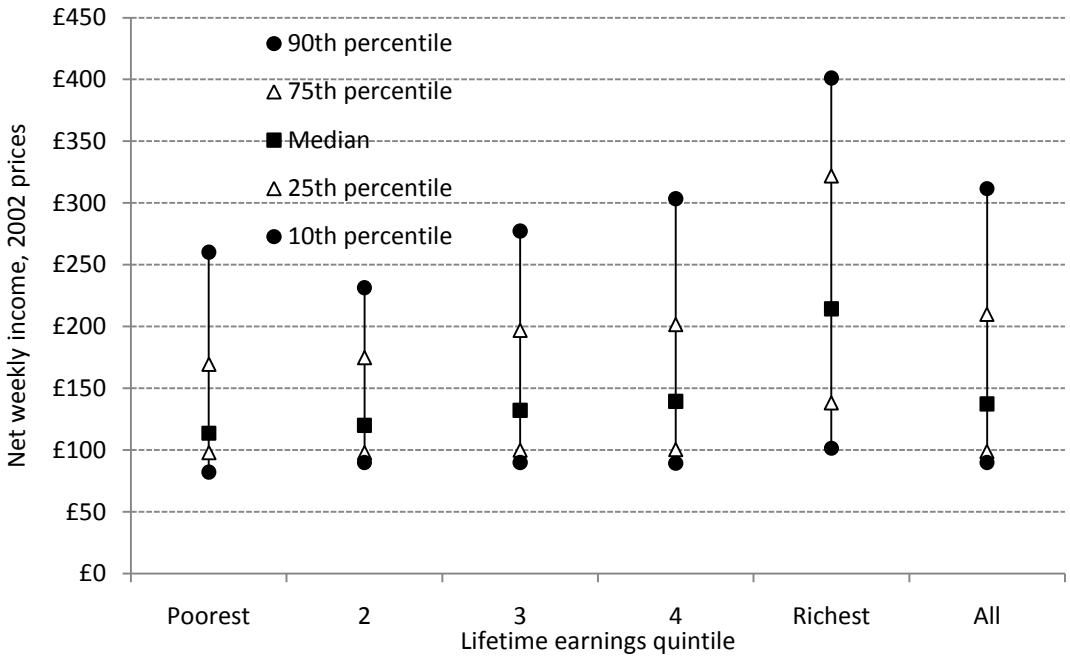
percentile of total wealth is found to be 4.3 times the 25th percentile of total wealth. This compares to 3.3 times for single men and 2.5 times for couples. More than half of individuals in the lowest quintile of the lifetime earnings distribution (or indeed any of the other quintiles, except the second) are found to have more wealth than the poorest 10% of individuals in the highest lifetime earnings quintile.

Figure 3.20. 10th, 25th, 50th, 75th and 90th percentiles of total wealth, by lifetime earnings quintile – single women



Note: Sample size = 655. Also see notes to Figure 3.6.

Figure 3.21. 10th, 25th, 50th, 75th and 90th percentiles of total retirement income, by lifetime earnings quintile – single women



Note: Sample size = 655. Also see notes to Figure 3.7.

Figure 3.21 shows the distribution of weekly net income across single women within each quintile of lifetime earnings. The overall pattern is much the same as that seen for wealth – median weekly income rises slightly across the distribution of lifetime earnings but within each quintile there is considerable dispersion in the levels of income that single women have. One-in-four single women in the highest quintile of lifetime earnings have income below £140 per week, while one-in-four single women in the lowest quintile of lifetime earnings have income above £170 per week.

Section 4 presents multivariate analysis of the factors associated with differences in wealth holdings for couples and single men over-and-above those explained by differences in lifetime earnings.

3.4 Ratio of wealth to lifetime earnings

As mentioned in the introduction, an issue of debate in the literature has been whether or not it is true that those individuals with higher lifetime earnings tend to save a higher proportion of those incomes. Our data are not sufficient to give a precise answer to this question because, while differences in wealth in retirement could arise from differences in lifetime earnings, it is also possible that they could arise for other reasons – such as the effect of Government redistribution (through, for example, progressive taxation of income and the provision of means tested benefits to lower income households), receipt of gifts and inheritances or differences in the rates of return on investments achieved by different individuals.

With this important caveat in mind, Table 3.1 shows the median ratio of wealth to lifetime earnings observed in our data split by current family type and quintile of lifetime earnings.[23] A figure of 0.3, for example, suggests that total net wealth at or near retirement is worth 30% of total lifetime earnings. If one compares this measure to previous studies in the US, one is struck by the similarities: for all households, Gustman and Steinmeier (1999) find median wealth to lifetime earnings of 0.30, with 0.39 for the top 25th percentile of lifetime earnings distribution. With our data we find a ratio of 0.32 for all couples and 0.37 for the top 20th percentile of the lifetime earnings distribution.

Table 3.1. Median ratio of total wealth to lifetime earnings by lifetime earnings quintile

Lifetime earnings quintile	Couples	Single men	Single women
Poorest	0.34	0.38	1,572.66
2	0.27	0.18	1.30
3	0.29	0.16	0.69
4	0.31	0.21	0.40
Richest	0.37	0.31	0.36
All	0.32	0.24	0.57

Note: Sample size = 967 couples, 307 single men, 625 single women. Those with zero lifetime earnings are excluded.

Among couples we see that this measure of the 'saving ratio' falls between the poorest and the 2nd quintile of lifetime earnings and then rises across the rest of the lifetime earnings distribution. Since the decline between the poorest and 2nd quintile of lifetime earnings could be explained by measurement error (specifically, as mentioned before, the exclusion of some self-employment income in our measure of 'lifetime earnings'), this could be taken as suggestive that savings rates might be increasing with lifetime earnings. However, for single men, the ratio of wealth to lifetime earnings is flat across the middle 60% of the lifetime earnings distribution. Little can be read into the results for single women: the very high values of wealth as a share of lifetime earnings for those with low lifetime earnings suggest that the earnings of previous partners (who have now left the household due to death or divorce) are likely to be important, unmeasured determinants of current wealth.

Table 3.2. Median ratio of annual retirement income to lifetime earnings, by lifetime earnings quintile and current family type

Lifetime earnings quintile	Couples	Single men	Single women

[23] To calculate these figures we have worked out the ratio of total net wealth to lifetime earnings for each individual (or couple) and then found the median ratio across all individuals (or couples) within each particular quintile of the lifetime earnings distribution.

Poorest	0.019	0.028	237.000
2	0.013	0.012	0.101
3	0.012	0.010	0.038
4	0.013	0.009	0.021
Richest	0.014	0.011	0.014
All	0.014	0.012	0.039

Note: Sample size = 967 couples, 307 single men, 625 single women. Those with zero lifetime earnings are excluded.

Table 3.2 presents similar figures for the median ratio of annual retirement income to lifetime earnings for each quintile of the lifetime earnings distribution.[24] If an individual had worked for 40 years, a figure of 0.014 in Table 3.2 would indicate a replacement rate in retirement of average annual earnings of approximately 56% (=0.014*40). This would correspond to a higher net replacement rate because of the impact of income tax and national insurance contributions, which will reduce net income by more during working life when income is higher than in retirement. The patterns seen in Table 3.2 are slightly different from those seen in Table 3.1. As in Table 3.1, the median ratio of retirement income to lifetime earnings is higher in the poorest quintile than in the second quintile for each group. This could reflect redistribution achieved through the tax and benefit system. However, it might also reflect mis-measurement of lifetime earnings for those who had significant self-employment (or other non-employment) income during their lives. Unlike Table 3.1, however, there is not such a pronounced increase in the median ratio among those in the higher quintiles of lifetime earnings. This difference may suggest that high lifetime earners have a lower fraction of their wealth annuitised than those lower down the lifetime earnings distribution – in other words, less of the wealth they hold is reflected in their regular income streams.

Section 4 presents multivariate analysis of the factors associated with differences between individuals in the ratio of wealth holdings in retirement to lifetime earnings.

4. Can we explain the dispersion in wealth that remains after controlling for differences in lifetime earnings?

We have seen in the previous section that there is significant dispersion in wealth even between individuals of the same family type with similar levels of lifetime earnings. A lot of the crucial issues relating to savings and wealth accumulation over the life cycle, mentioned in the introduction, depend on what explains these variations. Do they reflect bad planning, myopia, different consumption needs earlier in life, expectations of dying young, or something else? We cannot definitively distinguish between all the possible explanations. However, in this section we present further analysis of how

[24] The measure of retirement income used here is the annualised equivalent of the weekly retirement income figures shown in Figures 3.1, 3.8 and 3.15.

current and past circumstances and expectations in early retirement relate to wealth holdings at retirement, after controlling for differences in lifetime earnings.

Our methodology rests on using information from ELSA respondents (collected in 2002–03) to assess how much of the distribution of wealth (and the ratio of wealth to lifetime earnings), conditioned on lifetime earnings, can be explained. It is worth mentioning at the outset that lifetime earnings do not represent all the resources that may have been available to a family over their lifetime. Two important forms of resources (that could potentially have been significant for some families) are missing from the NI dataset: first, any self-employment or business income will be left out; second, we do not observe any information on the amounts of gifts or inheritances previously received by survey respondents. We have excluded from our analysis any individuals who had more than five years in which they were self-employed; this should have removed many of those whose lifetime resources are heavily influenced by self-employment income, but some may still remain. However, a low level of lifetime employment income among our sample could still be consistent with holding significant wealth in retirement if this wealth had been inherited.

Our measure of lifetime earnings, although much more precise than what has previously been available, is not devoid of measurement errors. As mentioned in the previous section, we do not have information on the lifetime earnings of past partners and we are therefore likely to miss a large share of the lifetime resources of separated, divorced and widowed women. In addition, the lack of information on earnings above the UEL or earnings below the LEL leads to increased measurement error, particularly in the lowest and highest parts of the lifetime earnings distribution. Given that characteristics that are likely to affect the amount of wealth accumulation (conditional on lifetime earnings) are also likely to affect the probability of having had earnings above the UEL – such as having a long planning horizon – we have decided to exclude from our analysis in this section individuals in the top and bottom 10% of our estimated lifetime earnings distribution. Our results cannot be generalised to the poorest and richest of households but have therefore a greater robustness for the middle 80% of the population.

As mentioned in the introduction, it is worth recalling that we do not model the direct impact of characteristics (shocks or choices) on lifetime earnings. Instead we take lifetime earnings as given and we assess how much, after conditioning on lifetime earnings, specific characteristics can explain differences in wealth accumulation. Even if we find no significant effect of a given variable, it could still be that the impact of this characteristic is directly to influence the level of lifetime earnings, rather than to affect the proportion of lifetime earnings that are saved.

We run two types of regressions. First, we use median regression methods with the level of net wealth as the dependent variable and a number of explanatory variables,

which include lifetime earnings. This specification gives a sense of how much wealth accumulation can be related to lifetime earnings and to other characteristics. Second, we use OLS regressions with the ratio of net wealth to lifetime earnings as the dependent variable and similar explanatory variables to those used in the regressions of the level of wealth. In this specification, the dependent variable can be interpreted as being similar to a measure of the saving rate, though it incorporates not only active saving from earnings but also measures unearned income (such as investment returns and inherited wealth) that has been accumulated. We run each of these types of regressions for each type of family unit separately. We control for family composition (previous marital status and number of own children living either in or outside the household), region, educational qualifications, housing tenure type, an indicator of health (whether self-report being in fair or poor health), expectations of longevity[25], cognitive ability (measured numerical ability), NI contribution choices (whether paid reduced rate for married women, whether contracted out) and measures of career breaks (years credited for spells of non employment). As in Section 3, we define total net wealth as the sum of net financial wealth, net physical wealth (including housing wealth), private pension wealth and state pension wealth. Determinants to total net wealth might be the saving rate or investment returns as well as the degree of state redistribution (through state pensions or taxation). Later we also consider different types of wealth separately.

The regression results for median total net wealth of couples are shown in Table 4.1. Unsurprisingly, we find that higher lifetime earnings are associated with higher wealth: a £1,000 increase in lifetime earnings is found to increase total net wealth by an average of £253. However, the adjusted R^2 for the regression shown here (including lifetime earnings, age and other characteristics) is 35%, compared with an adjusted R^2 of just 19% for a regression including only lifetime earnings and no other characteristics (not reported here). In other words, a large amount of the variation in wealth is explained by factors other than lifetime earnings.

Table 4.1 Regression of total net wealth or the ratio of wealth to lifetime earnings on lifetime earnings and other characteristics: couples

	(1) Total wealth	(2) Ratio of wealth to lifetime earnings
Lifetime earnings	0.253***	–0.00596*
	(0.0273)	(0.00245)
Age of the male	–10.39***	–0.00956***

[25] The indicator of expected longevity used is whether the respondent reported at least a 75% chance of living to some older age. The age that people were asked about depended on their age at interview but was typically 10 to 15 years older than their current age. Specifically, those aged 65 or under were asked the chances of living to 75, those aged 66 to 69 were asked about age 80, and those aged 70 to 74 were asked about age 85.

	(1.992)	(0.00180)
Age of the female	–4.696**	–0.00417**
	(1.430)	(0.00129)
Proportion of lifetime earnings earned by man	204.4***	0.159**
	(55.13)	(0.0502)
No children	31.23	0.0122
	(26.59)	(0.0248)
More than 3 children	5.261	–0.00497
	(12.78)	(0.0116)
Own occupier	58.89***	0.0830***
	(16.20)	(0.0147)
Own occupier in London or South-East	53.40	0.0450
	(30.42)	(0.0274)
Living in London or South-East	17.80	0.0251
	(25.18)	(0.0227)
Some class 2 contributions	–14.28	–0.0305
	(19.94)	(0.0179)
Remarried male	–57.30*	–0.0479
	(27.27)	(0.0245)
Remarried female	2.809	0.00589
	(26.64)	(0.0239)
Male with qualification above A-level	97.31***	0.0802***
	(15.94)	(0.0145)
Female with qualification above A-level	94.97***	0.0871***
	(19.99)	(0.0181)
Male in fair/poor health	–1.889	–0.0183
	(14.30)	(0.0130)
Female in fair/poor health	–28.41	–0.0256
	(14.86)	(0.0135)
Male with >=75% chance of living for 10 to 15 years	–1.493	–0.00598
	(13.77)	(0.0125)
Female with >=75% chance of living for 10 to 15 years	2.574	0.00508
	(12.73)	(0.0115)
Male with high numeracy	48.79***	0.0439***
	(12.69)	(0.0114)
Female with high numeracy	38.93**	0.0347**
	(14.14)	(0.0127)
Whether female has paid reduced rate	–25.31	–0.0428***
	(13.46)	(0.0122)
Whether contracted out (female)	22.35	0.00573
	(14.85)	(0.0134)
Whether contracted out (male)	16.65	–0.00484
	(15.88)	(0.0143)
With credits between 16 and 49 (female)	–12.36	–0.0345*
	(18.12)	(0.0165)
With credits between 50 and 59 (female)	–30.89*	–0.0301*

	(15.64)	(0.0142)
With credits between 16 and 49 (male)	–23.21	–0.0152
	(15.82)	(0.0143)
With credits between 50 and 59 (male)	–17.16	–0.0149
	(12.45)	(0.0112)
N	774	774
adj. R^2	0.35	0.60

*** statistically significant at 1%, ** at 5%, * at 10%.

Notes: In specification (1), the dependant variable is total net wealth and the estimator is a median regression. Lifetime earnings and total wealth are expressed in thousand pounds. In specification (2), the dependant variable is the ratio of total net wealth over lifetime earnings and the estimation is done using OLS. The sample excludes couples in the lowest and highest decile of the lifetime earnings distribution as well as those with more than 5 years of Class 2 NI contributions.

Older couples are found to have lower levels of wealth – this is not surprising given that our sample is aged up to 75 and the older members may have started to spend their previously accumulated wealth. Those who are owner-occupiers are found, on average, to have £59,000 more wealth in retirement, perhaps suggesting that this group did, ex-post, particularly well out of investment returns over their lifetimes. Those couples where the man was the only earner are found to have much higher levels of wealth than those where the woman earned a larger share of lifetime earnings. One explanation consistent with this is that one-earner couples have greater scope for home production and therefore lower financial costs during working life.

Those couples where the man or the woman hold high level educational qualifications are found to have higher levels of wealth: couples in which the man has a qualification higher than A-level have, on average, £97,000 more wealth than otherwise identical couples in which the man is educated to a lower level (the equivalent figure for women in couples is £95,000). This could be because patient individuals (that is, those who do not discount the future very heavily) are both more likely to save and also more likely to remain in education for longer; or it could reflect a causal impact of education on decisions over how much, and in what form, to save.

We find that higher levels of numeracy are associated with higher levels of wealth: couples in which the man has high numeracy[26] have, on average £49,000 more wealth than couples in which the man has lower numeracy, while the woman having high numeracy is associated with £39,000 more wealth, on average. This is an extremely large coefficient given that it is conditional on both the level of lifetime earnings and

[26] Numeracy is measured based on answers to a series of increasingly difficult mathematical questions of the type that might be used in everyday life (such as calculating change from a purchase in a shop through to calculating compound interest on money held in a bank account). Those who managed to answer most of the questions correctly are defined as having high numeracy – 47% of men in couples from the sample fall into this category and respectively 23% of women in couples, 38% of single men and 23% of single women.

also the formal educational qualifications of both members of the couple.[27] This could be a causal effect – in other words, higher levels of numeracy lead to individuals choosing to save more (because they are better able to plan for retirement and, on average, better planning might mean more rather than less saving) or making better investment choices. Alternatively, there could be a third factor – such as greater patience (that is, a tendency not to discount the future very heavily) – that explains both greater numeracy and higher wealth. However, to reiterate, this finding is conditional on both lifetime earnings and formal educational qualifications, which makes the causal story more plausible.

There are no large relationships between indicators of the choices individuals had made about their NI contributions (such as whether women paid the reduced rate or whether individuals contracted out of the state second tier pension) and the total net wealth of the couples. There is some mild evidence that those who have gained credits for periods out of the labour market (likely mainly to be due to unemployment or disability spells) have lower net wealth but the coefficients are not statistically significant at conventional levels. Current health status is not in itself found to be statistically significantly related to wealth in retirement.

In the second specification shown in Table 4.1, the ratio of total net wealth to lifetime earnings is regressed on lifetime earnings and other characteristics. The coefficient on lifetime earnings in the first row can be interpreted as the change in this ratio, in percentage points, associated with a £100,000 change in lifetime earnings. The negative coefficient on lifetime earnings means that the ratio of total wealth to lifetime earnings is slightly decreasing over the middle 80% of the lifetime earnings distribution (i.e. excluding the lowest and highest income deciles). However, the coefficient is very small and not statistically significantly different from zero at the 5% level, meaning that this can be interpreted as a constant average ratio of total wealth to lifetime earnings for the middle of the income distribution. This result is consistent with similar analyses using data from the US (Gustman and Steinmeier 1999, Venti and Wise 2000). Although these studies do not formally test the relationship between the ratio of wealth to lifetime earnings and lifetime earnings, they present descriptive evidence that point to a similar result for the middle of the lifetime earnings distribution.

Equivalent results for single men are shown in Table 4.2. For this group, less of the variation in wealth is explained by the observed characteristics that we allow for than it is for couples. Though, again as for couples, the adjusted R^2 is much larger once we control for other characteristics in addition to lifetime earnings and age. Total wealth is found to increase with lifetime earnings – a £1,000 increase in lifetime earnings

[27] This is, however, consistent with earlier results from Banks and Oldfield (2007), who found that numerical ability was strongly correlated with measures of retirement saving and investment portfolios, even after controlling for other dimensions of cognitive ability.

increases wealth by £149 – and to be lower for older individuals than for younger ones. Being an owner-occupier is also strongly correlated with wealth. As for couples, we find that holding higher qualifications is associated with higher wealth: single men with higher qualifications have, on average, £40,000 more wealth than less qualified single men. As for couples, there is some mild evidence that receipts of credits at older ages is associated with lower total net wealth for single men.

Table 4.2 Regression of total net wealth or the ratio of wealth to lifetime earnings on lifetime earnings and other characteristics: single men

	(1) Total net wealth	(2) Ratio of wealth to lifetime earnings
Lifetime earnings	0.149***	–0.0263***
	(0.0355)	(0.00653)
Age	–8.071***	–0.00987***
	(1.564)	(0.00288)
No children	18.48	0.00543
	(22.17)	(0.0413)
Own occupier	61.03***	0.0892**
	(15.49)	(0.0285)
Own occupier in London or South East	146.0***	0.213***
	(33.17)	(0.0606)
In London or SE	–38.02	–0.0126
	(24.59)	(0.0445)
Some class 2 contributions	13.48	0.0442
	(22.41)	(0.0410)
Divorced	11.68	0.0167
	(24.03)	(0.0445)
Widowed	–4.094	–0.0262
	(25.40)	(0.0470)
With qualification above A-level	40.11*	0.0946**
	(18.98)	(0.0351)
In fair/poor health	1.957	–0.0252
	(15.04)	(0.0276)
>=75% chance living for 10 to 15 years	9.096	0.0195
	(14.99)	(0.0273)
With high numeracy	20.60	0.0603*
	(14.22)	(0.0261)
With credits between 16 and 49	–13.80	–0.0436
	(16.03)	(0.0295)
With credits between 50 and 59	–32.67*	–0.0422
	(15.04)	(0.0275)
Whether contracted out	3.745	0.0507
	(15.73)	(0.0289)
N	247	247
adj. R^2	0.32	0.29

*** statistically significant at 1%, ** at 5%, * at 10%.

Notes: In specification (1), the dependant variable is total net wealth and the estimator is a median regression. Lifetime earnings and total wealth are expressed in thousand pounds. In specification (2), the

dependant variable is the ratio of total net wealth over lifetime earnings and the estimation is done using OLS. The sample excludes single men in the lowest and highest decile of lifetime earnings distribution as well as those with more than 5 years of class 2 NI contributions.

Due to the concerns, expressed above, about the robustness of the measures of lifetime earnings for single women, we do not present in the main text any regression results for this group. These are included in Appendix Table A.6 for reference.

Table 4.3 Median regression of types of wealth on lifetime earnings and other characteristics: couples

	(1) State pension wealth	(2) Private pension wealth	(3) Total private wealth
Lifetime earnings	–0.00448	0.127***	0.254***
	(0.00372)	(0.0115)	(0.0303)
Age of the male	–3.630***	–3.818***	–7.539***
	(0.273)	(0.851)	(2.193)
Age of the female	–1.791***	–1.530*	–1.853
	(0.196)	(0.602)	(1.566)
Proportion of lifetime earnings earned by man	–3.182	82.35***	218.7***
	(7.584)	(23.76)	(61.12)
No children	–4.996	6.813	31.51
	(3.686)	(11.71)	(29.77)
More than 3 children	–2.074	2.328	5.179
	(1.753)	(5.419)	(14.21)
Own occupier	0.406	8.584	68.77***
	(2.220)	(6.926)	(17.93)
Own occupier in London or South-East	2.433	16.05	49.20
	(4.159)	(12.82)	(33.81)
Living in London or South-East	2.049	–8.226	28.57
	(3.433)	(10.57)	(28.01)
Some class 2 contributions	0.540	–20.10*	–29.09
	(2.715)	(8.355)	(21.99)
Remarried male	0.475	–15.26	–48.96
	(3.729)	(11.40)	(29.87)
Remarried female	1.398	–4.442	2.577
	(3.640)	(11.15)	(28.99)
Male with qualification above A-level	4.304	42.23***	96.51***
	(2.207)	(6.823)	(18.02)
Female with qualification above A-level	–0.227	57.47***	116.6***
	(2.772)	(8.377)	(22.30)
Male in fair/poor health	–0.139	6.855	–1.470
	(1.964)	(6.132)	(16.02)

Female in fair/poor health	1.764	–11.33	–30.43
	(2.034)	(6.305)	(16.38)
Male with >=75% chance of living for 10 to 15 years	2.168	–1.475	–8.247
	(1.905)	(5.877)	(15.52)
Female with >=75% chance of living for 10 to 15 years	–4.311*	6.801	6.316
	(1.728)	(5.425)	(14.19)
Male with high numeracy	–0.0830	12.95*	45.18**
	(1.727)	(5.388)	(14.09)
Female with high numeracy	–3.170	6.050	35.89*
	(1.925)	(5.948)	(15.62)
Whether female has paid reduced rate	–8.541***	–4.934	–13.44
	(1.843)	(5.722)	(14.93)
Whether contracted out (female)	0.587	16.09*	19.88
	(2.034)	(6.340)	(16.53)
Whether contracted out (male)	–11.93***	43.20***	28.63
	(2.185)	(6.735)	(17.44)
With credits between 16 and 49 (female)	–0.324	–5.326	–4.406
	(2.510)	(7.808)	(20.28)
With credits between 50 and 59 (female)	2.672	–16.27*	–43.76*
	(2.130)	(6.659)	(17.33)
With credits between 16 and 49 (male)	2.531	–19.43**	–32.74
	(2.170)	(6.724)	(17.64)
With credits between 50 and 59 (male)	–4.918**	–3.273	–12.50
	(1.700)	(5.302)	(13.88)
N	774	774	774
Adj. R²	0.33	0.30	0.33

*** statistically significant at 1%, ** at 5%, * at 10%.

Notes: Private wealth is total net wealth excluding state pension wealth. Lifetime earnings and wealth measures are expressed in thousand pounds. The sample excludes couples in the lowest and highest decile of lifetime earnings distribution as well as those with more than 5 years of class 2 NI contributions.

In Table 4.3 and Table 4.4, we present the results for couples of similar regressions to those shown in Table 4.1, but distinguishing between different types of wealth. Table 4.3 reproduces results using specification (1) – i.e. median regression of level of wealth on lifetime earnings and other characteristics – while Table 4.4 presents the results obtained using the second specification, looking at the ratio of wealth to lifetime earnings. In both cases, we present results separately for: state pension wealth, private pension wealth and then total private wealth (defined as total net wealth minus state pension wealth).

State pension wealth is negatively related to lifetime earnings. This is not surprising, as the system has a redistributive component. Meanwhile private pension wealth and total private wealth are strongly positively correlated with lifetime earnings. Almost no characteristic is a significant determinant of state pension wealth apart from age of the members of the household, reflecting in large part the state pension rules. This can be

contrasted with the regressions for private pension wealth and total private wealth. An increase of £1,000 of lifetime earnings is associated with a £254 increase in total private wealth and a £127 increase in private pension wealth. Being an owner occupier is only significantly positively related to wealth holdings when looking at total private wealth, and not when looking only at private pension wealth. This is reassuring evidence that this characteristic is not simply picking unobserved preferences that could impact on other types of wealth. The fact that households with some class 2 NI contributions have lower private pension wealth but not lower other private wealth is similarly consistent with our priors. High numeracy among both men and women is associated with higher total private wealth but private pension wealth is less strongly related to the numeracy of men and not at all significantly to that of women. This could be explained if higher numeracy levels, controlling for lifetime earnings, mostly affect one's ability to make better investment decisions, which might affect total private wealth holdings in retirement, while private pension wealth – which, for this cohort, largely comprises defined benefit pensions – was not as influenced by individuals' ability to make relatively sophisticated investment decisions.

We also find that choices about the level of NI contributions that individuals have made have an impact on the distribution of total wealth. Couples where the wife has paid the married women's reduced rate have lower state pension (£8,500 lower) wealth than couples where the woman did not but there is no overall difference between these two groups in terms of private wealth. Couples where the husband contracted out of the second tier state pension have lower state pension wealth – £12,000 lower on average – but they also have more private pension wealth – £43,000 – than those who remained contracted in. This suggests that, as expected, contracting out led to a shift from state pension entitlements to private pension entitlements.

The relationship shown in Table 4.3 between the retirement wealth and having received credits for periods out of work suggests there is some evidence that the pattern of earnings throughout working life has some impact on wealth, over and above the direct impact through the overall level of lifetime earnings. Even after controlling for total lifetime earnings, private pension wealth is found to be lower for those who have had credit periods than those who have not. Interpreting these coefficients is complicated by the fact that credits can have been received for a number of different reasons (and not only unemployment or disability spells), so these variables might confound several effects. However, they do suggest that for those who have had shocks in their earnings histories, these shocks might have led to lower wealth accumulation not only because their earnings turned out to be lower than expected but also because they might have had to deplete their savings (or reduced their planned savings) as a result of these shocks.

Table 4.4 presents similar results using ratio of wealth to lifetime earnings as the dependent variable. The ratio of state pension wealth to lifetime earnings is negatively related to lifetime earnings, which reflects the redistributive structure of state pensions. In contrast, private pension wealth is positively correlated with lifetime earnings; in other words, richer households tend to accumulate more wealth through their private pensions than poorer households – excluding again the poorest and richest. This could be for a number of reasons. First, higher earners tend to be more likely to be offered an occupational pension than lower earners. Second, those who experience rapid pay growth (who will typically have higher lifetime earnings) accrue pensions through final salary defined benefit schemes that are worth far more as a share of their career average earnings than those who experience lower pay growth (who will typically have lower lifetime earnings). Although the prevalence of final salary DB pensions has declined (at least in the private sector) in recent years, such pensions are quite widespread among the cohort considered here.

The coefficient on lifetime earnings is not significant in the regression for the ratio of total private wealth to lifetime earnings. Both having higher levels of qualifications and higher numeracy are associated with having a higher ratio of total private wealth to lifetime earnings, conditional on lifetime earnings, illustrating the importance of these characteristics. The specification shown in Table 4.4 explains a large part of the variation in wealth holdings relative to lifetime earnings: between 28.4% in the case of private pension wealth and 58.3% in the case of state pension wealth. The remaining variation could be explained either by differences in preferences between individuals or other differences in circumstances not captured by our regressors – in particular, we have not been able to include a measure of inherited wealth or gifts received in the past.

Table 4.4 Regression of ratios of types of wealth over lifetime earnings on lifetime earnings and other characteristics: couples

	(1) State pension wealth ratio	(2) Private pension wealth ratio	(3) Total private wealth ratio
Lifetime earnings	–0.00852***	0.00385**	0.00255
	(0.000465)	(0.00122)	(0.00243)
Age of the male	–0.00337***	–0.00378***	–0.00618***
	(0.000341)	(0.000895)	(0.00178)
Age of the female	–0.00180***	–0.00158*	–0.00238
	(0.000245)	(0.000643)	(0.00128)
Proportion of lifetime earnings earned by man	–0.00729	0.0776**	0.166***
	(0.00952)	(0.0250)	(0.0498)
No children	0.00102	0.0161	0.0112
	(0.00469)	(0.0123)	(0.0246)
More than 3 children	–0.00560*	–0.000994	0.000635

	(0.00219)	(0.00575)	(0.0115)
Own occupier	–0.00355	0.0136	0.0866***
	(0.00278)	(0.00731)	(0.0146)
Own occupier in London or South-East	0.00232	0.00465	0.0426
	(0.00520)	(0.0137)	(0.0272)
Living in London or South-East	0.000285	–0.0107	0.0248
	(0.00430)	(0.0113)	(0.0225)
Some class 2 contributions	0.000499	–0.0177*	–0.0310
	(0.00340)	(0.00892)	(0.0178)
Remarried male	–0.00234	–0.0101	–0.0456
	(0.00465)	(0.0122)	(0.0243)
Remarried female	0.00497	0.00216	0.000918
	(0.00453)	(0.0119)	(0.0237)
Male with qualification above A-level	0.00789**	0.0265***	0.0723***
	(0.00274)	(0.00720)	(0.0143)
Female with qualification above A-level	–0.0000899	0.0323***	0.0872***
	(0.00343)	(0.00900)	(0.0179)
Male in fair/poor health	–0.000773	–0.00240	–0.0175
	(0.00247)	(0.00649)	(0.0129)
Female in fair/poor health	0.00472	–0.00623	–0.0303*
	(0.00255)	(0.00670)	(0.0134)
Male with >=75% chance of living for 10 to 15 years	0.00462	–0.00414	–0.0106
	(0.00237)	(0.00622)	(0.0124)
Female with >=75% chance of living for 10 to 15 years	–0.00204	0.00822	0.00712
	(0.00217)	(0.00571)	(0.0114)
Male with high numeracy	0.00116	0.0201***	0.0427***
	(0.00216)	(0.00568)	(0.0113)
Female with high numeracy	–0.00187	0.00378	0.0366**
	(0.00241)	(0.00632)	(0.0126)
Female number of years with reduced rate	–0.00974***	–0.00399	–0.0330**
	(0.00231)	(0.00606)	(0.0121)
Whether contracted out (female)	0.000814	0.00733	0.00491
	(0.00255)	(0.00669)	(0.0133)
Whether contracted out (male)	–0.0145***	0.0339***	0.00966
	(0.00270)	(0.00710)	(0.0142)
With credits between 16 and 49 (female)	–0.00504	–0.0125	–0.0294
	(0.00313)	(0.00823)	(0.0164)
With credits between 50 and 59 (female)	0.00177	–0.0127	–0.0319*
	(0.00268)	(0.00705)	(0.0141)

With credits between 16 and 49 (male)	0.00213	−0.0195**	−0.0173
	(0.00271)	(0.00711)	(0.0142)
With credits between 50 and 59 (male)	−0.00425*	−0.00466	−0.0107
	(0.00213)	(0.00560)	(0.0112)
N	774	774	774
adj. R^2	0.583	0.284	0.355

*** statistically significant at 1%, ** at 5%, * at 10%.

Notes: The sample excludes couples in the lowest and highest decile of lifetime earnings distribution as well as those with more than 5 years of class 2 NI contributions.

5. Conclusions

In this paper we use a unique dataset, containing individual survey data from the English Longitudinal Study of Ageing (ELSA) linked to data on earnings histories from administrative records, to construct measures of lifetime earnings and examine how these relate to financial resources in retirement. Retirement income and wealth at retirement are, as expected, positively correlated with lifetime earnings but there is also substantial dispersion in retirement income and retirement wealth among people with very similar lifetime earnings. For example, we find that greater numerical ability and higher educational qualifications are positively correlated with retirement resources even after controlling for differences in lifetime earnings. These correlations come in large part through private non-pension wealth, suggesting that decisions about how to invest in housing or financial wealth are impacted by higher numeracy. We also find a very significant impact of being an owner occupier on total private wealth.

The retirement resources of single women are far less well explained by their own lifetime earnings than those of couples or single men. We hypothesise that, as the vast majority of single women in the age group considered had previously been married, this reflects the fact that we do not observe the lifetime earnings of their former spouses.

Finally we find evidence that – excluding the richest and poorest – the ratio of total wealth to lifetime earnings is on average relatively constant across the lifetime earnings distribution, suggesting that "the rich" do not save more. Our findings are qualitatively consistent with previous findings from similar studies in the US (Gustman and Steinmeier 1999, Venti and Wise 2000). However, we have included a slightly different set of regressors and have not been able to control for some factors that were included in earlier US studies, making a direct comparison between the results difficult. In particular, we have not been able to include a measure of past receipt of inheritances or gifts, which might have affected total lifetime resources. The residual variation in wealth holdings not explained by the regression specifications presented in section 4 could be explained by a number of other unobserved differences, in particular: preferences, previous receipt of inheritances or gifts, and different success with investment

strategies. As we have conducted most of our analysis only on the middle 80% of the distribution of lifetime earnings, we cannot extrapolate our results to the very lowest and very highest lifetime earning individuals; it is also possible that the pattern seen among these groups could be markedly different.

Appendix

Table A.1 Mean and median lifetime earnings by decile of lifetime earnings

	Couples		Single men		Single women	
Deciles	Mean	Median	Mean	Median	Mean	Median
Poorest	415,923	446,469	[116,768]	[93,857]	7	4
2	791,266	790,004	[411,332]	[423,644]	3,716	71
3	951,940	954,530	[557,777]	[550,384]	42,197	38,779
4	1,069,124	1,072,914	[658,809]	[657,686]	100,595	100,298
5	1,164,709	1,161,857	[753,526]	[757,213]	164,900	170,001
6	1,254,056	1,252,505	[821,287]	[806,775]	234,770	233,242
7	1,370,829	1,372,170	[908,778]	[912,816]	315,057	310,066
8	1,503,025	1,504,076	[988,494]	[981,992]	448,207	441,703
9	1,689,203	1,674,053	[1,122,411]	[1,115,649]	640,830	635,389
Richest	2,169,523	2,052,289	[1,475,540]	[1,381,991]	1,035,514	959,156

Note: In pounds. Sample size is: 967 couples, 308 single men, 655 single women. Square brackets indicate statistics are based on a small sample (of only 30 or 31 individuals).

Table A.2 Mean and median lifetime earnings by quintile of lifetime earnings

	Couples		Single men		Single women	
Quintiles	Mean	Median	Mean	Median	Mean	Median
Poorest	603,594	673,200	264,050	286,411	1,847	18
2	1,010,228	1,013,210	608,293	606,877	71,173	66,588
3	1,209,382	1,208,118	787,962	785,953	199,568	192,524
4	1,437,269	1,433,253	948,636	935,267	381,123	374,594
Richest	1,928,119	1,827,883	1,296,081	1,213,008	836,666	785,392

Note: In pounds. Sample size is: 967 couples, 308 single men, 655 single women.

Table A.3 Share reporting zero net housing wealth by quintile of lifetime earnings

Quintiles	Couples	Single men	Single women
Poorest	40%	66%	51%
2	17%	53%	53%
3	9%	54%	34%
4	7%	24%	32%
Richest	2%	15%	16%
All	15%	43%	37%

Note: Sample size is: 967 couples, 308 single men, 655 single women.

Table A.4 Years contracted-out by deciles of lifetime earnings (couples)

	Men		Women	
Deciles	Years contracted-out	As a share of years with earnings	Years contracted-out	As a share of years with earnings
Poorest	2.55	0.21	1.43	0.16
2	7.84	0.43	1.70	0.15
3	9.13	0.47	2.93	0.19
4	10.45	0.51	2.47	0.18
5	10.05	0.51	3.73	0.24
6	11.91	0.57	3.44	0.20
7	11.59	0.56	3.80	0.22

8	13.38	0.59	6.85	0.37
9	13.20	0.63	8.03	0.43
Richest	13.33	0.63	11.04	0.58

Note: In pounds. Sample size is 967.

Table A.5 Years contracted-out by deciles of lifetime earnings (singles)

	Single men		Single women	
Quintiles	Years contracted-out	As a share of years with earnings	Years contracted-out	As a share of years with earnings
Poorest	2.26	0.17	0.11	0.06
2	5.31	0.33	0.96	0.10
3	10.02	0.54	2.49	0.18
4	10.19	0.55	6.56	0.40
Richest	11.26	0.58	10.15	0.58

Note: Sample size is: 308 single men, 655 single women.

Table A.6 Regression of total net wealth or the ratio of wealth to lifetime earnings on lifetime earnings and other characteristics: single women

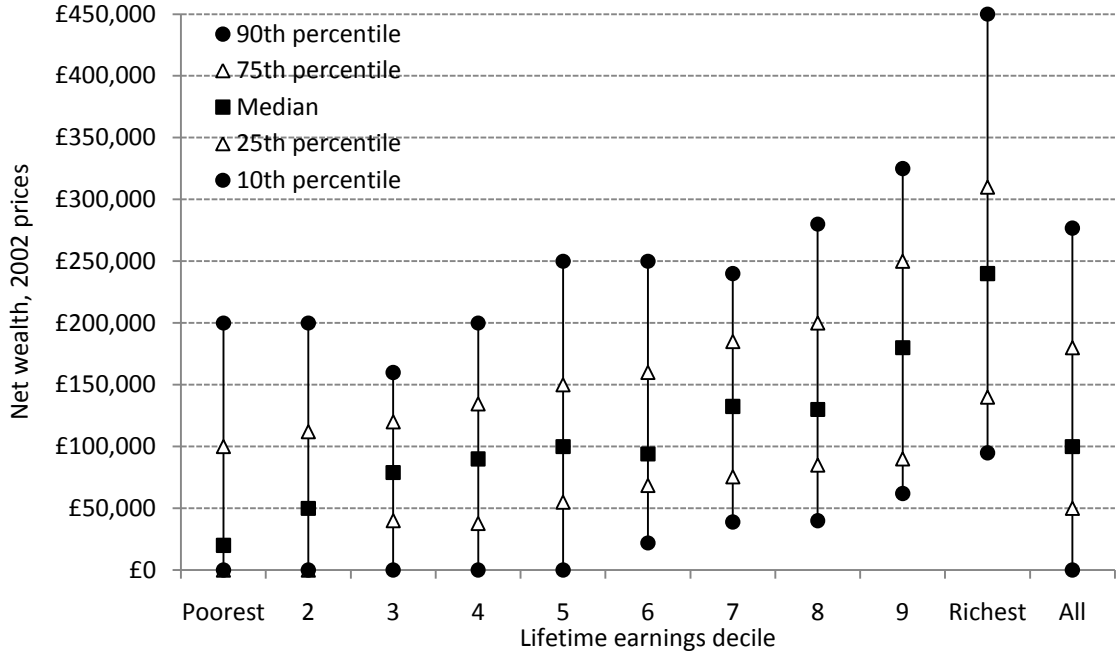
	(1) Total net wealth	(2) Ratio of wealth to lifetime earnings
Lifetime earnings	0.0791**	−178.4**
	(0.0241)	(67.87)
Age	−4.699***	12.75
	(1.039)	(28.52)
No children	−19.65	41.15
	(13.85)	(380.1)
Own occupier	114.6***	550.9*
	(9.771)	(272.3)
Own occupier in London or South East	85.12***	−9.170
	(19.33)	(532.9)
In London or SE	8.064	67.68
	(14.98)	(413.7)
Some class 2 contributions	−21.03	−568.0
	(25.35)	(716.8)
Divorced	−7.210	299.8
	(18.21)	(509.2)
Widowed	−32.67	33.04
	(18.77)	(523.8)
With qualification above A-level	66.63***	158.7
	(13.03)	(364.8)
In fair/poor health	−18.88*	−318.0
	(9.420)	(262.2)
>=75% chance living for 10 to 15 years	24.35**	−13.62
	(9.280)	(255.7)
With high numeracy	7.300	−36.74
	(10.01)	(276.9)
Number of years with reduced rate	−1.996**	−63.12**
	(0.769)	(21.26)

With credits between 16 and 49	–14.14	–230.5
	(10.68)	(296.3)
With credits between 50 and 59	–17.68	–372.9
	(9.498)	(264.7)
Whether contracted out	11.66	–128.0
	(9.484)	(263.7)
N	521	521
adj. R^2	0.28	0.04

*** statistically significant at 1%, ** at 5%, * at 10%.

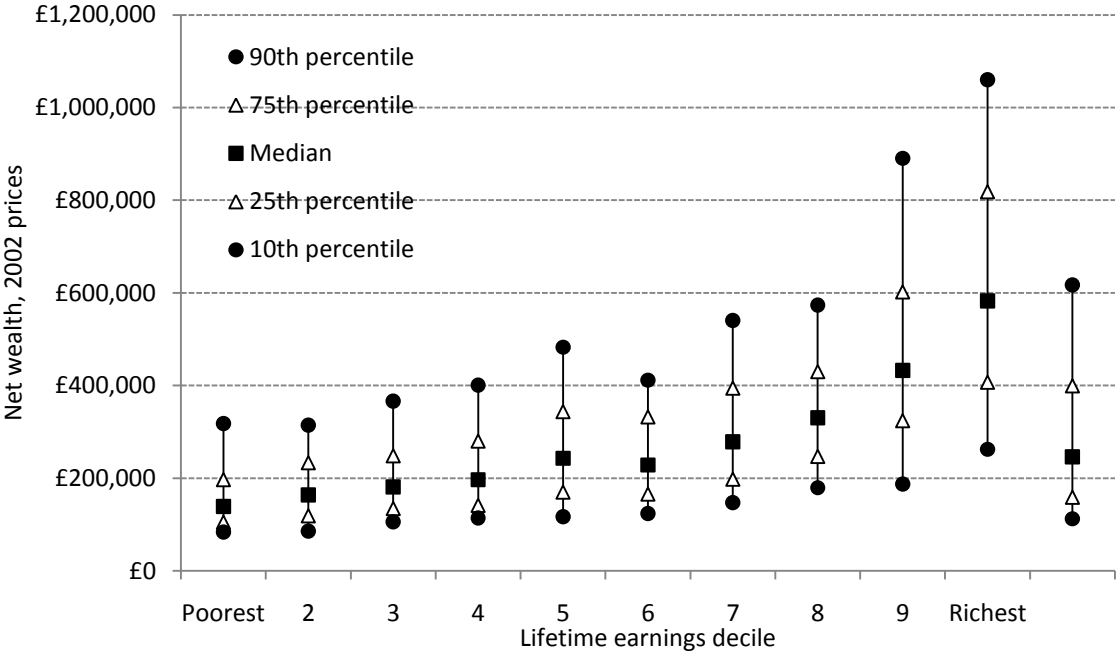
Notes: In specification (1), the dependant variable is total net wealth and the estimator is a median regression. Lifetime earnings and total wealth are expressed in thousand pounds. In specification (2), the dependant variable is the ratio of total net wealth over lifetime earnings and the estimation is done using OLS. The sample excludes single women in the lowest and highest decile of lifetime earnings distribution as well as those with more than 5 years of class 2 NI contributions.

Figure A.1. 10th, 25th, 50th, 75th and 90th percentiles of housing wealth, by lifetime earnings decile – couples



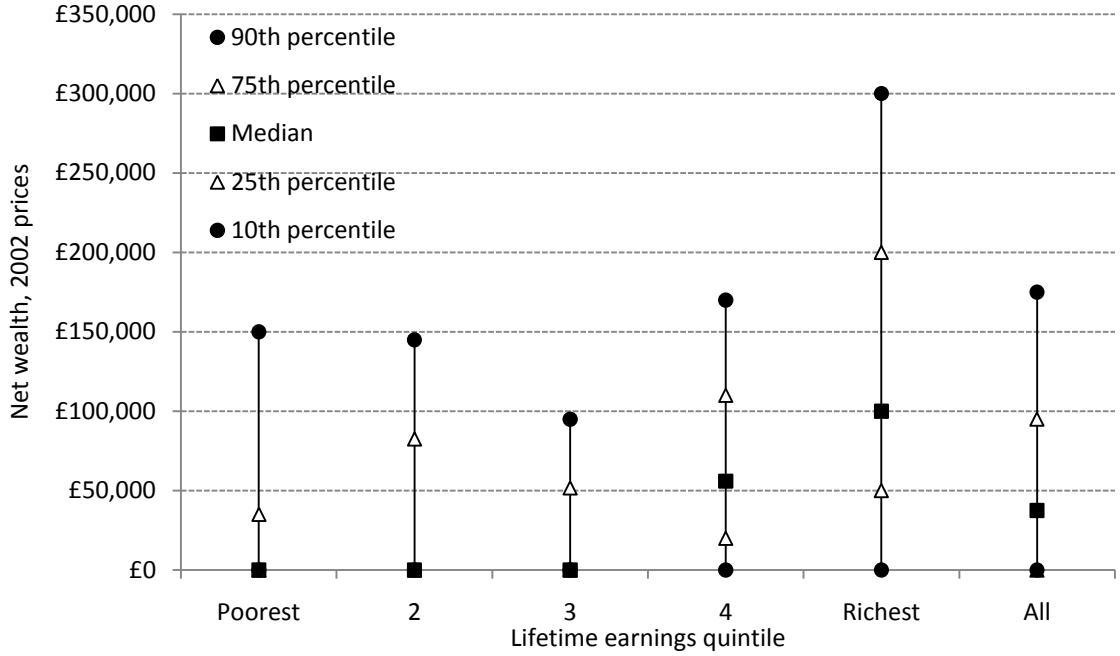
Note: Sample size = 967; one observation per couple.

Figure A.2. 10th, 25th, 50th, 75th and 90th percentiles of non-housing wealth, by lifetime earnings decile – couples



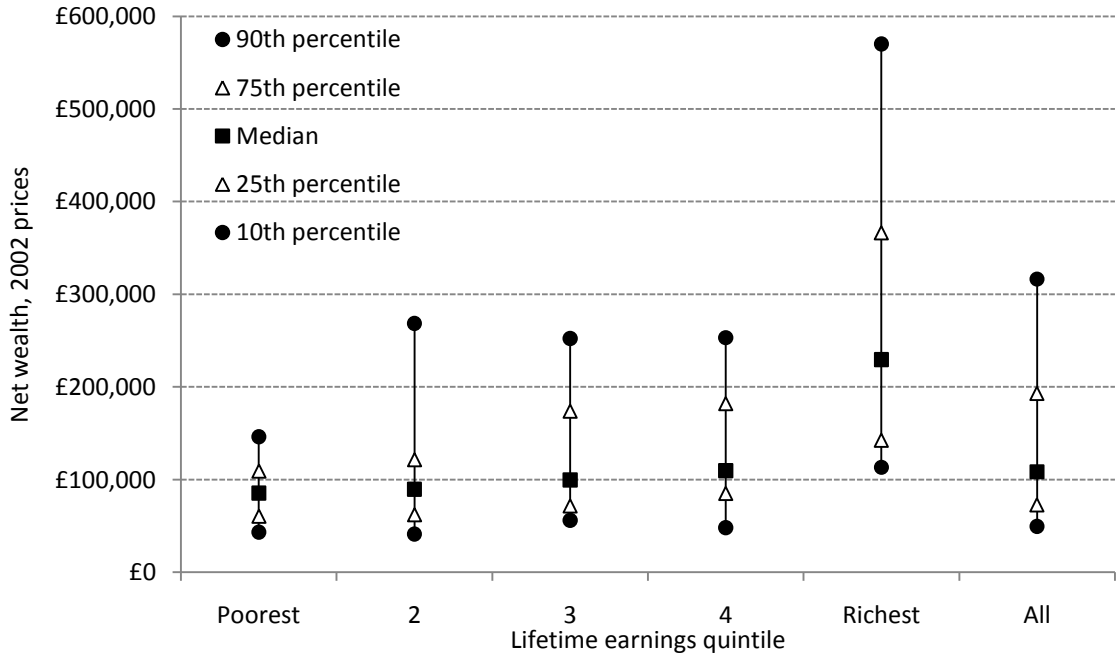
Note: Sample size = 967; one observation per couple.

Figure A.3. 10th, 25th, 50th, 75th and 90th percentiles of housing wealth, by lifetime earnings quintile – single men



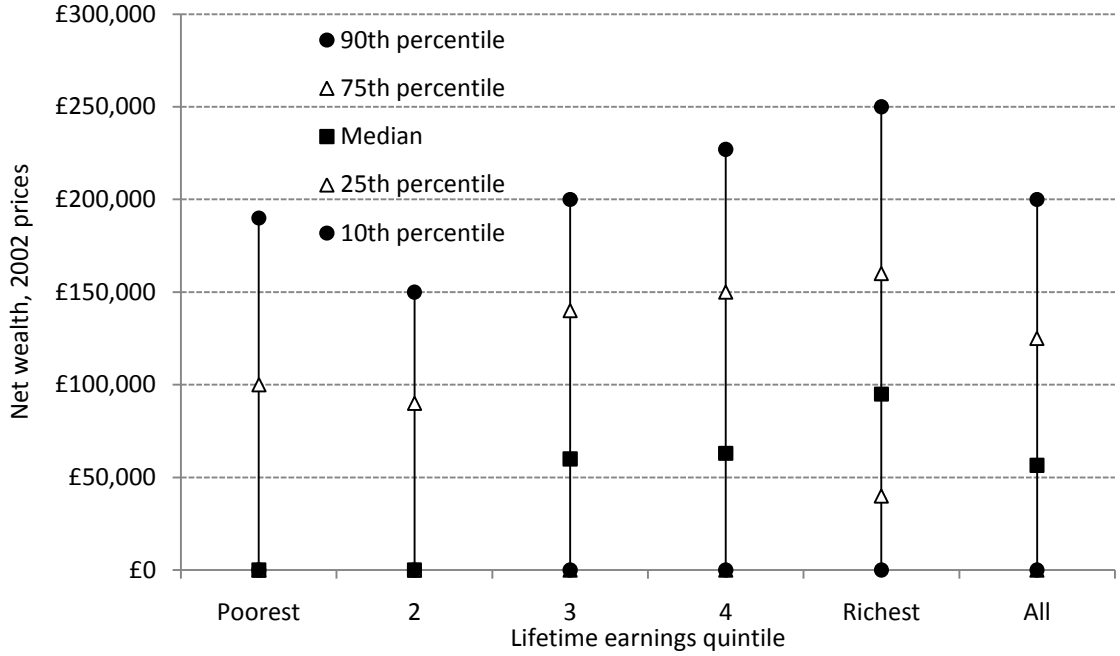
Note: Sample size = 308.

Figure A.4. 10th, 25th, 50th, 75th and 90th percentiles of non-housing wealth, by lifetime earnings quintile – single men



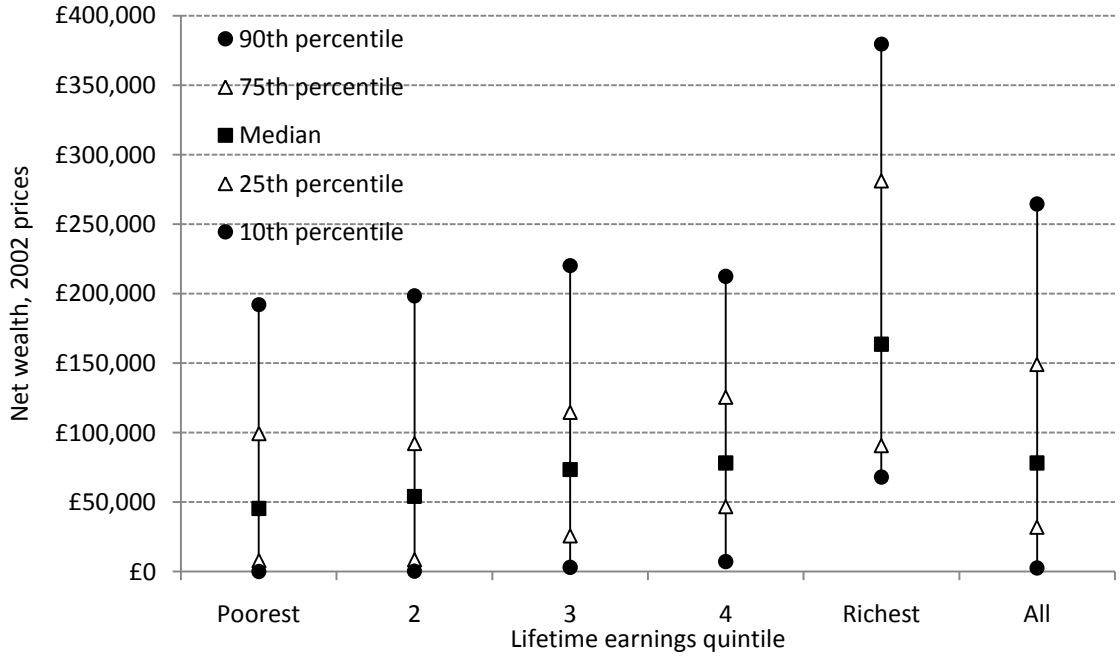
Note: Sample size = 308.

Figure A.5. 10th, 25th, 50th, 75th and 90th percentiles of housing wealth, by lifetime earnings quintile – single women



Note: Sample size = 655.

Figure A.6. 10th, 25th, 50th, 75th and 90th percentiles of non-housing wealth, by lifetime earnings quintile – single women



Note: Sample size = 655.

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