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INTERGENERATIONAL WEALTH MOBILITY IN ENGLAND, 1858–2012: SURNAMES AND SOCIAL MOBILITY*

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This article uses a panel of 18,869 people with rare surnames whose wealth is observed at death in England and Wales 1858–2012 to measure the intergenerational elasticity of wealth over five generations. We show, using rare surnames to track families, that wealth is much more persistent than standard one generation estimates would suggest. There is still a significant correlation between the wealth of families five generations apart. We show that this finding can be reconciled with standard estimates of wealth mobility by positing an underlying first order Markov process of wealth inheritance with an intergenerational elasticity of 0.70–0.75 throughout the years 1858–2012.

There is strong popular and academic interest in the rate of intergenerational wealth mobility.[1] However, for most countries until recently there is scant evidence on such mobility rates. For England, for example, the only extensive study looking at wealth at death is that of Colin Harbury and David Hitchins, which compared wealth at death of rich fathers and their sons in the interval 1902–73.[2] Thus we do not know the current intergenerational elasticity of wealth in England. Nor do we know how the current elasticity compares with earlier generations before the adoption of the modern fiscal state with extensive taxation and redistribution of income and wealth.

In this article, we utilise a newly constructed database recording the wealth at death of 18,869 people with rare surnames in England and Wales 1858–2012 to estimate the intergenerational elasticity of wealth over five generations.[3] These generations experience very different social and economic regimes. In particular taxation of income, and of inherited wealth, became substantial for upper income groups in the years 1945–80. Constructing this database necessitated collecting by hand from the

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[1] Major contributions include Galton (1869), Beeton and Pearson (1899) (on the inheritance of longevity) and Becker and Tomes (1986) (theoretical framework). For the intergenerational persistence of wealth, notable empirical contributions include Menchik (1979) (Connecticut, early twentieth century), Harbury and Hitchins (1979) (UK, also early twentieth century) and Charles and Charles (2003) (US, Panel Study of Income Dynamics). Important recent contributions to the measurement of the intergenerational correlation of earnings are Corak (2006) and Jäntti *et al.* (2006) (both studies incorporate international comparisons). Educational mobility has been documented by Dearden *et al.* (1997) and Hertz *et al.* (2007). For occupational mobility see Ermisch *et al.* (2006) and the recent historical work of Long (2013) and Long and Ferrie (2013). For comprehensive overviews of the intergenerational literature see Solon (1999), and Black and Devereux (2011).

[2] Harbury and Hitchins (1979). There are no studies of wealth inheritance at other stages in the life cycle for England.

[3] Güell *et al.* (2007) employed surnames to estimate the intergenerational correlation of years of education in Spain using cross sectional data from the census of Catalunia, 2001. Despite using surnames the type of social mobility that Güell *et al.* estimate is, however, akin to the conventional mobility estimates that we show below overestimate underlying social mobility rates.

Principal Probate Registry in London the probate details of everyone in the database dying 1967–2012, as well as hand collecting death records 2006–12.

Because we use rare surnames, for a fifth of the sample we can link children to their fathers, and estimate the intergenerational elasticity in the conventional way. However, this linking again heavily depends on hand inspection of an extensive set of records that potentially reveal family relationships over the years 1800–2012. We find that the intergenerational elasticity, measured this way, averages 0.41–0.50 and shows little evidence of variation across generations. This is close to the estimates of Harbury and Hitchins from the same source 1902–73.[4] It also suggests wealth mobility rates in England are consistent with earnings mobility estimates.[5]

The results from the individual links, suggesting a stable intergenerational elasticity of wealth at death across very different social and economic regimes, are themselves interesting. However, if we link the generations instead by grouping people into surname cohorts, we find a much greater intergenerational elasticity of wealth across generations for the surname cohorts. This elasticity is close to 0.75 for all periods. The persistence of wealth is so high that surnames with the highest average wealth in the initial generation, 1858–87, remain significantly wealthier than average in 1999–2012.

In Section 1 we develop a simple model of social mobility that can reconcile the very different estimates of the rate of wealth mobility at the individual and group level. This model argues that wealth at death has two components: a systematic one which is inherited with a high degree of persistence across generations, and a chance component which is not inherited. This simple model produces a number of predictions about the structure of elasticities in wealth across multiple generations that we test empirically using our panel of data.

In Section 2 we describe the construction of our data panel and outline some imperfections we need to deal with in these probate estimates of wealth at death.

In Section 3 we derive estimates of the intergenerational elasticity of wealth at the surname and individual level. We show that these estimates are not the product of the imperfections in the wealth data detailed in Section 2. We also show that our data meet all the predictions of the simple model developed in the following Section to reconcile these divergent results.

We consider the implications of these results for social mobility studies in general in Section 4. We argue that they imply that conventional estimates looking at social mobility on particular aspects of status, such as wealth, will greatly overstate the mobility of families on broader estimates of social status. They also show that wealth mobility measured at the group level – for racial, religious or national origin groups – will again be much lower than measured at the individual level. Section 5 concludes.

1. Methods

The intergenerational elasticity of wealth is conventionally estimated by estimating the coefficient β in the equation

[4] Harbury and Hitchins (1979) estimate the intergenerational wealth elasticity in England to be 0.48–0.59.
[5] Dearden *et al.* (1997) and Nicoletti and Ermisch (2007) report earnings elasticity estimates in the range 0.22–0.69.

$$w_{ijt+1} = \beta w_{jt} + v_{ijt}, \tag{1}$$

where w_{it} is measured wealth in logarithms in generation t, normalised to mean 0, j indexes fathers, i indexes their children and v_{ijt} is a random component. We make such estimates below where we know the familial connections. These estimates are similar across periods and relatively precise over the years 1858–2012.

If we form any grouping of parents and children in generation t, indexed by k, defined just by the wealth of fathers and calculate the β_A in the expression

$$\bar{w}_{ikt+1} = \beta_A \bar{w}_{ikt}, \tag{2}$$

where now we look at average wealth values, then the expected value of β_A will be β. For example, we could take parent–child pairs grouped by the wealth decile in generation t and calculate β_A for each decile in this way, with an expected value in for each decile of β.

In this article we form averages analogous to (2) but group the individuals based on their sharing surnames, where these surnames are grouped by their earlier average wealth. When we calculate β_A from the average wealth of these surname cohorts, the calculated β_A is nearly twice as high as the estimated individual family elasticities.

This higher persistence of wealth for the surname cohorts is surprising. The averaging across surname types should produce an attenuated estimate of the β linking parents and children for several reasons. First we take all those born with a class of surnames in a time interval $(t,\ t + n)$ and compare them to those born in the time interval $(t + 30,\ t + n + 30)$, the 30 years representing the average interval between generations. This introduces error in that some children of the generation born in the interval $(t,\ t + n)$ will not be born in the interval $(t + 30,\ t + 30 + n)$. And some of those born in the interval $(t + 30,\ t + 30 + n)$ will have fathers not born in $(t,\ t + n)$. Second the surname method counts those in $(t,\ t + n)$ who have no children equally with those who have large numbers of children. Third, the surname method includes wives of men bearing the surnames who adopted those surnames on marriage. For all these reasons, the surname averages should produce a downwards biased estimate of the average parent–child wealth linkages.

We posit the following simple model to explain the unexpectedly high intergenerational wealth elasticities estimated from surname cohorts. We assume that measured wealth at death is the sum of two components so that

$$w_{it} = x_{it} + u_{it}, \tag{3}$$

where x_{it} is underlying social status of a person, and u_{it} is a random component linking wealth to that underlying status. We also assume x_{it} evolves according to the simple AR1 process

$$x_{it+1} = bx_{it} + e_{it}. \tag{4}$$

In this case, the observed intergenerational elasticity of wealth estimated conventionally from (1) will be such that

$$\mathrm{E}(\hat{\beta}) = b\frac{1}{1 + \left(\frac{\sigma_u^2}{\sigma_x^2}\right)} = b\theta, \tag{5}$$

where σ_x^2 is the variance of the underlying social status, and σ_u^2 is the variance of the random components linking the underlying status to wealth.[6] $\hat{\beta}$ will be an underestimate of b, the underlying elasticity across generations of social status.

The β_A estimated from looking at average wealth by groupings such as wealth deciles of fathers will also be a biased estimate of the underlying persistence b. This is because in the limit, with such a grouping,

$$\beta_A = \frac{\bar{w}_{ikt+1}}{\bar{w}_{ikt}} = \frac{\bar{x}_{ikt+1}}{\bar{x}_{ikt} + \bar{u}_{ik}}, \tag{6}$$

where $\bar{u}_{ik} \neq 0$. However, where people are grouped by rare surnames based on the earlier measured average wealth of the surname, and not based on their own or their parents wealth, this will give an unbiased estimate of the underlying b. For in such a case, in the limit, $\bar{u}_{ik} = 0$.

This model of the underlying structure of wealth mobility stated above, of an underlying AR1 process, has implications for the values of the higher order elasticities between wealth across generations. Assuming that the attenuation factor θ is the same in all generations, if we estimate β_n in the expression

$$w_{ijt+n} = \beta_n w_{jt} + v_{ijt}, \tag{7}$$

then $\mathrm{E}(\hat{\beta}_n) = \theta b^n$. We are able to test this below for $n = 2$ and $n = 3$.

The model also has implications for the implied values of the coefficients if we estimate a regression of social status as a function of status of both fathers and grandfathers, as in

$$w_t = \beta_{t-1} w_{t-1} + \beta_{t-2} w_{t-2} + v_t. \tag{8}$$

Even though the underlying model implies that the only influence on generation $t + 1$ comes from the status of the previous generation t, when we estimate this relationship empirically it will appear that the grandparent generation have some influence on the wealth of the current generation. However, in this model, this is just because the grandparent wealth provides information on what the likely true underlying status of the parents is.

If b is the underlying rate of social mobility, and θ is the attenuation factor, then

$$\mathrm{E}(\hat{\beta}_{t-1}) = \theta b \left(\frac{1 - \theta b^2}{1 - \theta^2 b^2} \right), \tag{9}$$

and

$$\mathrm{E}(\hat{\beta}_{t-2}) = \theta b^2 \left(\frac{1 - \theta}{1 - \theta^2 b^2} \right). \tag{10}$$

The structure of this process means that, however many generations of ancestors are included, they will always statistically predict the wealth of the current generation. Thus, if we include great-grandparents and estimate

$$w_t = \beta_{t-1} w_{t-1} + \beta_{t-2} w_{t-2} + \beta_{t-3} w_{t-3} + v_t, \tag{11}$$

[6] $\theta = \frac{1}{1 + \left(\frac{\sigma_u^2}{\sigma_x^2} \right)}$.

then the expected values of β_{t-1}, β_{t-2} and β_{t-3} are predicted to be

$$\mathrm{E}(\hat{\beta}_{t-1}) = \theta b\left[\frac{1-\theta b^2(1+\theta-2\theta b^2+b^2)}{1-\theta^2 b^2(2-2\theta b^2+b^2)}\right], \tag{12}$$

$$\mathrm{E}(\hat{\beta}_{t-2}) = \theta b\left[\frac{b(1-\theta)(1-\theta b^2)}{1-\theta^2 b^2(2-2\theta b^2+b^2)}\right], \tag{13}$$

$$\mathrm{E}(\hat{\beta}_{t-3}) = \theta b\left[\frac{b^2(1-\theta)^2}{1-\theta^2 b^2(2-2\theta b^2+b^2)}\right]. \tag{14}$$

We can use the data on individual linkages of fathers and their children to test whether the model we develop is consistent with the various observed intergenerational wealth elasticities.

2. The Data

The data for this study consist of a database of estimated wealth at death for 18,869 English and Welsh men and women who died between 1858 and 2012 aged 21 and above. For each person we have gender, year of death, age at death, whether the person was probated or not, and if probated their estimated wealth at death. For a subgroup of people, mainly men and unmarried women, we also can establish the identity of their father. The men and women selected for inclusion in the database had one of 634 rare surnames, where 40 or fewer people held the surname at the time of the 1881 census. By design, these rare surnames were chosen to oversample from the wealthy and the poor in the period 1858–87. Thus the variance of wealth in 1858–87 will be larger than for the population as a whole but with social mobility over generations will decline towards the population variance by 2012.

The rarity of the surnames allows us to trace the family connections of a substantial subgroup of those in the database using a variety of sources: the censuses of 1841–1911, birth records, marriage records, probate records, baptismal records, apprentice contracts, ship passenger lists and newspaper announcements.[7] The varieties of ways in which these sources record the same first names and surnames, and the mistakes from transcribing the handwriting of earlier documents, mean that this matching has to largely be done by hand. Thus the name 'Ernest Frederick Dilke' appeared in the records also as Ernest Dilke, Ernest F. Dilke, E. F. Dilke, Ernest Dilks, Ernest Duke and Ernest Dilkes.

For England and Wales, there are national birth and death registers 1837–2012. For deaths recorded 1867 and later, the death register records age at death. For 1858–66, we estimated age at death where possible from the birth records, or from the census records of 1841, 1851 and 1861. The England and Wales death register includes only people dying in England and Wales. We supplemented the death register information with information on people dying abroad, or at sea. This allows us to include men

[7] The matching by inspection of individuals across generations is extremely time consuming, so we have only attempted that for a quarter of the individuals in the sample.

dying abroad in the Boer War, First World War and Second World War, as well as retirees dying abroad in Spain in more recent years.

For each year 1858–2012, we have complete information on who was or was not probated, which is in itself an indicator of wealth at death. Starting in 1858, all probates in England and Wales were recorded at the Principal Probate Registry, and each estate was assigned a value for tax purposes.[8] Only estates which exceeded a minimum value were required to be probated. Few probated estimates had wealth estimated as under these legal minimums in any period. We thus assume that anyone dying aged 21 and above who was not probated had an estate value half the minimum probate value at the time of their death, but with some exceptions explained in the Appendix.

Since wealth at death has a very skewed distribution, we use the logarithm of estimated wealth to produce a distribution closer to normal. Also since the nominal value of average wealth increased greatly between 1858 and 2012 we normalised by the estimated average wealth at death in each period. We thus construct for each person i dying in year t a measure of normalised wealth at death which is

$$w_{it} = \ln(wealth_{it}) - \overline{\ln(wealth_t)}, \tag{15}$$

where $\overline{\ln(wealth_t)}$ is the estimated average wealth at death, estimated from those dying with the surname *Brown*. *Brown*, like most common surnames, is a surname of average social status. For each period w_{it} will thus have an average expected value for the population as a whole of 0. For the population as a whole the standard deviation of log wealth changed little over the years 1858–2012, as is shown in Table 1. This means that the intergenerational elasticity of wealth will generally also be close for the population as a whole to the intergenerational correlation of wealth.

Between 1988–98, the reported wealth measure was mainly limited to 2–3 broad wealth bands and is not a good indicator of wealth.[9] So we do not use the individual wealth data for these years, though we can use the information about what fraction of people were probated to estimate average wealth at death by surname group even in these years. Table 1 gives a summary of the database.

Common surnames in England varied little in average social status by 1800.[10] Rare surnames, however, did and do vary in status, and it is these we use to track elite and underclass groups across generations using this database. In England, a significant fraction of surnames have always been rare. Figure 1, for example, shows the share of the population holding surnames held by 50 people or less, for each frequency grouping, for the 1881 census of England. The vagaries of spelling and transcribing handwriting mean that, particularly for many of the surnames in the 1–5 frequency range, this is just a recording or transcription error. However, for names in the

[8] This value was based initially just on the 'personalty' of the deceased. Personalty was any asset except real estate. However, such partial wealth indicators will still serve as an index of overall wealth.

[9] Thus in 1990, in our sample nearly two-thirds of the probate values were reported as 'not exceeding' £100,000 and 'not exceeding' £115,000. For 1981–87 when fewer probates had these value bands, and the so described limits were at the much lower levels of either £25,000 or £40,000, we replaced these values with an expected actual value for this range. This was the average of actual values for these years that fell below £25,000 and £40,000.

[10] When surnames were established in medieval England many were a marker of social status. Slow but persistent social mobility, however, meant that by 1650 common surnames were of uniform average status.

Table 1

Summary of the Data

Period	Deaths 21+	Probates	Average log wealth	SD log wealth – rare names	SD log wealth – population	Father known
1858–87	2,727	1,161	2.24	3.67	1.72	484
1888–1917	3,198	1,239	1.45	3.24	1.81	1,034
1918–59	5,479	2,611	0.86	2.38	1.70	2,105
1960–93	4,708	2,092	0.49	1.86	1.40	1,268
1994–2012	2,457	1,161	0.42	2.31	1.97	656

Notes. The Table reports the mean and standard deviation of normalised log wealth for the rare surname sample, and the standard deviation of normalised log wealth for the population as a whole, proxied by the surname Brown. Years 1988–98 are excluded from the calculated means and standard deviations. Average normalised log wealth for the population as a whole measured in this way is 0 in each period.

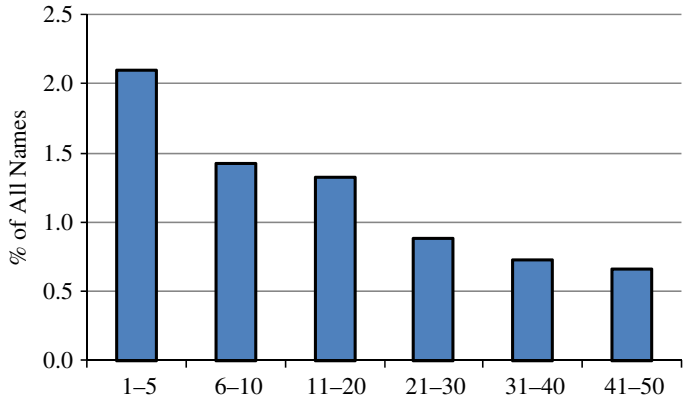

Fig. 1. *Relative Frequency of Rare Surnames, 1881 Census, England*
Notes. From the transcribed 1881 census of England and Wales (Schurer and Woollard, 2000).

frequency ranges 6–50, most will be genuine rare surnames. Thus in England in 1881, 5% of the population, 1.3 million people, held 92,000 such rare surnames.

Such rare surnames arose in various ways: immigration of foreigners to England, such as the Huguenots after 1685 (*Abauzit, Bazalgette, Bulteel, Du Cane*), unusual spellings of more common surnames (*Bigge, Bisshopp*) or just names that were always held by very few people (*Pepys, Binford,* or *Blacksmith).*

Through two forces – the fact that many of those with rare names were related, and the operation of chance – the average social status of those with rare surnames varies greatly at any time. We can thus divide people in any generation into constructed social and economic classes of rich, middling and poor by focusing on those with rare surnames. We will not often be able to discern exactly which later person with a surname was related to which earlier one. However, by treating everyone with the surname as one large family, we can follow families over many generations. We thus construct for 1858–87 as a measure of the average wealth of each candidate surname k

$$w_k = \frac{1}{n_k}\sum_{j=1}^{nk} \ln(wealth_{kj}) - \overline{\ln(wealth)}, \tag{16}$$

where n_k is the number of persons dying aged 21 and above for each surname k in these years. We do this using deaths 1858–87, so that we have a long enough window with rare surnames to observe sufficient deaths to attribute reliably an average wealth to the surname.

We divided our rare surnames into four types based on their average wealth at death 1858–87: the rich where $w_k > 4$, the prosperous where $4 > w_k > 1.5$, the average where $1.5 \geq w_k \geq -0.3$ and the poor where $w_k < -0.3$.

We found candidate surnames for each group from a variety of sources. For the rich and the prosperous surnames we had two lists of candidates. First we looked in the years 1858–61 at all probates of surnames beginning with the letters A–C held by 40 or fewer people in 1881, seeking those with substantial bequests that might be candidates to be rare surnames of high average wealth at death for the period 1858–87. This process proved time consuming and produced only 37 rich surnames and 22 prosperous ones. The second candidate source we had was a list of people who had died 1809–39 leaving an estate of £100,000 or more.[11] This produced a set of 68 rich rare surnames and 54 prosperous rare surnames for deaths in the years 1858–87. Thus the bulk of the samples of rich and prosperous surnames dying 1858–87 were identified by their surname wealth prior to 1840.

As candidates for the poor surnames we checked the probate records for rare surnames from two sources: a list of habitual paupers in 1861, and lists of the criminally indicted in London and Essex 1860–2. The Appendix lists the details of these sources. Because in the period 1858–87 only 15% of adults were probated at death, it proved difficult using average probate values to identify truly poor surnames. So most of the identification of the intergenerational elasticity of wealth, below, comes from the richer samples.

Table 2 lists the first 15 surnames alphabetically in each group. The complete listing is given in the Appendix. The important point here is that there is nothing in most of these surnames that signals their social status. Though there are a few of the rich surnames that would potentially signal great wealth – Rothschild, for example – most of the surnames themselves are neutral markers, not having any effects on outcomes. It is also important that no information about their status in years later than 1887 was used to assign surnames to the initial wealth type.

By design these surnames oversample the extremes of the wealth distribution in 1858–87. However, even the surnames classified as rich or prosperous cover a wide range of wealth at death, particularly as we move to the second and later generations and wealth regresses towards the mean. Figure 2, for example, shows the location of the average log wealth of the rich and prosperous surnames in the overall distribution of log wealth, as represented by the Brown surname. The distribution of wealth for the Brown surname is used as a proxy for the overall wealth distribution. By the fourth generation both of these richer surname types have an average wealth that falls below

[11] This list is derived from Rubinstein (2009).

Table 2

The Rare Surname Groups, 1858–87

Rich	Prosperous	Poor
Ahmuty	Agace	Adson
Angerstein	Agar-Ellis	Aller
Appold	Aglen	Almand
Auriol	Allecock	Angler
Bailward	Aloof	Anglim
Basevi	Alsager	Annings
Bazalgette	Bagnold	Austell
Beague	Beridge	Backlake
Benthall	Berthon	Bagwill
Berens	Brettingham	Balsden
Berners	Brideoake	Banbrook
Bigge	Broadmead	Bantham
Blegborough	Broderip	Bawson
Blicke	Brouncker	Beetchenow
Boger	Brune	Bemmer

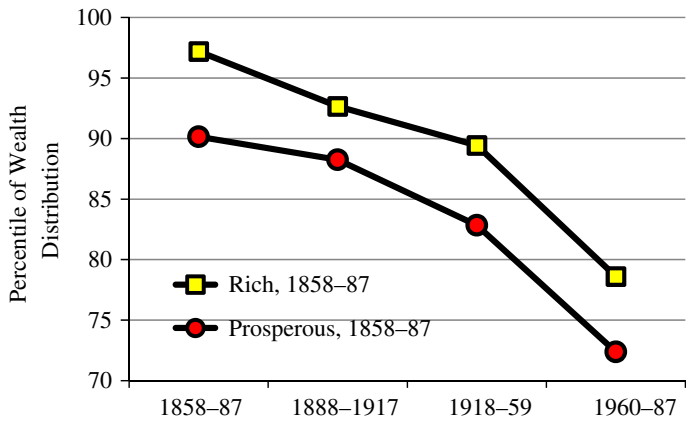

Fig. 2. *Location by Wealth Percentiles, Surname Types, by Generation*
Note. See Appendix for details of this calculation.

the 80th percentile of all deceased. Thus within even these richer surname groupings there are many people dying with modest or no assets.

Table 3 gives a summary of the data by death generations. Since we have measures of wealth at death, and average age of death was increasing, to get cohorts of close to 30 years difference in average birth dates we have to have death cohorts that are longer than 30 years. These are thus 1888–1917, 1918–59, 1960–93 and 1994–2012, producing average dates of birth for the adults in these death cohorts of 1815, 1843, 1872, 1902 and 1925. There are declining numbers of surnames in the sample over time because rare surnames tend to die out due to the vagaries of fertility and mortality.[12]

[12] Since the death register index 1858–65 does not record age at death, for these years we estimated age at death where possible from age reports in the 1861, 1851 and 1841 censuses, as well as from the birth register 1837–65.

Table 3

Summary of the Surname Samples

Period	Surnames	Probates	Deaths 21+
Rich and prosperous			
1858–87	182	1,137	1,661*
1888–1917	180	1,070	1,785
1918–59	182	1,962	2,874
1960–93	176	1,115	1,769
1994–2012	170	526	890
Poor			
1858–87	226	19	1,054*
1888–1917	199	151	1,327
1918–59	201	571	2,364
1960–93	201	875	2,635
1994–2012	164	548	1,393

Notes. All surnames were held by 40 or fewer people in the 1881 census. Deaths are from the General Registry Office (See References Section). *Where age was unknown 1858–65 (97 and 363 cases), the fraction above 21 was estimated from the 1866–87 ratio of deaths 21+ to all deaths.

Table 4

Proportion Probated by Surname Group

Period	Average birth year	Rich	Prosperous	Poor	All deaths
1858–87	1814	0.83	0.56	0.02	0.15
1888–1917	1843	0.66	0.54	0.11	0.22
1918–59	1872	0.73	0.63	0.24	0.40
1960–93	1900	0.66	0.61	0.33	0.46
1994–2012	1926	0.62	0.57	0.39	0.43

Table 4 and Figure 3 show the probate rates of the rich, prosperous and poor surnames by death cohort, for those dying 21 and older. Also shown are the overall average probate rates. There are large differences in probate rates in the first generation. These differences narrow over time. However, even by 1994–2012, the proportion probated for the rich surname group is still 0.62, compared to an average for England of 0.43. For the prosperous it is 0.57. Thus four generations later descendants of the rich and prosperous surname groups born circa 1815 are still by implication significantly wealthier than the average person dying in England.

Figure 4 shows the average log probate values for each surname group, for those probated, by period relative to the value of all probates for those probated, omitting 1988–98. The probate values of all the surname groups approach average probate values for England but, again, the probate values of the two richer groups remain significantly above average values in 1999–2012. Finally Table 5 and Figure 5 combine the information in Figures 3 and 4 to produce an estimate of the average log wealth at death of the rich and poor surname groups by death cohort, minus the average log wealth of all deceased.

Figure 5 shows that for each surname group average wealth is converging to the social mean across generations but at very slow rates. Also the rate of convergence does

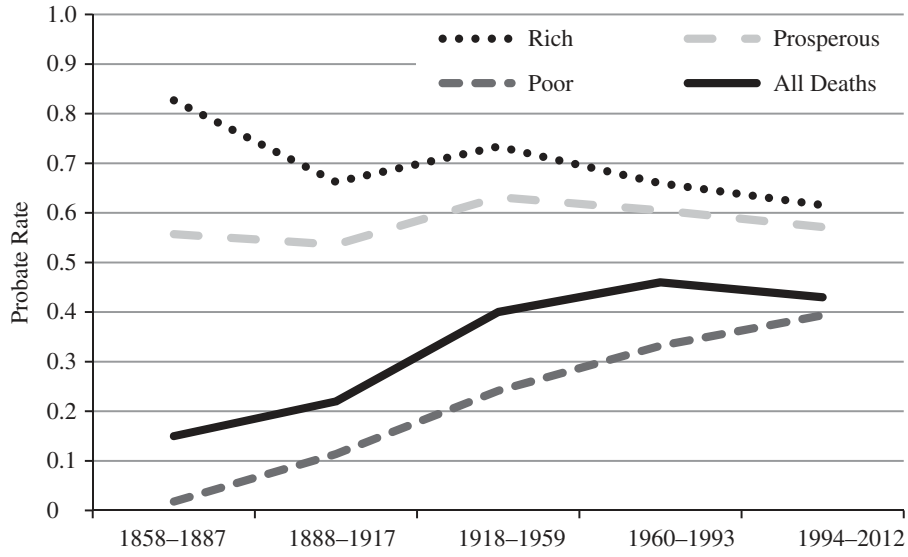

Fig. 3. *Probate Rates of Surname Types, by Generation*
Notes. The probate rate in a given generation is the number of people recorded in the probate registry divided by the number of people dying.
Source. Principal Probate Registry and GRO.

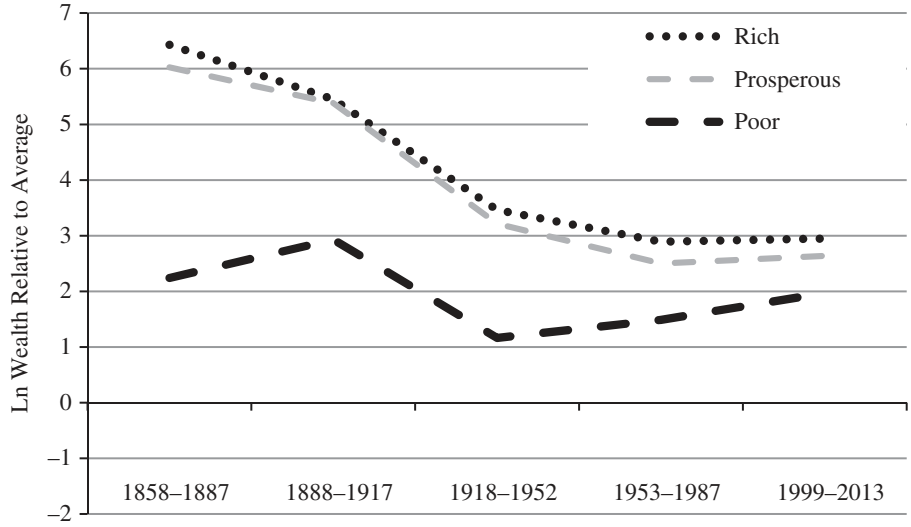

Fig. 4. *Average ln Probate Wealth, Those Probated, by Generation*
Notes. ln probate wealth by surname is measured as average ln wealth by surname minus the estimated overall average ln probate wealth (from the *Brown* surname).

not appear to be greater in recent generations. Average wealth at death in 1999–2012 for the rich group of 1858–87 is still 3.9 times average wealth at death for all deceased. Yet the earliest cohorts were born in an era of limited public schooling and limited

Table 5

Average ln Wealth, All Adult Deaths, by Death Generations

Generation	Rich	Prosperous	Poorer
1858–87	5.20	3.05	−0.64
1888–1917	3.32	2.49	−0.43
1918–52	2.29	1.68	−0.43
1953–87	1.69	1.19	−0.10
1999–2012	1.36	1.03	−0.11

Notes. Wealth is measured relative to estimated average wealth. Those not probated are assigned an imputed wealth as described in the text. The years 1988–98 are omitted for the reasons described in the text.

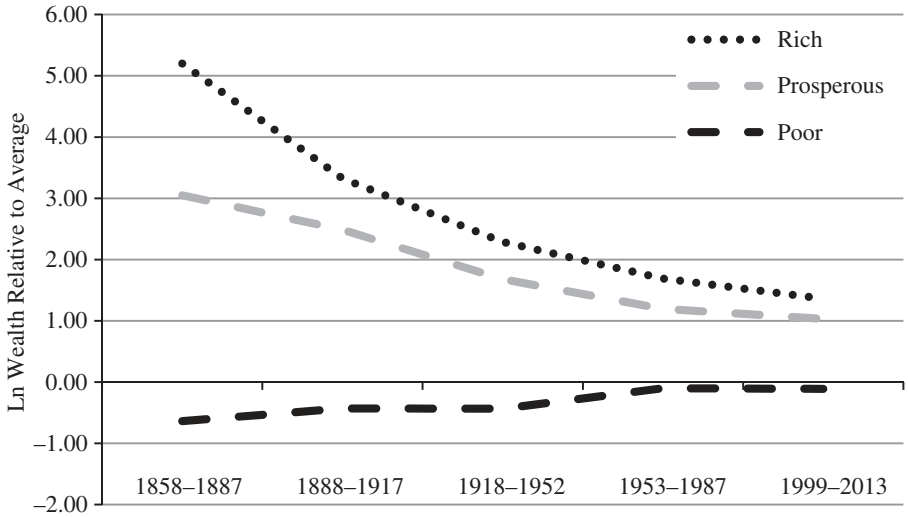

Fig. 5. *Average Log Probate Value, Including Those Not Probated, by Generation*
Source. Table 5.

taxation, and the last in an era of public provision of education and extensive taxation and redistribution.

3. Intergenerational Elasticity Estimates

We use the data on wealth at death described above to estimate the intergenerational elasticity of wealth across the years 1858–2012 in England in two ways. The first is the conventional method where we use the links between fathers and their sons and unmarried daughters to estimate the intergenerational elasticity by estimating the β in the expression

$$w_{ijt+1} = \alpha + \beta w_{jt} + \delta DFEM_{ij} + v_{it}, \tag{17}$$

where j indexes the fathers, and i the children of father j, for children dying in the five periods 1858–87, 1888–1917, 1918–59, 1960–93 and 1994–2012. We include the

indicator variable DFEM which is 1 when the child is a daughter, 0 otherwise. This indicator is statistically significant and negative in all periods.

This estimation itself provides an interesting information on rates of wealth mobility in England across very different social regimes, running from Victorian times to the present. The estimates here are shown in Table 6, averaging 0.41. They are very reasonable in the light of the limited evidence found elsewhere on wealth mobility across generations. They are also surprisingly stable over time. There is no clear sign in the data of any increasing wealth mobility in recent generations.[13] We take the wealth of fathers only, even though in many cases we know also the mothers, because in England before 1882 all the property of wives was subsumed in their husband's estate.

Table 4 shows that probate rates before 1930 were generally low, so that we are assigning to many fathers and children in estimating the coefficients in (15) an imputed wealth, particularly in the earlier periods. Such imputation can bias the estimate of β both downwards (when it applies to the fathers) and upwards when the same imputation is made for both father and child. Table 6 also shows the estimation results where to limit the amount of imputation we consider only fathers who were probated. This raises the average estimated elasticity to 0.51, but again with no sign of any decline in elasticity for the most recent generations.

Using surname groupings, we derive an alternative estimate of the intergenerational elasticity of wealth by measuring the rate of movement of wealth among rich, prosperous and poor surname groups towards average wealth. Thus, we calculate

$$\beta_A = \frac{\bar{w}_{ikt+1}}{\bar{w}_{ikt}}. \tag{6}$$

Table 7 shows these estimates by period, and the average across four generations. Also shown are bootstrapped standard errors.[14] What is striking in Table 7 is the high

Table 6

Conventional Estimates of Intergenerational Wealth Elasticities, 1858–2012, Individual Families

Period of child death	All N	All $\hat{\beta}$	Father probated, N	Father probated $\hat{\beta}$
1858–87	237	0.376	160	0.483
		(0.063)		(0.134)
1888–1917	902	0.494	581	0.672
		(0.028)		(0.057)
1918–59	2,109	0.389	1,230	0.473
		(0.017)		(0.036)
1960–87	1,126	0.383	567	0.370
		(0.023)		(0.039)
1999–2012	449	0.419	207	0.539
		(0.055)		(0.086)

Note. Robust standard errors in parentheses.

[13] Consistent with this, Long (2013) found that occupation mobility rates in England in 1881 and 1911 were similar to those of 1972.

[14] If b is indeed the ratio of two normally distributed variables, it would not possess an expected value or a variance. However, in practice when we bootstrapped b over many thousands of iterations, its value was always defined.

Table 7

Wealth Elasticities Between Death Generations, Surname Groups

Year of death	Rich	Prosperous	Rich/prosperous	Poor
1888–1917	0.64	0.81	0.71	0.67
	(0.027)	(0.051)	(0.026)	(0.060)
1918–59	0.69	0.68	0.68	1.01
	(0.043)	(0.042)	(0.028)	(0.104)
1960–87	0.74	0.71	0.72	0.23
	(0.054)	(0.052)	(0.032)	(0.070)
1999–2012	0.81	0.87	0.83	1.28
	(0.095)	(0.126)	(0.077)	(3.698)
Average	0.71	0.76	0.73	0.60
	(0.019)	(0.027)	(0.016)	(0.162)

Note. Bootstrapped standard errors in parentheses.

estimated values for the intergenerational elasticity of wealth when estimated in this way. For the rich group this averages 0.71, for the prosperous group 0.77 and for the poor group, 0.60. For the richer groups, the standard errors on these estimates are low up until the last period. They show that we can be confident the intergenerational elasticity on average was above 0.7. However, the standard errors are higher for the poor group, since their average wealth is closer to the social average, and β_A is estimated as the ratio of two numbers. By the time we get to the last generation, the standard error on the poor group is so high that there is no information in this estimate.

If we combine both higher wealth groups, the average β_A for those is 0.73 and, now, the estimated β_A across all generations is 0.68–0.83. It is also striking that there is no sign of any gain in wealth mobility over time. Wealth is as closely connected to the previous generations for those dying 1999–2012 as it was in previous generations.

It is clear that this high persistence of wealth is occurring across a broad range of the wealth distribution. The average β_A for the prosperous group is higher even than for those initially very wealthy. Also as both rich groups move towards mean wealth in later generations, β_A does not decline.

As before, in the estimates in Table 7 we have to impute probate values for large numbers of people whose estates were not probated. Could this imputation be the source of the surprising persistence in Table 7? We saw with the individual estimates that it does make a modest difference to the estimated intergenerational correlation if we use only fathers whose wealth is not imputed, though in that case it increases the estimated elasticity. However, once we group people by surnames into hundreds in each generation to estimate β_A then the imputation has inconsequential effects on the estimate. Given that on average we are imputing the probate values for 530 people in each surname category per generation, even if we had the exact values of wealth for all those not probated these would average out in such a grouping close to the imputed values.

However, as a check it is possible to also estimate β_A just from the proportion of people probated in each generation in each surname group, without having to make these imputations. Suppose we assume $w_i \sim \mathrm{N}(0, \sigma^2)$, and also that only the top x% of

those in the wealth distribution are probated. This is the situation shown in Figure 6. The richer groups are assumed to be probated at a higher rate because their wealth distributions are rightwards shifted compared to the population distribution.

The over-representation of surname group k among the probated in 1858–87 could be produced by a range of values for the initial mean wealth of this group, $\bar{w}_{k0}$, and the variance for the group, σ^2_{k0}. However, for any assumption about $(\bar{w}_{k0}, \sigma^2_{k0})$ the change in the share probated in the next generation will imply a value for β_A. This is because

$$\bar{w}_{kt+1} = \beta_A \bar{w}_{kt}, \tag{18}$$

and

$$\sigma^2_{kt+1} = \beta^2_A \sigma^2_{kt} + (1 - \beta^2_A)\sigma^2. \tag{19}$$

We assume the variance of w_i for the surname groups is the same as for the general population. We do this because, as Figure 7 shows, the variance of wealth for those probated, whose wealth can be observed, is even greater than the variance for the general population, represented by the surname Brown. Then we calculate from the change in share probated in each period, compared to the population share probated, what the implied β_A is for each group in each period, just from how much shift downwards of the mean would be required to increase the share probated in the way observed. Alternative assumptions about the initial variance of w_i for each surname group has little effect on the estimates of β_A.

Table 8 shows the results. The fitted β_A is most stable for the rich, the group whose probate rates differ most from the average. It is most noisy for the poor, whose probate rates are closest to the average. However, overall there is a remarkable similarity between the average wealth elasticity β_A estimated in this way for each surname group, and the earlier estimates of Table 7, as Table 8 shows. There is again no sign, looking at the rich and the prosperous surnames, that regression to the mean measured by probate rates is any faster in the current generation than it was in earlier generations.

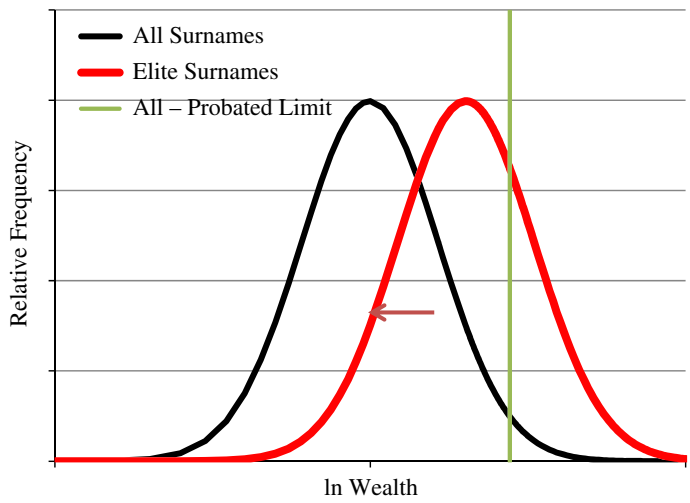

Fig. 6. *Regression to the Mean of Elite Surnames*

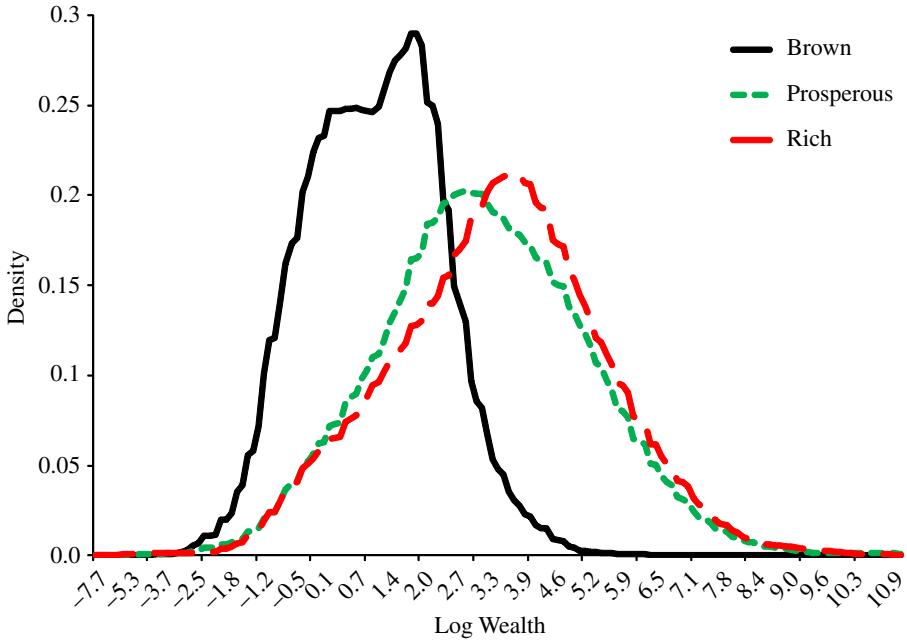

Fig. 7. *Wealth Distribution, Rich, Prosperous and Brown Surnames, 1918–59*

Table 8

Intergenerational Wealth Elasticity Estimated from the Proportions Probated

Period	Rich	Prosperous	Rich and prosperous	Poor
1888–1917	0.61	0.75	0.69	0.40
	(0.027)	(0.045)	(0.025)	(0.055)
1918–59	0.74	0.69	0.72	1.02
	(0.040)	(0.052)	(0.032)	(0.129)
1960–93	0.59	0.63	0.60	0.73
	(0.056)	(0.078)	(0.045)	(0.076)
1994–2012*	0.92	0.96	0.93	0.37
	(0.12)	(0.149)	(0.094)	(0.114)
Average by group	0.68	0.73	0.71	0.52
	(0.026)	(0.032)	(0.020)	(0.064)
Average from Table 7	0.71	0.76	0.73	0.60

Notes. *Adjusting b estimate down for shorter interval between average date of birth in this period. Bootstrapped standard errors in parentheses.

The estimate of β_A is not sensitive to the assumed initial variance of w_i among the surname groups. For the rich if we assumed a variance initially three times the population variance then $\hat{\beta}_A$ would have been overall 0.64 instead of 0.68. If we assumed an initial variance of w_i one-third that of the population, then $\hat{\beta}_A$ would be 0.72. For the last period these initial assumptions about variance have even less effect. Now $\hat{\beta}_A$ would range from 0.73 to 0.77. So just looking at the share probated supports, the conclusion of very slow regression to the mean, even in the most recent period.

In Section 1, we proposed an explanation of these very different rates of regression to the mean for surname groups compared to individual families. The explanation proposed is the structure of inheritance given in (3) and (4). This structure implies an underlying constant slow rate of regression to the mean for a latent variable of overall social competence for families. This social competence is linked to any particular aspect of social status only with a random component. We showed there that this explanation has testable implications for the wealth elasticity that would be predicted between grandchildren and grandchildren, and great-grandparents and great-grandchildren, controlling, or not controlling for other ancestors.

Table 9 reports the estimates of these various coefficients, and the predicted level of these coefficients if there is an underlying regression to the mean of a generalised social status of 0.72. Columns (3) and (4) show the estimated bivariate wealth elasticities between grandparents and grandchildren, and great-grandparents and great-grandchildren. Also shown in square brackets are the implied values, if there was an underlying Markov process of regression to the mean with $b = 0.72$, as would be indicated by the surname estimations. In both cases the estimates are close to those implied by such a process.

Columns (5) and (6) show the estimated multivariate intergenerational wealth elasticities once we include grandfathers, and grandfathers and great-grandfathers also. Again the values predicted by (3) and (4) as a description of the wealth mobility process are close to those observed. Only the coefficient on the wealth of fathers is statistically significantly different from what would be predicted.

The fact that even controlling for the wealth of fathers and grandfathers, the wealth of great-grandfathers is predictive of child wealth is interesting. Great-grandfathers will not have been alive at the same time as their great-grandchildren. So they were unlikely to play any direct role, not mediated by grandparents and parents, in the wealth acquired by these great-grandchildren at the ends of their lives. In this model their wealth is correlated with that of their great-grandchildren, even controlling for the wealth of fathers and grandfathers, simply because it provides more information on

Table 9

Intergenerational Elasticities of Wealth in England, 1858–2012

Dependent variable ln wealth of	Sons/ daughters	Grandsons/ daughters	Great grandsons/ daughters	Grandsons/ daughters	Great grandsons/ daughters
lnWealth fathers	0.425	–	–	0.242	0.225
	(0.013)			(0.027)	(0.047)
	–			[0.364]	[0.356]
lnWealth grandfathers	–	0.285	–	0.157	0.089
		(0.016)		(0.022)	(0.035)
		[0.310]		[0.153]	[0.133]
lnWealth great-grandfathers	–	–	0.255	–	0.120
			(0.023)		(0.029)
			[0.232]		[0.056]
Observations	4,949	2,158	633	2,129	294
R^2	0.31	0.21	0.19	0.27	0.26

Notes. Robust standard errors in parentheses. [ ] indicate predicted values based on constant underlying b of 0.72.

what the underlying social status of fathers and grandfathers is, that underlying status being what influences the wealth of the current generation.

4. Interpretation

We see three striking facts in the data presented above. The first is that the elasticity of wealth across single generations is substantially greater for people grouped into surname cohorts than it is for individual families. The second is that the elasticity of wealth across generations has changed little either at the individual or the group level between 1858 and 2012, despite the enormous changes of these years. The third fact is that the elasticity of wealth in individual families and for surname groupings between children and grandparents and great-grandparents is surprisingly strong.[15] We posit a simple model to explain this, where there is an underlying social status of families regressing only slowly to the social mean, and show that it accords well with the data.

The constancy of the rate of regression of wealth to the social mean across these five generations is a surprise. The earlier generation held wealth in an era where income and wealth taxation was very modest, and the current generation holds wealth in an era where there has been a considerable taxation of both income and wealth. The maximum inheritance tax rate in England for those dying 1858–87 was 4.1%. Thus these families could pass on wealth almost intact to their heirs dying 1888–1917. In contrast for those dying in the generation 1960–93, the maximum inheritance tax averaged 69%, as Figure 8 illustrates. The rich of the generation dying 1999–2012 thus would have faced substantial confiscation by government of any transfers from the previous generation. This should have pushed their wealth much more quickly towards the mean than was happening before. Yet we do not see this in the data. The persistence of wealth remained just as high for the last two heavily taxed generations as for the previous two that mainly escaped inheritance taxation.

Aside from direct taxation of wealth there have been other changes since 1858 that would seem to create greater wealth mobility. There has been, for example, since 1870, a vast expansion of state provision for education. Only in 1880 did England introduce compulsory primary school attendance, to age 10. Over time the school leaving age was progressively extended: 11 in 1893, 12 in 1899 and 14 in 1918. Thus, the first two generations in our study, those born on average in 1815 and 1843, grew up in a society with no public provision for schooling and no requirement that parents educate children. The last generation, born on average in 1925, lived in a society where the state provided education to all to age 14. Yet none of these changes seem to have affected the intergenerational elasticity of wealth.

One implication of the structure we have identified underlying the inheritance of wealth is that if we look at groups of people identified by race, religion or ethnicity, then these groups will see wealth regress to the mean at a much slower rate than that observed for individual families. For such groupings, the transitory components in wealth will on average be zero and will thus not affect the measured intergenerational

[15] Recent studies report the same surprisingly strong links across multiple generations for wealth in Denmark (Boserup *et al.*, 2013), education and earnings in Sweden (Lindahl *et al.*, 2012) and occupations in England and the US (Long and Ferrie, 2012).

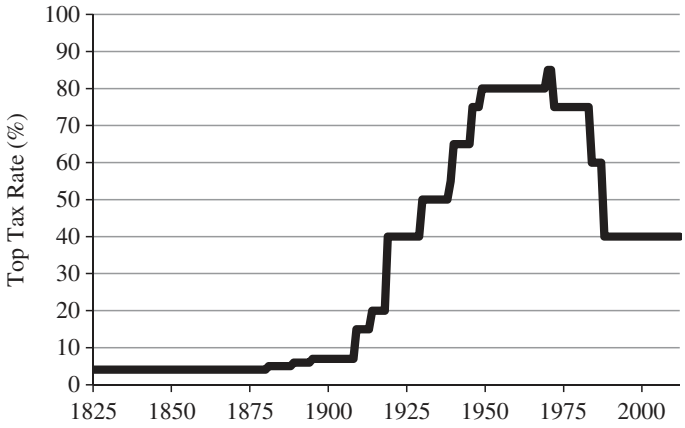

Fig. 8. *Maximum Inheritance Tax Rates, UK, 1825–2012*

elasticities, which will depend only on the underlying component. So for racial, religious and ethnic groups we would expect to see an intergenerational elasticity of wealth at death of 0.7 or greater.

What is the nature of the underlying latent variable which seemingly governs the inheritance of wealth in the same way over five generations? There is evidence from these same surnames, that we do not detail here, that the underlying latent variable is the generalised social competence of these families, which is regressing only slowly to the mean. Thus, if we take any measure of socio-economic status for these same rare surnames in the years 1800–2012 – educational attainment, longevity, occupational attainment, for example – we observe the same underlying high rate of persistence. One measure of educational attainment for these surnames, for example is their rate of occurrence at Oxford and Cambridge 1830–2012. Though the rich and prosperous surnames were categorised purely by their average wealth at death 1858–87, they are heavily over-represented at Oxford and Cambridge 1830–59. From 1860 to 2012, their over-representation at Oxford and Cambridge has declined but still, in 2010–2, six generations later, they occur at a higher than the expected rate. The decline in their representation at these universities can again be modelled as a simple Markov process in an underlying latent variable of social competence with a persistence of around 0.73 (Clark and Cummins, 2014). Wealth mobility and educational mobility for these families is remarkably similar in the years 1858–2012. Again this constancy in the character of mobility occurs at a time of great change in the nature of Oxford and Cambridge as educational institutions in terms of how they selected students and how students were funded.

The evidence from education suggests that all aspects of social status may be governed in part by the same underlying process posited in (4) of

$$x_{it+1} = bx_{it} + e_{it}. \tag{4}$$

In this case if we were to measure the social status of families as an aggregate of earnings, wealth, education, occupation and health, then observed social mobility even in parent–child studies would decline. For such an aggregation would reduce the

variance of the error component in measured status. Thus, the measured rate of persistence, even in one generation, will be much closer to that of the underlying latent variable.

5. Conclusions

Utilising a newly constructed data set we are able to observe the inheritance of wealth over five generations in England, for people dying between 1858 and 2012. The data set was constructed to include everyone dying with a set of rare surnames identified as rich or poor based on average wealth at death 1858–87. This structure allows us to measure social mobility in two ways. The first is the conventional measure of the intergenerational elasticity of wealth between fathers and children. These estimates, at 0.41–0.50, fall within the expected range but are also surprisingly stable over five generations from 1858 to 2012. However, the rare surnames also allow us to measure the intergenerational wealth mobility by looking at people grouped by the initial average wealth of their surnames. Using such groupings, the estimated intergenerational elasticity is much higher, in the range of 0.7, and again is stable over the period 1858–2012.

We show that these two sets of estimates can be reconciled by positing a simple latent variable model of the inheritance of wealth with an underlying AR1 process. This model has testable implications for what the observed wealth elasticities will be between grandparents and grandchildren, and great-grandparents and great-grandchildren. We show that the observed elasticities in our database are close to the predicted.

The implications of this model are that wealth will be surprisingly persistent in families across multiple generations. This is what allows rich rare surnames to still remain rich on average even four generations later. It also implies that wealth differences between racial, religious and ethnic groups will also be highly persistent across generations.

What is the latent variable that underlies the inheritance of wealth? Evidence in other work we have done on the inheritance of education status in England suggests that families can be conceived of as having an underlying social competence, which is highly persistent across generations. This social competence generates their outcomes on all dimensions of social status but with random components on each one. In this case, social mobility between generations measured on any single aspect of status will be much greater than mobility on a more general ranking of families' overall social status, that averages earnings, wealth, occupation, education, health and longevity.

Appendix A. Data Compilation

A.1. *Construction of the Surname Samples*

Rare surname samples were created from surnames held by 40 or fewer people in 1881, where there was at least one adult death in 1858–87. Surnames were designated as rich, prosperous or poor based on the log average wealth at death, estimated as personalty, of all those 21 and above

Table A1

Probates 1858, England and Wales

Wealth (less than) £	Number of probates	Proportion of adult deaths
–	–	0.8584
10	1,935	0.0091
60	6,368	0.0301
200	7,182	0.0339
450	4,303	0.0203
800	2,725	0.0129
1,500	2,671	0.0126
3,000	2,058	0.0097
5,000	806	0.0038
7,000	439	0.0021
9,000	303	0.0014
15,000	602	0.0028
25,000	231	0.0011
40,000	187	0.0009
75,000	102	0.0005
100,000*	67	0.0003

Note. *Personal estates of £100,000 and above.

with a surname dying in these 30 years. Personalty is all property other than real estate. In this period on average only 15% of adults in England had their estates probated after death. The value of the other 85% mostly fell below the minimum estate value of £10 at which probate was required. Thus, Table A1 shows the numbers and distribution of probate values in 1858 compared to all deaths aged 21 and above, from the report of the Registrar General.

Since nominal values of probates were changing over time with economic growth, and later with inflation, we normalise these values throughout by calculating for each probate the logarithm of its value minus the logarithm of the average probate value for the population as a whole in that quinquennia. For 1858 we know the overall distribution of probate values in England and Wales. Table A1 shows these. For later years, we estimated this distribution using the samples of the probate values for the common surname Brown.

For those not probated we have to attribute a probate value. In each period there was a minimum estate value at which probate was legally required: £10 (1858–1900), £50 (1901–30), £50–500 (1931–65), £500 (1965–74), £1,500 (1975–83) and £5,000 (1984–2012) (Turner, 2010, p. 628). We thus took as the value of estate for those not probated as typically half the minimum requiring probate: £5 (1858–1900), £10 (1901–9), £15 (1910–2019), £20 (1920–30), £25 (1931–9), £50 (1940–9), £100 (1950–9), £250 (1960–74), £750 (1975–83) and £2,500 (1984–2012). We did not increase the attributed value in 1901 to £25 because the rise in the probate limit to £50 in that year had little effect on the implied value of the omitted probates in 1901 compared to 1900. Thus, whatever the exact cut-off the bulk of the omitted probates was closer to 0 in value than to £50.

We identified candidate rare surnames in a number of ways. For the rich and prosperous samples we checked the probate records in 1858–61 looking for rare surnames with high probate values. We also checked rare surnames from Rubinstein's list of the very rich dying 1810–39 (Rubinstein, 2009). To identify the poor surnames, we checked the probate records for rare surnames from three sources. First there was the 1861 list of paupers who had been in workhouses across England and Wales for at least five years, issued by Parliament. Then there were people convicted of crimes in Essex courts 1860–62. Finally, there were those convicted of crimes in the Old Bailey in London in these same years.

For 1858–87 deaths, rare surnames were classified in one of three groups based on the average value of the log of wealth.

A.1.1. *Rich*

The rich group is surnames with average natural logarithm of probate values in these years of 6.3 or above. This corresponds to the top 5% of wealth for individual probate values in 1858 in Table A1. This group includes some distinguished baronial surnames, such as Leveson-Gower. However, there are also surnames such as Clarke-Jervoise where the largest probate value in the period was £4,000, below even the top 1% of wealth at death in 1858.

The list of these surnames is: Ahmuty, Allecock, Angerstein, Appold, Auriol, Bailward, Basevi, Bazalgette, Beague, Berens, Beridge, Berners, Bigge, Blegborough, Blicke, Boger, Bouwens, Braikenridge, Brightwen, Brudenell-Bruce, Brunel, Bulteel, Burmester, Burrard, Buttanshaw, Cankrien, Carbonell, Cazalet, Cazenove, Champion-De Crespigny, Clagett, Claypon, Cleoburey, Coape, Colfox, Colvile, Conduitt, Conyngham, Cornwallis, Coryton, Cotesworth, Courtauld, Crokat, Daubuz, D'aubuz, De Gatacre, De Lousada, Du Cane, Elmsall, Fector, Fludyer, Garle, Gatacre, Gaussen, Haldimand, Haselfoot, Hilhouse, Holbech, Hugonin, Jervoise, Knowlys, Labouchere, Lane-Fox, Legrew, Leschallas, Leveson-Gower, Loddiges, Lousada, Lucena, Lutyens, Marryat, Merceron, Meux, Micklethwait, Montefiore, Morier, Musters, Oglander, Orred, Papillon, Penoyre, Penrhyn, Perigal, Puget, Pulteney, Roupell, Rushout, Skipwith, Sotheby, Strangways, Streatfeild, Taddy, Thoroton, Trebeck, Trelawny, Tunno, Usticke, Vansittart, Watlington, Weguelin, Willoughby De Broke, Willyams.

A.1.2. *Prosperous*

The second group of surnames is designated 'prosperous' since surnames with an average personalty at death as low as £45 in 1858–87, close to the estimated average annual wage, would qualify for inclusion in this group. In terms of individual probates this corresponds to the next 6% of the population dying 1858.

The list of these surnames is: Agace, Agar-Ellis, Aglen, Aloof, Alsager, Bagnold, Benthall, Berthon, Brandram, Brettingham, Brideoake, Broadmead, Broderip, Brouncker, Brune, Calrow, Champernowne, Chaplyn, Chatteris, Cludde, Cookney, Cothay, Creyke, Croasdaile, Cruso, Cruttwell, Daukes, De Grey, Dilke, Du Boulay, Faulconer, Favre, Filder, Goodford, Goodhart, Grazebrook, Greame, Grimshawe, Hecker, Heneage, Hetley, Hollwey, Jeakes, Lamotte, Lechmere, Leir, Leycester, Lillingston, Linzee, Lombe, Magenis, Manners-Sutton, Merewether, Methold, Mildmay, Minet, Monins, Nedham, Nottidge, Novelli, Oliverson, Pepys, Perryn, Pickmere, Pigou, Poulett, Proby, Reynardson, Rothschild, Rusbridger, Sapte, Senhouse, Severne, Sich, Teissier, Thellusson, Thoyts, Tyssen, Uppleby, Uthwatt, Villebois, Weyland.

A.1.3. *Poor*

The poor were those surnames where the average estimated wealth at death was at least 30% less than the average. Most of these poor surnames had no-one dying probated in 1858–87.

The list of these surnames is: Aller, Almand, Angler, Anglim, Annings, Austell, Backlake, Bagwill, Balsden, Bantham, Bawson, Beetchenow, Bemmer, Bevill, Bierley, Biker, Bilcock, Bivens, Blacksall, Blind, Boate, Bollingbrook, Booman, Bowel, Brandfield, Brenham, Brickham, Broan, Brummage, Buffee, Buie, Bulmore, Bundley, Burlin, Butfoy, Byott, Caddie, Camac, Camamile, Camel, Canary, Cansell, Casseldine, Chauncey, Cholmondley, Colcutt, Colmar, Colo, Comm, Concoran, Coniston, Cooler, Coten, Courtoy, Crage, Cresson, Cripple, Crix, Croud, Dadey, Damery, Damson, Dazley, Dealing, Dearey, Defoe, Delmer, Demar, Dement, Denmar, Detnon,

Diccox, Dinon, Doss, Draby, Drone, Earing, Eggs, Ellmers, Etton, Fabey, Flinch, Follington, Furrow, Garan, Girl, Glansford, Glassonbury, Goodhill, Goodlud, Grangey, Greaveson, Gricks, Gussen, Gyle, Hallick, Hallos, Halm, Harriet, Haupt, Hestford, Hoborough, Holloron, Horny, Hugger, Hutch, Illesley, Jeays, Jenne, Jerden, Jerratt, Joins, Junes, Kilborne, Lamer, Lansfield, Layle, Ledge, Ledwell, Lennington, Lerner, Leserve, Leverno, Liebman, Linker, Livard, Lofton, Magary, Mallindine, Mallow, Manes, Masten, Maunton, Medus, Mien, Mincke, Mittens, Modell, Molly, Monis, Mountaney, Mune, Mutt, Nies, Noddles, Osterman, Pagnum, Passan, Pelle, Pitters, Pordham, Potterell, Pounceby, Prop, Purvor, Readington, Reddich, Rent, Riddalls, Rowthorn, Ruffitt, Sammy, Savers, Scaresbrook, Scharff, Seawood, Seears, Seeby, Sherbourn, Sherrie, Sheville, Shimmons, Showman, Sideway, Sidwells, Sifton, Sinnot, Sissey, Sitter, Sling, Starker, Stint, Stopper, Stringle, Strut, Sturr, Susan, Talk, Tamen, Tanks, Tidder, Tonbridge, Tosbell, Toung, Trencher, Trevellyan, Trivess, Tunnel, Tusker, Vallett, Vickerage, Vino, Waldrum, Waldwyn, Wathews, Waude, Weathersby, Weet, Witticks, Wressle, Wrest, Yearn, Zouch.

A.2. *Overall Distribution of Probate Wealth*

Using the distribution of the Brown surname. probate values and probate rates gave an estimate of the overall distribution of wealth at death. We could then estimate where the average wealth of the rich prosperous rare surname groups fell within this overall distribution.

A.3. *Surname Mutation*

The principal way in which surnames would change over these years that we could observe was by the adoption of hyphenated double names. Thus, some *Uthwatt*s became *Andrewes-Uthwatt*, some *Heneage*s, *Heneage-Vivian*. This process was mainly found among the surnames of the rich and the prosperous. We included all such hyphenated versions of each rare surname in our data.

A.4. *Emigration and Immigration*

We calculated the expected stock of each surname in our sample for 2002 using the 1881 stock combined with births and deaths, 1881–2002 (Schurer and Woollard, 2000, GRO). This estimate was then compared with ONS data on the 2002 surname distribution of England and Wales. For some names, it was obvious that considerable immigration had occurred in recent years. These surnames, whose 2002 stock did not reasonably correspond with that expected from the 1881 census and the GRO vital records were dropped from the sample.

Appendix B. Data Sources

B.1. *Wealth*

England and Wales, Index to Wills and Administrations, 1858–2012. Principal Probate registry, London (available online 1858–1966 at Ancestry.co.uk).

Prerogative Court of Canterbury and Related Probate Jurisdictions: Probate Act Books. Volumes: 1850–57. Held at the National Archives, Kew. (Catalogue Reference: PROB 8/243-250.)

B.2. *Births and Deaths*

General Register Office. England and Wales Civil Registration Indexes. London, England: General Register Office.

B.3. *Online Sources*

FreeBMD. *England & Wales, FreeBMD Death Index: 1837–1915* [database on-line]. Provo, UT, USA: Ancestry.com Operations Inc, 2006. Available at www.ancestry.com (last accessed: 26 May 2014).

FreeBMD. *England & Wales, FreeBMD Birth Index, 1837–1915* [database on-line]. Provo, UT, USA: Ancestry.com Operations Inc, 2006. Available at www.ancestry.com (last accessed: 26 May 2014).

Ancestry.com. *England & Wales, Birth Index: 1916–2005* [database on-line]. Provo, UT, USA: Ancestry.com Operations Inc, 2008. Available at www.ancestry.com (last accessed: 26 May 2014).

Ancestry.com. *England & Wales, Death Index: 1916–2006* [database on-line]. Provo, UT, USA: Ancestry.com Operations Inc, 2007. Available at www.ancestry.com (last accessed: 26 May 2014).

Births post 2005 and deaths post 2006 were collected from the London Metropolitan Archives.

B.4. *Others*

Calendars of Prisoners, 1860–9. Calendars of prisoners for Essex Quarter Sessions, Essex Assizes and Special Sessions of Gaol Delivery. Essex Record Office, Q/SMC 9.

England and Wales, Censuses, 1841–1901. Available online at http://www.nationalarchives.gov.uk/records/census-records.htm (last accessed: 26 May 2014).

Office for National Statistics, *Surnames*. Available online at http://www.taliesin-arlein.net/names/search.php (last accessed: 26 May 2014).

Proceedings of the Old Bailey, 1674–1913. Available online at http://www.oldbaileyonline.org/ (last accessed: 26 May 2014).

Schurer, K. and Woollard, M. (2000). 1881 Census for England and Wales, the Channel Islands and the Isle of Man (Enhanced Version) [computer file]. Genealogical Society of Utah, Federation of Family History Societies, [original data producer(s)]. Colchester, Essex: UK Data Archive [distributor]. SN: 4177, http://dx.doi.org/10.5255/UKDA-SN-4177-1 (last accessed: 26 May 2014).

UK, House of Commons Papers. 1861. *Paupers in workhouses. Returns from each workhouse in England and Wales, of the name of every adult pauper who has been an inmate of the workhouse during a continuous period of five years*. Vol LV, 201. Cmd. 490.

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Additional Supporting Information may be found in the online version of this article:

Data S1.

References

Becker, G. and Tomes, N. (1986). 'Human capital and the rise and fall of families', *Journal of Labor Economics*, vol. 4(3), pp. S1–39.

Beeton, M. and Pearson, K. (1899). 'Data for the problem of evolution in man. II. A first study of the inheritance of longevity and the selective death-rate in man', *Proceedings of the Royal Society of London*, vol. 65 (no. 413–422), pp. 290–305.

Black, S. E. and Devereux, P.J. (2011), 'Recent developments in intergenerational mobility', in (O. C. Ashenfelter and D. Card, eds.), *Handbook of Labor Economics*, vol. 4B, pp. 1487–542, Amsterdam: Elsevier.

Boserup, S.H., Wojciech, K. and Kreiner, C.T. (2013). 'Intergenerational wealth mobility: evidence from Danish wealth records of three generations', Working Paper, University of Copenhagen.

Charles, K.K. and Charles, E.H. (2003). 'The correlation of wealth across generations', *Journal of Political Economy*, vol. 111(6), pp. 1155–82.
Clark, G. and Cummins, N. (2014). 'Surnames and social mobility.' forthcoming, *Human Nature*. vol. 25(4), available at: www.econ.ucdavis.edu/faculty/gclark/ and www.neilcummins.com (last accessed: 26 May 2014).
Corak, M. (2006). 'Do poor children become poor adults? Lessons from a cross country comparison of generational earnings mobility', IZA Discussion Paper 1993.
Dearden, L., Machin, S. and Reed, H. (1997). 'Intergenerational mobility in Britain', Economic Journal, vol. 107(440), pp. 47–66.
Ermisch, J., Francesconi, M. and Siedler, T. (2006). 'Intergenerational mobility and marital sorting', Economic Journal, vol. 116(513), pp. 659–79.
Galton, F. (1869). *Hereditary Genius: An Enquiry into its Laws and Consequences*, London: Macmillan.
Güell, M., Rodríguez Mora, J.V. and Telmer, C. (2007). 'Intergenerational mobility and the informative content of surnames', Working Paper, Edinburgh University.
Harbury, C.D. and Hitchins, D.M. (1979). *Inheritance and Wealth Inequality in Britain*, London: Allen and Unwin.
Hertz, T., Jayasundera, T., Piraino, P., Selcuk, S., Smith, N. and Verashchagina, A. (2007). 'The inheritance of educational inequality: international comparisons and fifty-year trends', *B.E. Journal of Economic Analysis & Policy*, vol. 7(2), pp. 1–46.
Jäntti, M., Bratsberg, B., Røed, K., Raaum, O., Naylor, R., Österbacka, E., Björklund, A. and Eriksson, T. (2006). 'American exceptionalism in a new light: a comparison of intergenerational earnings mobility in the Nordic countries, the United Kingdom and the United States', Discussion Paper 1938, Institute for the Study of Labor (IZA), Bonn.
Lindahl, M., Palme, M., Sandgren Massih, S. and Sjögren, A. (2012). 'The intergenerational persistence of human capital: an empirical analysis of Four generations', Working Paper, IFAU, Uppsala University.
Long, J. (2013). 'The surprising social mobility of Victorian Britain', *European Review of Economic History*, vol. 17(1), pp. 1–23.
Long, J. and Ferrie, J. (2012). 'Grandfathers matter(ed): occupational mobility across three generations in the U.S. and Britain, 1850–1910', unpublished manuscript. http://www.aeaweb.org/aea/2013conference/program/retrieve.php?pdfid=229 (last accessed: 26 May 2014).
Long, J. and Ferrie, J. (2013). 'Intergenerational occupational mobility in Great Britain and the United States since 1850', *American Economic Review*, vol. 103(4), pp. 1109–37.
Menchik, P. (1979). 'Intergenerational transmission of inequality: an empirical Study of wealth mobility', *Economica*, vol. 46(184), pp. 349–62.
Nicoletti, C. and Ermisch, J. (2007). 'Intergenerational earnings mobility: changes across cohorts in Britain', *B.E. Journal of Economic Analysis and Policy*, vol. 7(2), pp. 777–826.
Rubinstein, W.D. (2009) *Who Were the Rich? A Biographical Directory of British Wealth-Holders*. vol. 1, *1809–1839*, London: Social Affairs Unit.
Solon, G. (1999). 'Intergenerational mobility in the labor market', in (O.C. Ashenfelter and D. Card, eds.), *Handbook of Labor Economics*, vol. 3A. pp. 1761–800, Amsterdam: Elsevier.
Turner, J.D. (2010). 'Wealth concentration in the European periphery: Ireland, 1858–2001', *Oxford Economic Papers*, vol. 62(4), pp. 625–46.