

# The Relative Role of Socio-Economic Factors in Explaining the Changing Distribution of Wealth in the US and the UK

by

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## **Abstract**

The US and the UK experienced substantial increases in net wealth over the period 1994/95-2005/06, largely driven by house price booms in each country. The distribution of these gains across households led to a slight increase in wealth inequality in the US but a substantial fall in inequality in the UK. We use a decomposition technique to examine the extent to which changes in households' socio-economic characteristics explain changes in wealth holdings and wealth inequality. In both countries we find that changes in household characteristics had an equalising effect on wealth inequality; moderating the increase in the US and accounting for over one-third of the fall in UK inequality.

Keywords: household wealth, wealth inequality, debt, housing assets, age-wealth profiles, decomposition

JEL codes: C81, D31, D63, I24, I31

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# 1 Introduction

The UK-US comparison is often used in economic case studies, and for good reason. Apart from the obvious cultural connections between the two countries it is common-place to note similarities in social and economic policies, systems and outcomes. Both exhibit high levels of earnings and income inequality, both have been characterised as countries with relatively weak institutions and less generous welfare states. However, in the distribution of wealth and in the recent history of wealth inequality, there are important differences between the two countries.<sup>1</sup> The objective of this paper is to better understand the roots of these differences and to explain the contrasting changes in wealth distribution and wealth inequality in the two countries, focusing on changes in household characteristics during the decade immediately preceding the financial crisis.

During this period both the US and the UK experienced substantial increases in net wealth, largely driven by house price booms. But the outcomes in terms of wealth inequality over the period were rather different and clearly an explanation for this must be attributable in part to the fact that households in the two countries typically hold rather different portfolios of personal wealth. Research comparing holdings of housing and financial wealth has highlighted the fact that US households are much more likely to hold financial assets than UK households who are more likely to hold housing assets (Banks et al. 2004). UK households are more likely to enter home-ownership earlier than US households and entry into the housing market leaves UK households with fewer savings to invest in the stock market. This phenomenon has been understood to be driven partly by higher volatility in UK house prices and partly by institutional differences (size of down payment, ability to insure against interest rate fluctuation, etc). But that is at best only a partial explanation as recent evidence suggests that younger UK cohorts are entering the housing market later but do not appear to be saving more, in terms of financial asset accumulation, than older cohorts (Hood and Joyce 2013). The widespread diffusion of stock ownership which occurred in the US over the 1990s (Gale and Pence 2006), has not been replicated in the UK. Some of this difference appears to be due to historical factors and pension systems (Banks et al. 2000).

We investigate the different distributional outcomes in the two countries by comparing private wealth holdings of financial and non-financial assets of UK and US households over the period 1994/5 – 2005/6. We examine the relationship between the distribution of economic and demographic factors of households and the distribution of wealth and assess the extent to which changes in these factors explain changes in the distributions of wealth over this period. Sections 2 and 3 describe the data and the principal changes in wealth distribution that have occurred during the period. Section 4 explains the methodology for analysing the distributional changes; this methodology is then implemented in Section 5. Section 6 concludes.

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<sup>1</sup>Although income inequality is well documented, until recently much less has been known about the distribution of household wealth. For earlier work comparing US and UK wealth see Banks et al. (2004).

## 2 Data

The principal data source for the US is the Luxembourg Wealth Study database (LWS), which provides harmonised national wealth survey data to facilitate comparability across countries. International wealth data, drawn from national surveys and in some cases administrative sources, held in this database have been harmonized as much as possible to allow for meaningful comparisons between countries.<sup>2</sup> However, because the LWS time coverage for the UK is limited, the analysis for the UK is based on the original BHPS data: household wealth definitions are comparable to the one adopted by LWS while the necessary imputations for housing and financial wealth described in detail in Karagiannaki (2011).

Wealth holdings are typically computed at the household level by summing wealth (and debt) holdings across all members of a household. Normally, households are described in terms of the characteristics of the household head and no equivalisation is made for household size or composition. This contrasts with earnings statistics which are usually presented (as they are paid) on an individual basis and income which is typically expressed at a household level and equivalised using a variety of scales that adjust for ‘need’ based on household size and composition to facilitate comparison on a like-for-like basis. There is no consensus on whether or how household wealth holdings should be equivalised. In our analysis we use unadjusted measures of household wealth, treating wealth as a common household good.

A consequence of using raw household wealth data is that individual wealth holders – the households – are clearly not equal in their ability to accumulate wealth or their ‘need’ for wealth holdings. Households with more adult members are likely to have higher wealth than households with fewer adults and, arguably, larger households’ wealth needs are greater. Through using household level wealth measures there is an underlying assumption that this provides a good description of the wealth status of household members and against other alternatives this may well be the most realistic. However, it should be borne in mind that wealth ownership within a household can take various forms with some assets personally owned by individual members and some jointly owned between household members. Some assets may be jointly owned with other family members or individuals who are not household members. Similarly some debts may be viewed as personal (such as credit card debt, personal loans, bank overdrafts, etc) while others are more likely to be joint (mortgage debt). As an example of the complexity of intra-household asset ownership, legal ownership of household assets is frequently contested upon divorce/separation and settlements vary across different jurisdictions.

The main measure of wealth used in this paper is an estimate of net worth. Net worth is defined as the sum of total financial assets less total non-housing debts and total housing assets less housing debt. This measure of net worth excludes estimates of business assets and debts, life insurance and pension assets,

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<sup>2</sup>The detail of the sources used by LWS is discussed in the Data Appendix.

	Mean	$P_{10}$	$P_{25}$	$P_{50}$	$P_{75}$	$P_{90}$	Number of households
SCF							
1994	149.0	-7.0	0	34.7	123.9	296.4	4299
1997	183.8	-9.1	0	41.2	158.4	366.1	4305
2000	241.0	-7.3	0.3	49.4	181.1	487.1	4442
2003	266.1	-8.6	0.2	50.5	201.5	558.1	4519
2006	287.1	-10.9	0.1	58.4	221.1	562.6	4418
BHPS							
1995	103.8	-0.2	1.6	49.4	131.7	267.9	3915
2000	137.8	-0.1	3.4	75.0	177.1	363.4	3856
2005	253.6	0	14.2	175.0	342.1	598.0	3484

*Note:* The number of households in BHPS is for households with non-missing wealth data. Currency unit: thousands of 2005 dollars (PPP adjusted).

Table 1: Mean and quantiles of net worth in US and the UK

and durables or collectibles. See the Data Appendix for details.

### 3 Changes in US and UK household wealth

We focus on the decade from the mid 1990s onwards. This is a period characterised by a substantial increase in household net worth in both countries as shown in Table 1.

#### 3.1 The US

Mean *net worth* rose by around 62% between 1994 and 2000 (from about \$149,000 to \$241,000)<sup>3</sup> after which increases in wealth were much smaller: around 10% between 2000 and 2003 and less than 8% between 2003 and 2006. Overall, during the entire period average net worth increased by 93%. Median wealth grew by less, indicating a widening inequality of wealth over these years (Wolff 2007). For the entire period 1994-2006 it increased by 68%. Underlying this, each of the principal components of net worth behave in interesting and contrasting ways over the period.

Mean *financial wealth* showed a sharp increase from 1994 to 2000 (around 80%), followed by a rather modest decline from 2000 to 2003 and then a slight increase between 2003 and 2006 but not enough to match the 2000 level (Table 2). Figure 1<sup>4</sup> shows that these trends follow the trends in share prices, although

<sup>3</sup>All values are expressed in 2005 dollars.

<sup>4</sup>Source: Financial indicators from the Monthly Monetary and Financial Statistics (MEI) from the OECD statistical database

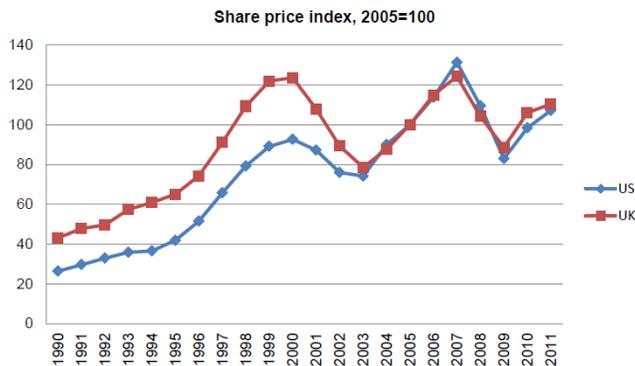


Figure 1: Share price index.

the strong recovery in share prices 2003-2006 was not matched by a comparable increase in financial wealth which, as defined in the Data Appendix, has a number of components that can separately influence trends. Overall, for the entire period mean net financial wealth grew by around 68% (a little under the increase in share prices). Over the same period median net financial wealth remained virtually unchanged while net financial wealth at the lower quartile decreased by around 70%, mainly as a result of the large increases in financial debt in the lower tail of the distribution. The stronger growth of net financial wealth at the upper tail of the distribution indicates again increased inequality. The patterns in terms of (gross) financial wealth are symmetric, showing larger increases at the upper tail of the distribution and small or no increases at the middle and lower tail of the distribution.

Mean (net) *housing equity* held by US households more than doubled over this period.<sup>5</sup> The larger increases occurred between 1994-2000 and 2000-2003 when (net) housing wealth increased by 50% and 26% respectively. Between 2003 and 2007 the growth in (net) housing wealth was much lower (increasing by around 10%).<sup>6</sup> Over the entire period, (net) housing equity increased by 108%. The increase in median housing wealth was slightly smaller than the increase in mean housing wealth (81%) indicating again widening inequality. The growth in gross housing wealth follows a similar pattern, although the difference between the median and the mean is greater, with the median growing by 71% and the mean by 106%.

Over the same period there has also been a substantial increase in financial

([http://stats.oecd.org/Index.aspx?DataSetCode=MEI\\_FIN](http://stats.oecd.org/Index.aspx?DataSetCode=MEI_FIN) last accessed on 30-01-2013). For further discussion see Wolff (2012).

<sup>5</sup>Note that the last year we examine for the US is 2007, which largely precedes the subsequent falls in house prices associated with the financial and economic crisis.

<sup>6</sup>This does not follow the pattern of house prices changes shown in Figure 2 where house prices increased more after 2003 than in the two earlier periods. This suggests that other changes such as increases in loan-to-value mortgages and owner occupation rates drove some of these changes.

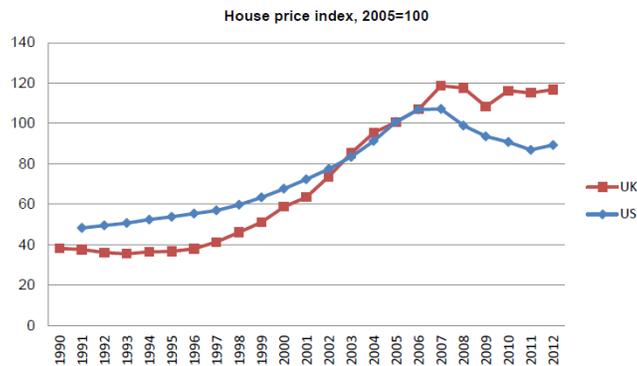


Figure 2: House price index.

debt and an even larger increase in housing (mortgage) debt (with the means of the former increasing by around 52% and the latter by 100%). Total debt as a proportion of gross (total) assets decreased between 1994 and 2000 (from around 26% to 21%) - as a result of the faster growth in the value of gross assets - but by 2006 the proportion increased again to 26% (reflecting slowdown of assets price growth).

### 3.2 The UK

The rapid growth in wealth occurred after 2000, in contrast to US experience: mean household net worth increased by 33% between 1995 and 2000, but by 84% between 2000 and 2005. Mean net worth was more than twice as high in 2005 as it was in 1995 (\$103,800 in 1995 compared to \$253,600 in 2005). The growth was stronger in the lower tail and the middle of the distribution, indicating a decrease in net-worth inequality.

	Mean	$P_{25}$	$P_{50}$	$P_{90}$	% Neg	Mean	$P_{25}$	$P_{50}$	$P_{90}$	% Pos	Mean	$P_{25}$	$P_{50}$	$P_{90}$	% Pos
	<b>Net financial wealth</b>					<b>Total financial assets</b>					<b>Financial debt</b>				
<b>SCF</b>															
1994	58	-5.2	0.2	92.2	42	67.3	0.7	3.7	97.6	88	9.4	0	2	23.7	67
1998	79.3	-5.1	0.8	136.2	38	91.4	0.8	6.1	145.3	91	12.2	0	2	29.9	65
2000	104.8	-5	1.2	175.4	38	116.3	1	6.8	181.6	92	11.6	0	2.1	29.5	65
2003	94.2	-7.7	0.3	146.8	41	107.8	0.7	5.4	153.9	91	13.7	0	3.3	33.1	66
2006	97.2	-8.8	0.2	126.9	42	111.5	0.8	5.2	134.6	91	14.3	0	3.1	37.8	67
<b>BHPS</b>															
1995	36.8	0.0	3.6	97.0	22	39.0	0.3	5.2	97.0	85	2.2	0.0	0.0	6.8	45
2000	28.9	0.0	3.7	82.3	24	32.7	0.3	5.9	84.1	85	3.8	0.0	0.0	12.6	45
2005	39.3	0.0	5.2	112.6	24	44.9	0.3	8.1	114.8	83	5.6	0.0	0.0	15.7	41
	<b>Net housing equity</b>					<b>Gross housing wealth</b>					<b>Housing debt</b>				
<b>SCF</b>															
1994	91.2	0.0	31.7	208.8	1	133.6	0.0	73.7	263.6	67	42.5	0.0	0.0	126.5	43
1998	104.5	0.0	36.6	228.5	1	153.7	0.0	85.2	330.2	68	49.1	0.0	0.0	141.1	45
2000	136.3	0.0	40.9	297.8	1	190.5	0.0	90.7	396.9	69	54.1	0.0	0.0	147.4	47
2003	171.9	0.0	49.9	371.6	0	248.5	0.0	116.8	530.7	71	76.6	0.0	0.0	201.7	49
2006	189.9	0.0	57.2	410.7	1	275.1	0.0	126	581.4	70	85.2	0.0	0.9	222.8	50
<b>BHPS</b>															
1995	67.2	0.0	36.6	164.6	2	92.7	0.0	82.3	210.2	65	25.5	0.0	0.0	87.8	38
2000	109	0.0	63.9	285.9	0	140	0.0	100.9	336.3	69	31.1	0.0	0.0	100.9	38
2005	214.2	0.0	157.3	471.7	0	259	0.0	220.1	550.3	72	44.9	0.0	0.0	149.4	37

Note: In thousands of 2005 dollars. Authors' calculations based on SCF (LWS) and BHPS waves 5, 10, 15. BHPS: Households with non-missing information on wealth and all other variables.

Table 2: Mean and quantiles of household net worth components

The increase in UK household net worth over the period was mostly driven by net housing wealth which, according to the estimates in Table 2, grew from an average of \$67,200 in 1995 to \$214,200 in 2005. In turn the main drivers of the increase in housing equity were the growth in house prices (see Figure 2)<sup>7</sup> and, to a lesser extent, the increase in the home ownership rate (up from 65% in 1995 to 72% in 2005).<sup>8</sup> Mean net financial wealth decreased by around 22% between 1995 and 2000 and increased between 2000 and 2005 to reach a level slightly higher than in 1995. This trend is likely to have been influenced by falls in the stock market but could also have been affected by investors shifting resources into housing investment where returns were higher. Probably the most noticeable change concerning the distribution of net financial wealth was the increase in the accumulation of debt in the lower tail of the distribution reflected in the two percentage point increase in the percentage of households with negative financial wealth holding (from 22% to 24% in 2005).

As a result of the substantial rise in the value of assets in the UK the proportion of debt fell, from around 21% to 16% of gross assets (from 26% to 19% of equity). Housing debt behaved similarly: falling from 28% to 17% as a proportion of housing assets (from 38% to 20% as a proportion of housing equity). But financial debt *rose* much faster than financial assets: debt as a proportion of gross financial wealth rose from about 6% in 1995 to 12% in 2005.

### 3.3 Wealth inequality

As a result of the large increase in household net worth, in both countries there were large increases in the absolute differences between quantiles over the period – see columns labelled  $P_{10}, \dots, P_{90}$  in Table 1. In the US this mainly reflected the increase of wealth in the upper tail of the distribution while in the UK this reflected a widening dispersion in the lower part of the distribution as a result of the median pulling away from the bottom of the distribution.

The differences between  $P_{50}$  and  $P_{90}$  are substantial and much greater in the US than in the UK. For net worth, households at  $P_{90}$  hold around nine times more wealth than households at the median in the US. In contrast, in the UK this difference was a factor of five at the beginning of the period falling to a factor of three by the end of the period. The differences between  $P_{50}$  and  $P_{90}$  for net financial wealth are very large indeed, particularly in the US, reflecting the fact that wealthier households are more likely to hold these types of assets.

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<sup>7</sup>Sources: ONS House Price Index, September 2012 - Monthly and Quarterly Tables 1 to 19, Table 14 ([www.ons.gov.uk](http://www.ons.gov.uk)); US Federal Housing Finance Agency, quarterly Purchase Only Index. (<http://www.fhfa.gov/Default.aspx?Page=87> last accessed on 30-01-2013). Quarterly data in both countries are averaged to reflect simple annual average and prices are expressed in Q2 2005 prices.

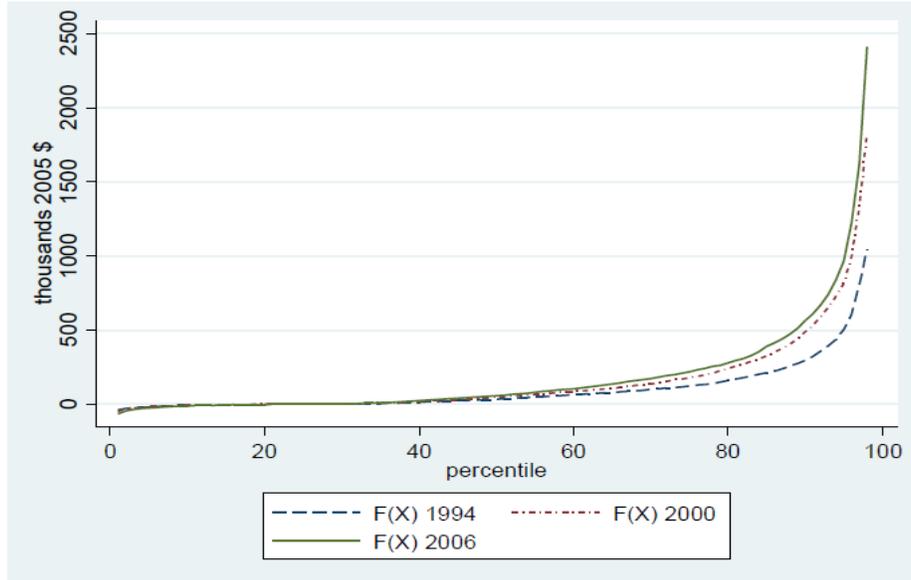
<sup>8</sup>The BHPS sample records a larger increase from a smaller base in home-ownership rates than other data sources. It would appear that this is partly driven by sample selection as households with missing wealth are more likely to be homeowners.

	$P_{90}/P_{50}$	$P_{25}/P_{50}$	Gini	Share of top...		
				1%	5%	10%
<b>Net worth SCF</b>						
1994	8.539	0.000	0.83	32.2	55.2	68.1
1997	8.876	0.001	0.83	32.1	55.6	68.4
2000	9.876	0.006	0.83	32.7	57.3	70.3
2003	11.045	0.005	0.83	31.5	56.5	70.0
2006	9.630	0.002	0.84	31.3	57.8	70.4
<b>Net worth BHPS</b>						
1995	5.426	0.033	0.69	12.0	33.0	48.7
2000	4.846	0.045	0.66	9.2	28.9	44.4
2005	3.417	0.081	0.59	7.6	24.6	38.4
<b>Net housing wealth SCF</b>						
1994	6.604	0.000	0.74	21.74	42.68	56.39
1997	6.260	0.000	0.75	23.27	44.79	58.52
2000	7.294	0.000	0.76	25.17	47.81	61.22
2003	7.447	0.000	0.77	25.29	48.03	61.97
2006	7.183	0.000	0.76	23.86	47.83	61.30
<b>Net housing wealth BHPS</b>						
1995	4.500	0.000	0.66	10.14	27.78	32.48
2000	4.474	0.000	0.64	9.51	28.29	32.51
2005	3.000	0.000	0.57	7.54	23.70	29.65
<b>Net financial wealth SCF</b>						
1994	472.538	na	1.11	58.04	85.21	96.92
1997	164.691	na	1.06	50.81	79.93	92.17
2000	154.700	na	1.02	51.38	78.83	91.12
2003	461.020	na	1.07	52.89	82.96	95.30
2006	523.990	na	1.10	57.54	88.14	98.57
<b>Net financial wealth BHPS</b>						
1995	26.500	0.000	0.89	23.44	55.2	71.28
2000	22.236	0.000	0.94	21.05	52.45	69.03
2005	21.730	0.000	0.98	21.28	54.48	70.15

*Note:* na denotes not applicable as denomination is negative

Table 3: Inequality of net worth

US SCF 1994, 2000, 2006



UK BHPS 1995, 2000 and 2005

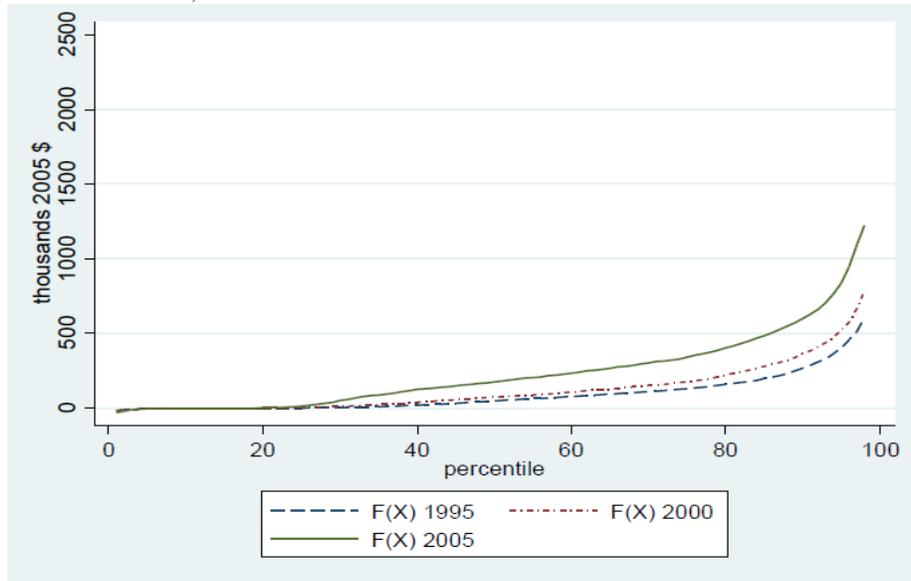


Figure 3: Pen's parades of net worth

	US SCF		UK BHPS	
	1994	2006	1995	2005
Age of household head				
16-24	5.25	5.42	4.47	3.28
25-34	19.53	16.24	17.02	11.91
35-44	23.02	19.59	17.67	18.02
45-54	17.84	20.77	15.23	17.25
55-64	12.5	16.85	12.66	15.86
65-74	12.05	10.52	16.87	13.78
75 or more	9.81	10.62	16.08	19.90
Household type				
Single no children	30.34	29.93	35.51	35.52
Single with children	9.69	9.34	5.57	6.49
Single with other adults no children	1.87	2.85	4.80	4.51
Couples no children	27.97	27.16	26.94	28.06
Couples with children	27.35	27.38	20.85	18.87
Couples with other adults	2.78	3.34	6.33	6.55
Educational attainment of the household head				
Low	50.22	46.36	60.87	45.36
Mid	23.66	23.35	29.34	40.21
High	26.11	30.28	9.79	14.43
Race or ethnicity of the household head				
White (including Middle Eastern/Arab)	77.53	73.87		
Black/African American	12.9	12.66		
Hispanic/Latino	5.67	9.41		
Other	3.9	4.06		
Housing status (% of homeowners)	67.7	70.8	64.6	72.2
Household disposable income (equivalised):				
Median	20,149	22,669	14,029	20,490
Mean (overall)	25,688	35,440	16,785	23,311
Mean of bottom 25%	6,539	8,979	6,490	10,302
Mean of second 25%	15,736	17,880	11,540	17,204
Mean of third 25%	25,065	29,070	17,687	24,276
Mean of top 25%	58,086	92,008	31,845	41,336
Gini	0.47	0.57	0.34	0.30
Number of households	4,299	4,418	3,915	3,484

Note: Authors' calculations from SCF (in LWS) and BHPS waves 5, 10, 15. Households with non-missing information on wealth and all other variables in our analysis. Income (in 2005 \$) excludes rental income and income from investments and savings. BHPS sample size precludes analysis on race. In SCF 1994 and 1997 data on race are recorded for household head only.

Table 4: Changes in the distribution of characteristics 1994/5-2005/06

The relative inequality measures presented in Table 3 show that despite the substantial increase in the level of net worth and the greater increases in the mean relative to the median, the degree of inequality in the distribution of net worth in the US remained fairly stable. Over the entire period the Gini coefficient for total net wealth increased by about one-point (from 0.83 to 0.84). This increase reflected mainly the larger concentration of wealth at the top of the distribution (mainly between  $P_{96}$  and  $P_{99}$  in the SCF data).

By contrast net-worth inequality in the UK *decreased* substantially: the Gini coefficient fell from 0.69 to 0.59. This was driven by the decrease in the inequality of housing equity; inequality in net financial wealth increased over this period. The fall in relative inequality was also accompanied by falls in wealth concentration at the top of the distribution (shares of the top 1%, 5% and 10%), again driven by falls in concentration of net housing wealth. As shown earlier the large increases in house prices drove up the value of housing equity and this benefited those in moderately wealthy households and consequently led to a fall in inequality. Although financial asset ownership is more skewed towards wealthier households, and inequality in these assets increased over this period, falls in financial asset holdings meant that this had little impact on overall wealth inequality.

Figure 3 shows the contrasting tale of changes in net worth and its distribution between the US and the UK over this period, highlighting the greater increase between 1994 and 2000 in the US. In the UK the greater increase occurred between 2000 and 2005 with large increases from the  $P_{30}$  upwards, in contrast to the US where increases occur further up the distribution.

## 4 Methodology

We analyse the development over time of the wealth distribution in two stages: (1) the computation of a “counterfactual” decomposition of the factors contributing to the changes in the distribution; (2) an assessment of the actual and counterfactual changes in terms of inequality and related distributional statistics.

### 4.1 Decomposition

Following DiNardo et al. (1996) – hereafter DFL – we use semi-parametric decomposition methods to estimate the portion of across time changes in the distribution of wealth which is attributable to changes in the distribution of household characteristics.<sup>9</sup> The characteristics that we account for here are income, educational attainment, age and household structure (for the US we

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<sup>9</sup>As stressed by Bover (2010), “An advantage of comparing conditional distributions rather than conditional densities is that one avoids the critical issue of choice of smoothing method and the differences in the results that may ensue. This is particularly relevant in the case of wealth (as compared to income), given that there is often a marked spike at zero because a non-negligible proportion of the population has no wealth. Capturing these spikes complicates the estimation of densities and the results often depend on the smoothing method adopted.”

also take into account race). Let  $w$  denote wealth and  $z$  a vector of wealth determinants. The distribution of wealth for each year  $t$  in country  $i$  can be thought of as given by:

$$F(w|t) = \int_z F(w, z|t) dz = \int_z F(w, z|t) dF_z(z|t) \quad (1)$$

Suppose we want to compare the wealth distributions in two time periods,  $t_1$  and  $t_2$ , and to identify the portion of the difference that can be accounted by the changes in the distribution of characteristics. The basic idea behind the DFL decomposition is to compare the actual distribution of wealth in  $t_2$  with the counterfactual distribution that would have prevailed if the distribution of characteristics in  $t_2$  was the same as in  $t_1$ . The counterfactual distribution of interest can then be thought of as the distribution that mixes the wealth function in  $t_2$  with the distribution of characteristics in  $t_1$ ,  $F(z|t_1)$ . The counterfactual distribution function is then given by

$$F_c(w|t_2) = \int_z F(w|z, t_2) dF(z|t_1) \quad (2)$$

Following DFL equation (2) can be rewritten as:

$$F(w|t_1) = \int_z F(w|z, t_2) \psi(z) dF(z|t_2) \quad (3)$$

where

$$\psi(z) := \frac{dF(z|t_1)}{dF(z|t_2)}$$

is a reweighting factor which reweights the distribution of characteristics in  $t_2$  to the distribution of characteristics in  $t_1$ . Following DFL we use a flexible probit model to derive the reweighting function  $\psi(\cdot)$ . The model is estimated on the pooled data from both years and the dependent variable is a dummy variable indicating  $t_2$ . The independent variables are the socio-economic characteristics the contribution of which we aim to assess. The reweighting function is then given by:

$$\psi(z) = \frac{\Pr(z|t_1)}{\Pr(z|t_2)} \quad (4)$$

In principle the function  $\psi(\cdot)$  could also be derived using non-parametric specifications (Barsky et al. 2002, Bover 2010, Sierminska et al. 2010), but in our application  $z$  includes five variables (see the list above) so that non-parametric estimation of the reweighting function is infeasible.

In our decompositions we use the earliest year in each country as the baseline  $t_1$  and compare each of the other years to  $t_1$ . Each counterfactual distribution is constructed by reweighting the distributions of characteristics in each year  $t_2$  in order to mirror the distributions of characteristics in  $t_1$ . The difference in the observed and the counterfactual distribution at each point in time captures the contribution of characteristics to the observed differences in net worth. We

first implement our decompositions for net worth and then for each of its sub-components separately taking into account differences in ownership of different types of assets, the degree of indebtedness and levels of wealth holdings.

## 4.2 Inequality

We use standard graphical and analytical techniques to summarise the distribution of wealth and the counterfactual distributions used in the decomposition analysis. In addition to the Gini coefficient we also compute a number of quantiles and shares (given by points on the inverse of the distribution function and on the Lorenz curve, respectively). The quantiles can be used to derive simple measures of dispersion – for example  $P_{25}/P_{50}$ , the ratio of the lower quartile (25th percentile) to the median (50th percentile) is commonly used as a simple way of characterising dispersion in the lower tail of the distribution. From the Lorenz ordinates we can infer the share of specific groups at the top of the distribution that may be of particular interest (we will focus on the shares of the top 1%, 5% and 10%).

## 5 The role of income and demographic changes

Table 4 presents summary statistics describing the distribution of various socio-economic characteristics in the US and the UK in 1994/1995 and 2005/2006. As the unit of analysis in this paper, as in most wealth studies, is the household, these characteristics mainly relate to the household head (household reference person as defined in the SCF and BHPS).<sup>10</sup> In both countries socio-economic characteristics of households have changed over this period. For instance there has been a rise in the share of middle-aged households in the US and a rise in the proportion of older aged households in the UK. Given what we know about wealth accumulation over the life cycle we would expect this to have an impact on the distribution of wealth. In both countries there has been a clear increase in the proportion of household heads with higher educational attainment and a clear upward trend in household income (mean, median and quartiles). In the US this has culminated in an increase in income inequality as measured by the Gini coefficient, reflecting the larger relative increases in income in the upper tail of the distribution.<sup>11</sup> In the UK on the other hand the increase in income levels led to a decrease in income inequality as measured by the Gini coefficient. The decreasing trend in income inequality measured using BHPS data is at odds with those based on estimates of net household income inequality in the

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<sup>10</sup>There are differences in how household heads are defined in the two surveys. In the UK (BHPS) the household head is the person legally or financially responsible for the accommodation, or the older of the two people equally responsible. In the US (SCF) the household head is the male in a married or couple family or the older individual in the case of a same-sex couple and the single individual where there is not a core couple.

<sup>11</sup>The increase in income inequality in SCF is substantially larger than in the increase suggested by the Census data reported in the US GINI Country report (Kenworthy and Smeeding 2013).

UK's official statistics which suggest a slight increase in inequality over this period.<sup>12</sup> According to Jenkins (2010) the divergence in the two series reflects the under-recording of net household income at the top of the distribution in the BHPS relative to the official series.<sup>13</sup> In addition, our estimates could be affected by the fact that we exclude capital income and realised capital gains from our measure of income.

Applying Section 4's decomposition methodology (Table 5) it is clear that in both the US and the UK changes in the distribution of characteristics explain a significant share of the changing distribution of wealth, especially changes occurring in the lower tail of the distribution.

In the US changes in the distribution of characteristics in 2000 and again in 2005 had a positive impact on wealth levels relative to 1994, particularly in the lower tail: at  $P_{10}$ , where households are in net debt, levels of indebtedness would have been larger than the actual levels observed if the distribution of characteristics had remained unchanged; at  $P_{25}$  and  $P_{50}$  the changing distribution of characteristics explained most of the increase in wealth levels in both years (100% and 78%); but in 2000 it only explained 25% of changes in wealth at  $P_{90}$  and 19% of changes in wealth at  $P_{95}$ ; in 2006 these figures increased to 39% and 37% respectively. The main reason for the increase in the contribution of characteristics was the decrease in asset prices having a greater impact at the upper tail of the distribution (see below). To see this compare the actual and counterfactual net financial and housing wealth distributions in Table 6: the changing distribution of characteristics played a moderate role in explaining the increase in financial wealth levels in 2000, but by 2006 it explained all of the change in financial wealth. But for housing equity the distribution of characteristics played a more moderate role in explaining the increasing levels of housing wealth in 2006: stronger effects are identified between  $P_{30}$  and  $P_{50}$ .

In the UK the distribution of characteristics played a more important role in explaining the increase in net worth towards the bottom of the distribution and was less important further up. This can be seen clearly in Figure 5 where the 2005 counterfactual distribution is much closer to the 1995 distribution in the lower part of the distribution (there is little observable difference in the US). The relative role of characteristics was stronger in explaining changes up to 2000 rather than up to 2005. As Table 6 shows, this pattern mainly follows the effects for housing equity: in 2005 the effects of characteristics was weaker, reflecting the substantial growth in house prices (see Figure 2) which had a stronger effect on the housing equity levels (especially at the middle and in the upper part of the distribution). Financial wealth would have been substantially smaller if it had not been for the changes in the distribution of characteristics.

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<sup>12</sup>Official estimates are taken from the *Households Below Average Income* series derived from the UK Family Resources Survey.

<sup>13</sup>The Households Below Average Income series makes adjustments to very high incomes using the HM Revenue and Customs' Survey of Personal Incomes – see Department for Work and Pensions (2013) page 267.

	$P_{10}$	$P_{25}$	$P_{50}$	$P_{90}$	$P_{95}$
<b>SCF 1994</b>					
Actual	-7.0	0	34.7	296.4	503.3
<b>SCF 2000</b>					
Actual	-7.3	0.3	49.3	487.1	815.4
Counterfactual	-8.0	0	38	439	757.3
Change	-0.3	0.3	14.6	190.6	312.1
Explained by characteristics	0.6	0.3	11.3	48.1	58.2
<b>SCF 2006</b>					
Actual	-11.0	0.1	58.4	562.7	966.6
Counterfactual	-11.7	0	39.8	458.3	796.5
Change	-4.0	0.1	23.7	266.2	463.3
Explained by characteristics	0.7	0.1	18.6	104.3	170.2
<b>BHPS 1995</b>					
Actual	-0.2	1.6	49.4	267.9	405.9
<b>BHPS 2000</b>					
Actual	-0.2	3.4	75	363.5	524.7
Counterfactual	-0.7	0.8	61.6	325.4	477.6
Change	0.1	1.7	25.6	95.6	118.7
Explained by characteristics	0.5	2.5	13.4	38.1	47.1
<b>BHPS 2005</b>					
Actual	0	14.2	175.0	598.0	835.8
Counterfactual	-1.4	0.5	142.2	504.7	700.3
Change	0.2	12.5	125.6	330.1	429.9
Explained by characteristics	1.4	13.7	32.7	93.3	135.5

*Note:* 1. In thousands of 2005 dollars. 2. Authors' calculations using SCF (LWS) and BHPS waves 5,10, 15. Households with non-missing information on wealth and all other variables. 3. Counterfactual distributional statistics estimated using the DFL re-weighting procedure. The explanatory variables included in the reweighting function include age, education and race of the household head (or the respondent for the 1994 SCF waves), household type, and household income net of capital gains and interest payments. The reweighting function in the UK does not include race. 4. All counterfactual distributions are estimated using the earliest year in each survey as a base year i.e. they represent the distribution that would prevail in each country if the distribution of characteristics was similar to that in 1994/5.

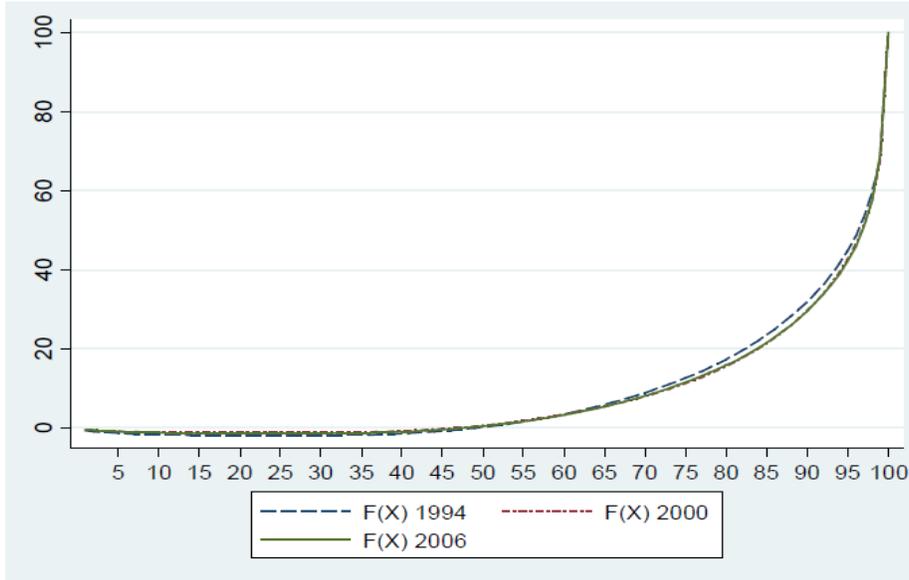
Table 5: DFL decomposition of the distribution of net worth

	Net financial wealth			Gross financial wealth			Financial debt		
	$P_{25}$	$P_{50}$	$P_{90}$	$P_{25}$	$P_{50}$	$P_{90}$	$P_{25}$	$P_{50}$	$P_{90}$
<b>SCF 1994</b>									
Actual	-5.3	0.2	92.1	0.7	3.7	97.5	0.0	2	23.7
<b>SCF 2000</b>									
Actual	-5.0	1.1	175.4	1.1	6.8	181.5	0.0	2.1	29.4
Counterfactual	-5.3	0.5	154.8	0.8	5.1	162.8	0.0	1.8	28.3
Explained	0.3	0.6	20.6	0.3	1.7	18.7	0.0	0.3	1.1
<b>SCF 2006</b>									
Actual	-8.8	0.2	126.9	0.8	5.2	134.5	0.0	3.2	37.8
Counterfactual	-8.8	0.0	92.8	0.5	3.7	101.5	0.0	2.9	36.2
Explained	0.0	0.2	34.1	0.3	1.5	33.0	0.0	0.3	1.6
<b>BHPS 1995</b>									
Actual	0.0	3.7	96.9	0.4	5.2	96.9	0.0	0.0	6.8
<b>BHPS 2000</b>									
Actual	0.0	3.7	82.3	0.3	5.9	84.1	0.0	0.0	12.6
Counterfactual	0.0	2.1	70	0.1	4.4	74.2	0.0	0.0	11.8
Explained	0.0	1.6	12.3	0.2	1.5	9.9	0.0	0.0	0.8
<b>BHPS 2005</b>									
Actual	0.0	5.2	112.6	0.4	8.2	114.8	0.0	0.0	15.7
Counterfactual	-0.3	2.0	94.8	0.0	4.7	97.5	0.0	0.0	15.7
Explained	0.3	3.2	17.8	0.4	3.5	17.3	0.0	0.0	0.0
	Net housing wealth			Gross housing wealth			Mortgage debt		
	$P_{25}$	$P_{50}$	$P_{90}$	$P_{25}$	$P_{50}$	$P_{90}$	$P_{25}$	$P_{50}$	$P_{90}$
<b>SCF 1994</b>									
Actual	0.0	31.6	208.8	0.0	73.6	263.5	0.0	0.0	126.5
<b>SCF 2000</b>									
Actual	0.0	40.8	297.7	0.0	90.7	396.8	0.0	0.0	147.4
Counterfactual	0.0	34	281.2	0.0	79.4	367.3	0.0	0.0	136.1
Explained	0.0	6.8	16.5	11.3	11.3	29.5	0.0	11.3	11.3
<b>SCF 2006</b>									
Actual	0.0	57.2	411.8	0.0	126	581.4	0.0	1.0	222.9
Counterfactual	0.0	40.1	348.8	0.0	98.8	484.5	0.0	0.0	199.6
Explained	0.0	17.1	63.0	0.0	27.2	96.9	0.0	1.0	23.3
<b>BHPS 1995</b>									
Actual	0.0	36.6	164.6	0.0	82.3	210.3	0.0	0.0	87.8
<b>BHPS 2000</b>									
Actual	0.0	63.9	285.9	0.0	100.9	336.3	0.0	0.0	100.9
Counterfactual	0.0	50.5	252.2	0.0	84.1	294.3	0.0	0.0	90
Explained	0.0	13.4	33.7	0.0	16.8	0.42	0.0	0.0	10.9
<b>BHPS 2005</b>									
Actual	0.0	157.2	471.7	0.0	220.1	550.3	0.0	0.0	149.4
Counterfactual	0.0	135.2	424.5	0.0	188.7	471.7	0.0	0.0	125.8
Explained	0.0	0.22	47.2	0.0	31.4	78.6	0.0	0.0	23.6

Note: In thousands of 2005 dollars. See also notes for Table 4.

Table 6: DFL decomposition of the distribution of net worth.

US SCF 1994, 2000 and 2006



UK BHPS 1995, 2000 and 2005

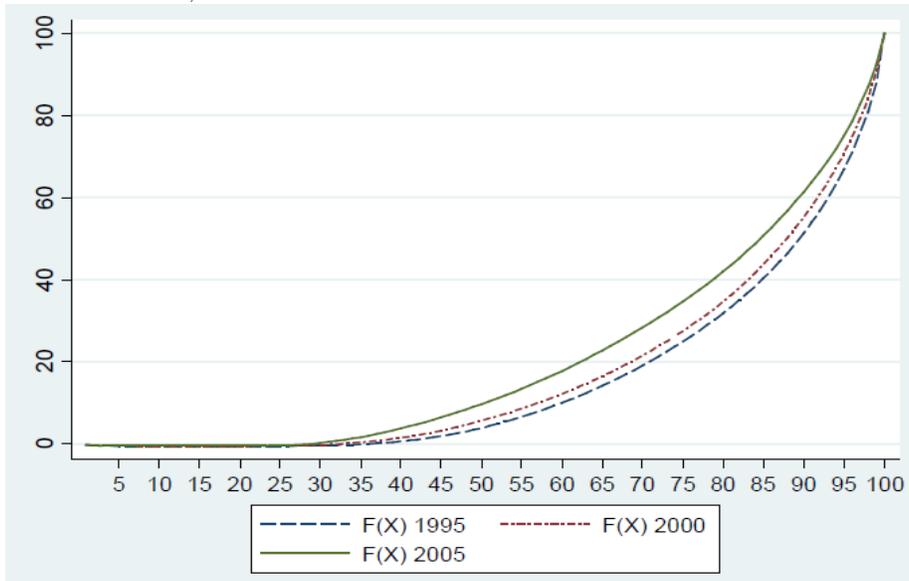


Figure 4: Lorenz curves of net worth

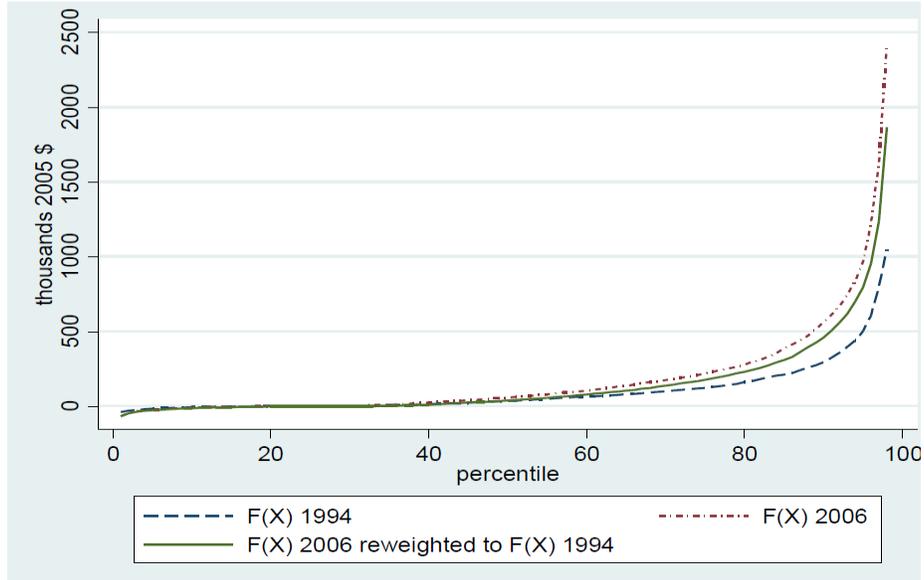
Table 7 examines the contribution of characteristics to the change in wealth inequality. In both countries this shows that changes in characteristics had an equalising effect on the distribution of net worth. As mentioned in Section 3, US wealth inequality in 2000 and 2005 was higher than in 1995 and the increase would have been even higher if it had not been for the change in the distribution of characteristics. The equalising effect of the changing distribution of characteristics appears to be stronger for inequality measures that pick up changes in the upper tail (the wealth share of the top 1% and  $P_{90}/P_{50}$ ). In the UK the changing distribution of characteristics accounted for around 40% of the total change in inequality measured by the Gini coefficient and more than accounted for the change in wealth dispersion in the lower tail of the distribution,  $P_{25}/P_{50}$ , while they had a considerably smaller impact in explaining the dynamics in the concentration of wealth in the upper tail (the share of the top 10%, 5%, 1%).<sup>14</sup>

Table 8 presents results for the decomposition of inequality dynamics by wealth component. In the US the changing distribution of characteristics explained a significant share of the decrease in the Gini coefficient of net financial wealth that occurred between 1995 and 2000 while the increase in inequality in the subsequent period would have been even larger if it had not been for the change in the distribution of characteristics. The rise in inequality of housing equity does not appear to be due to changes in characteristics. Again characteristics had an equalising effect on the distribution of housing wealth, in the sense that inequality would have been even higher if it had not been for the changing distribution of characteristics. In the UK the distribution of characteristics explained 33% of the decrease in the Gini coefficient of housing equity that occurred between 1995 and 2005 but had a very small effect in explaining the dynamics of housing equity concentration. The changing distribution of characteristics had an equalising effect on the dynamics of financial wealth: financial wealth inequality would have increased more than it did if it had not been for the changing distribution of characteristics.

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<sup>14</sup>Bastagli and Hills (2013) found that house prices growth explained over 90 per cent of the decrease in the Gini coefficient. By contrast, here the unexplained part of the distribution, which would include among others price effects, accounts for 60 per cent of the change. The main explanation for the difference between the two findings lies in sample selection: Bastagli and Hills (2013) used the panel sample of households that were observed in both years (around 2,000 households). Given that these are the same households the change in characteristics would be much smaller than in our cross-sectional sample.

US SCF 1994, 2000 and 2006



UK BHPS 1995, 2000 and 2005

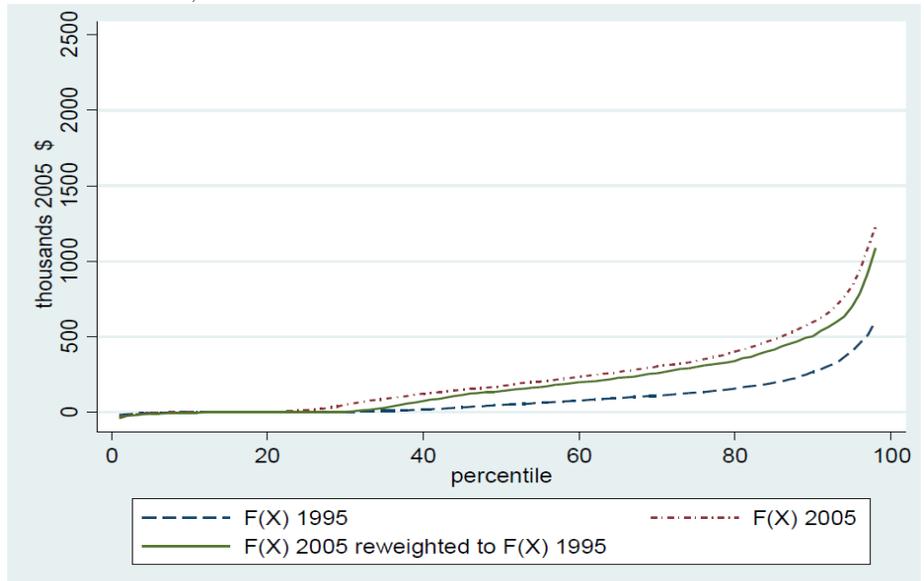
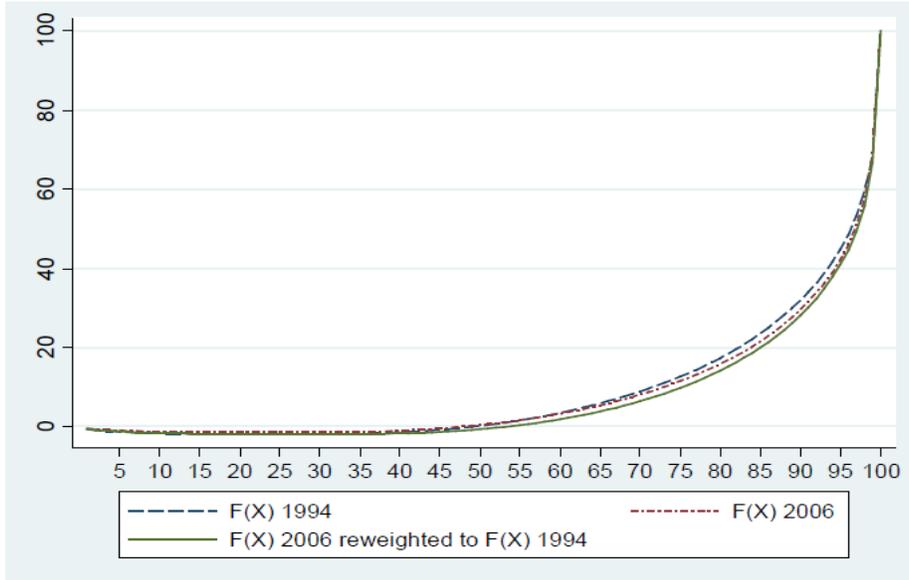


Figure 5: Actual and counterfactual net worth distributions: Pen Parades

US SCF 1994, 2000 and 2006



UK BHPS 1995, 2000 and 2005

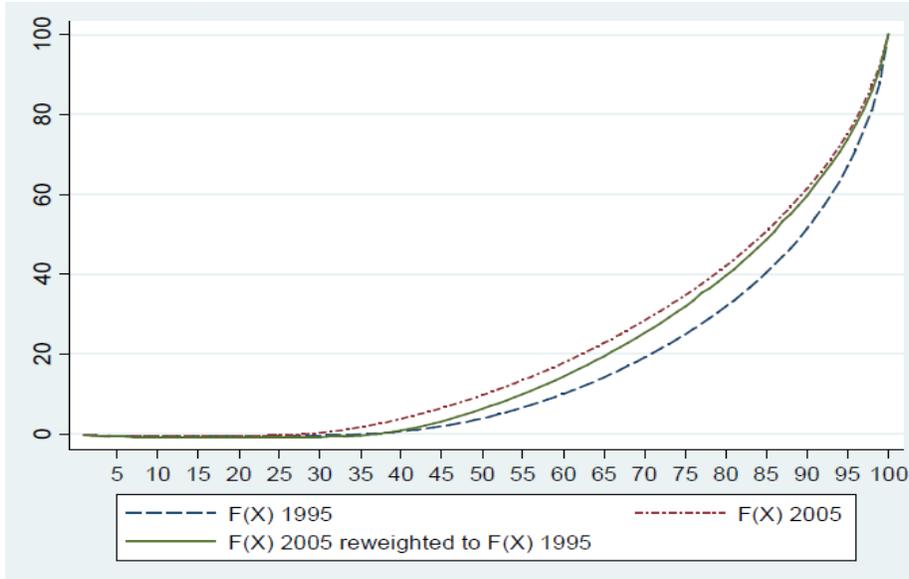


Figure 6: Actual and counterfactual wealth distributions: Lorenz curves

	Share of top...					
	$P_{90}/P_{50}$	$P_{25}/P_{50}$	Gini	1%	5%	10%
<b>SCF 1994</b>						
Actual	8.53	0.00	0.83	68.05	55.15	32.19
<b>SCF 2000</b>						
Actual	9.88	0.01	0.84	70.30	57.31	32.68
Counterfactual	11.62	0.00	0.85	71.74	58.59	33.99
Change	1.35	0.01	0.01	2.25	2.16	0.49
Explained by characteristics	-1.74	0.01	-0.01	-1.44	-1.28	-1.31
<b>SCF 2006</b>						
Actual	9.64	0.00	0.84	70.44	57.85	31.22
Counterfactual	11.50	0.00	0.86	71.85	58.95	33.24
Change	1.11	0.00	0.01	2.39	2.70	-0.97
Explained by characteristics	-1.86	0.00	-0.02	-1.41	-1.10	-2.02
<b>BHPS 1995</b>						
Actual	5.43	0.03	0.69	48.65	33.09	12.15
<b>BHPS 2000</b>						
Actual	4.85	0.05	0.66	44.72	29.24	9.28
Counterfactual	5.28	0.01	0.68	46.67	30.56	9.91
Change	-0.58	0.02	-0.03	-3.93	-3.85	-2.87
Explained by characteristics	-0.43	0.04	-0.02	-1.95	-1.32	-0.63
<b>BHPS 2005</b>						
Actual	3.42	0.08	0.59	38.58	24.84	7.65
Counterfactual	3.55	0.00	0.63	40.36	26.36	8.48
Change	-2.01	0.05	-0.10	-10.07	-8.25	-4.50
Explained by characteristics	-0.13	0.08	-0.04	-1.78	-1.52	-0.83

*Note:* See notes for Table 5

Table 7: Counterfactual decomposition of change in inequality in net worth in the UK and the US

	Net financial wealth			Gross financial wealth			Financial debt		
	Gini	Share of top...		Gini	Share of top...		Gini	Share of top...	
		5%	1%		5%	1%		5%	1%
<b>SCF 1994</b>									
Actual	1.10	85.21	58.04	0.90	74.28	50.52	0.75	40.96	21.04
<b>SCF 2000</b>									
Actual	1.02	78.82	51.38	0.90	72.35	47.14	0.76	42.11	22.53
Counterfactual	1.04	80.72	53.56	0.90	73.57	48.44	0.76	41.38	20.85
<b>SCF 2006</b>									
Actual	1.10	88.13	57.55	0.91	77.71	50.02	0.75	39.57	17.04
Counterfactual	1.15	92.29	61.53	0.92	79.24	53.02	0.75	40.04	17.44
<b>BHPS 1995</b>									
Actual	0.89	55.2	23.44	0.82	52.22	22.14	0.86	52.94	22.86
<b>BHPS 2000</b>									
Actual	0.94	52.45	21.05	0.79	46.63	18.63	0.83	43.67	19.12
Counterfactual	0.98	54.96	22.35	0.80	48.09	19.46	0.85	49.31	22.91
<b>BHPS 2005</b>									
Actual	0.98	54.48	21.28	0.79	47.85	18.66	0.85	50.19	23.97
Counterfactual	1.07	60.05	22.60	0.82	51.00	19.10	0.86	51.32	24.06
	Net housing wealth			Gross housing wealth			Mortgage debt		
	Gini	Share of top...		Gini	Share of top...		Gini	Share of top...	
		5%	1%		5%	1%		5%	1%
<b>SCF 1994</b>									
Actual	0.74	42.67	21.74	0.68	37.45	18.06	0.79	40.55	18.39
<b>SCF 2000</b>									
Actual	0.76	47.81	25.17	0.70	41.46	21.08	0.77	39.61	17.01
Counterfactual	0.78	49.28	26.62	0.71	42.72	21.93	0.78	40.67	17.60
<b>SCF 2006</b>									
Actual	0.76	47.88	23.89	0.70	41.25	19.39	0.76	40.12	17.18
Counterfactual	0.78	48.45	24.83	0.71	41.49	20.15	0.77	40.76	17.80
<b>BHPS 1995</b>									
Actual	0.66	27.78	10.14	0.57	22.34	7.80	0.76	31.09	9.11
<b>BHPS 2000</b>									
Actual	0.64	28.29	9.51	0.58	25.18	8.07	0.77	33.54	12.60
Counterfactual	0.66	29.02	10.28	0.61	23.96	9.15	0.79	34.55	12.95
<b>BHPS 2005</b>									
Actual	0.57	23.70	7.54	0.53	21.71	6.54	0.79	36.72	12.33
Counterfactual	0.60	24.26	8.13	0.57	22.34	7.47	0.83	37.61	13.56

*Note:* See notes for Table 4

Table 8: Decomposition of the change in inequality in net financial and housing wealth in the UK and the US

## 6 Conclusions

During the decade 1995-2005 mean household net worth almost doubled in the US and slightly more than doubled in the UK: the growth came early in the decade for the US, later for the UK. Both countries experienced house price booms that led to big increases in housing equity while financial assets followed a bumpier path, partly due to rises and falls in stock prices and partly to changes in financial debt. The house price boom may well have incentivised investors to shift resources from financial markets to housing markets where returns were higher. But the wealth-inequality paths of the two countries diverged: relative wealth inequality in the US increased slightly while wealth inequality in the UK fell substantially.

Using decomposition analysis we show that changes in households' socio-economic characteristics explain a considerable part of the pattern of wealth changes. But the story is not uniform throughout the wealth distribution. In both countries the changes in characteristics explain developments in the lower tail of the distribution quite well. In the upper tail of the US distribution characteristics explained a greater share of observed changes in financial wealth holdings after 2000 as financial asset prices fell. Characteristics played a more moderate role in explaining changes in housing equity being effectively overshadowed by the substantial growth in house prices. In the UK changes in characteristics were more important in explaining increases in net worth in the lower part of the distribution but, once again, changes in house prices dominated after 2000.

The net result in both countries was that changes in household characteristics had an equalising effect on wealth inequality; moderating the increase in the US and accounting for over one-third of the fall in inequality in the UK.

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## Data Appendix

As explained in the main text the data come from @@ the Luxembourg Wealth Study harmonised database. This database uses the Survey of Consumer Finances (SCF) for the US and the British Household Panel Survey (BHPS) for the UK.

### Survey of Consumer Finances

The SCF is sponsored by the US Federal Reserve Board in association with the US Department of the Treasury. The survey covers around 4,500 families, collecting information on income and wealth. A booster sample, chosen on the basis of information contained in tax returns, is selected to disproportionately sample wealthy families<sup>15</sup> and thereby the SCF has better coverage than general household surveys. In the LWS information is available for the SCF 2000, 2003 and 2006. As part of the funding that supported this project, in collaboration with the LIS datacentre, we extended the SCF series by adding harmonized data from the 1994 and 1997 surveys.

### British Household Panel Survey

The BHPS is managed by the Institute for Economic and Social Research and was designed to be representative of the British population rather than the UK, although a booster sample for Northern Ireland is available from 2001. This annual survey has followed a random sample of households since 1991. The original 1991 responding sample covered 5,050 households containing 9,092 adults. There have been a number of additions to the initial sample, booster samples etc., and in 2011 the BHPS was superseded by Understanding Society. Over time some households/household members have been lost due to attrition<sup>16</sup> and where younger original household members formed their own households or where original households have split, these additional households and household members have become part of the sample in their own right. Our analysis is limited to members of the original sample of responding households. Currently the LWS only includes one wave of the BHPS (2000). We have undertaken our own harmonization of the wealth information in the BHPS for the waves used here (1995 2000 and 2005).<sup>17</sup> We have shown elsewhere that our harmonization leads to very similar point estimates to the LWS data although some differences remain (Cowell et al. 2012). We believe that this is due to slight differences in imputation for missing components.

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<sup>15</sup>The wealthiest 400 families, defined by Forbes magazine, are excluded from this sample. Response rates are lower for this booster sample than for the main sample.

<sup>16</sup>This may be non-response to a single annual survey or long-term and even permanent non-participation.

<sup>17</sup>Extensive information on financial assets is only collected in the BHPS every five years.

## **Net worth**

The definitions of the components of net worth are as follows:

- Financial assets are the sum of monies held in current accounts, deposit and savings accounts, bonds, stocks, mutual funds and other investment funds.
- Non-housing debt is the sum of vehicle loans, total instalment debt (credit cards etc.), educational loans, loans from financial institutions, informal debt.
- Housing assets are the total value of the principal residence and investment real estate.
- Housing debt is principal residence outstanding mortgage, plus other property outstanding mortgage loan and other home secured debt.

## **Differences between UK and US definitions**

- In the UK (BHPS) information is not collected on the value of cash held in current accounts (checking accounts). The implication is that for the UK there will be a lower estimate of money held in the form of cash savings. This is most likely to have an impact on estimates at the lower end of the wealth distribution.
- Before 2000 there is no information in the UK on educational loans or bank overdrafts. The omission of educational loans is likely to have a negligible effect because although they were introduced in 1990 only a minority of households held them even in 2000.
- In the UK business property assets held personally by household members cannot be distinguished from housing property investment.