6 Malthus and Darwin: Survival of the Richest

Man accumulates property and bequeaths it to his children, so that the children of the rich have an advantage over the poor in the race for survival (Darwin, 1871, chapter 5).

Introduction

As has been emphasized, in the Malthusian Era the economic laws that governed human society were the same as those that govern all animal societies. Indeed Charles Darwin proclaimed his inspiration for *On the Origin of Species* was Malthus's *On a Principle of Population*. Darwin then employed his theory of natural selection in *The Descent of Man* to explain how humans evolved from earlier progenitors. Darwin even went so far, in the conclusion of that work, to endorse social Darwinism.

> *Man, like every other animal, has no doubt advanced to his present high condition through a struggle for existence consequent on his rapid multiplication; and if he is to advance still higher, it is to be feared that he must remain subject to a severe struggle (Darwin, 1871, 403).*

While this affirmation of Social Darwinism was misguided, Darwin's insight that, as long as population was regulated by Malthusian mechanisms, mankind would be subject to natural selection was profoundly correct.

In the Malthusian era on average every woman could have only two surviving offspring. But these two had to be selected by some mechanism from the average of 5 children each women had in the pre-industrial era. And as long as mothers and fathers varied in their characteristics this survival process favored some types of individuals over others. The Darwinian struggle that

shaped human nature did not end with the Neolithic Revolution, but continued indeed right up to 1800.

In this chapter we will see that there is very good evidence of differential survival of types for pre-industrial England in the years 1250-1800. In particular economic success translated very powerfully into reproductive success, with the richest individuals having more than twice the numbers of surviving children at death as the poorest.

Indeed the evidence is that the poorest individuals in the Malthusian era would typically not reproduce themselves. Instead pre-industrial England at least was a world of constant downward mobility. Given the static nature of the economy, and the economic opportunities it afforded, the abundant children of the rich had to, on average, move down the social hierarchy. The craftsmen of one generation supplied many of the laborers of the next, merchants sons became the petty traders, large landowners sons provided the smallholders.

The downward nature of social mobility in the Malthusian era is in stark contrast to the modern world, where the lower fertility of the rich for most of the years since 1870, and the expansion of upper level economic opportunities, has created instead a world of constant upward mobility, where parents on average see their children move up the social hierarchy.

Survival of the Richest

The first two basic Malthusian propositions, shown again in figure 6.1, imply that reproductive success, the number of
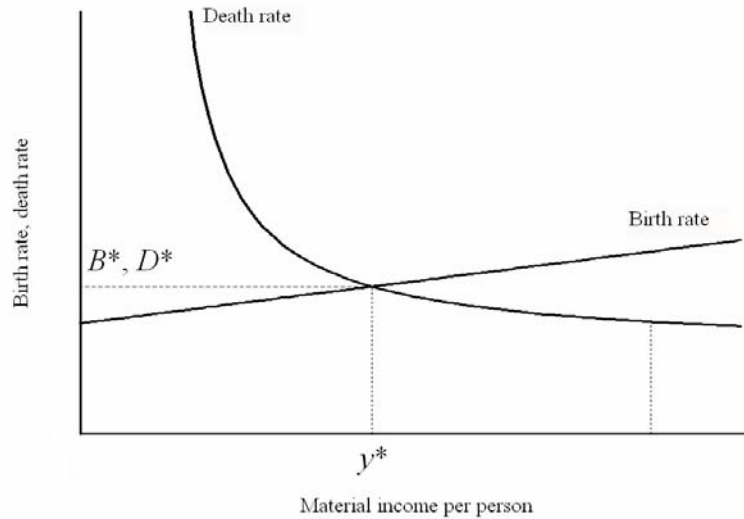
Figure 6.1 Birth and Death Schedules

offspring a person leaves on their death, increased with income. This curve was drawn for society as a whole. But within any settled agrarian society there are huge variations in income per person at any time. The existence of land and capital as assets that generate rents allows some individuals to command much greater shares of output than others. The same Malthusian logic thus implies that those who are successful in economic competition in settled agrarian societies, those who acquire and hold more property, or develop skills that allow for higher wages, would also be more successful reproductively.

The wills of the men in England discussed above by 1580 at least seem to mention nearly all surviving children. One way this can be demonstrated is through the ratio of sons to daughters. Daughters were much more likely than sons to be excluded from

wills: because they had married and were given their share of the inheritance in dowry, or because they were given no bequest. John Hynson of Fordham, Cambridge left to his two unmarried daughters Margaret and Mary £30 each. His three married daughters, whose names were not even given, were described thus "To my 3 daughters who are married 10s (£0.5) each."[144] Even bequests to unmarried daughters were generally smaller. For example, John Pratt of Cheveley, Cambridge left each son £5, but each daughter only £2.[145]

Hence the ratio of boys to girls named in wills can be used as a measure of how many daughters were omitted. The expected ratio will be 1.03 if boys and girls had equal chances of being mentioned in wills.[146] The actual ratio, as table 6.1 shows, averaged 1.04. Probably only 1 percent more girls than boys are omitted from these wills. But given that girls were so much more likely to be excluded if anyone was, the overall omission rate for children must have been very low.

We can thus use these wills to investigate the connection between wealth and reproductive success in pre-industrial England. Since we are interested in the reproductive success of testators, dead children were counted as surviving offspring if they themselves had produced living offspring. Thus William Cooke of Great Livermere in Suffolk, who died at about age 74, left four living children, but also two dead sons who both had two surviving children.[147] He was counted as having 6 children.

---

[144]Evans, 1993, 217.

[145]Evans, 1993, 108.

[146]Based on estimated relative male and female mortality rates by age in 1580-1649. Wrigley et al. , 1997, 296, 303.

[147]Evans, 1987, 359.

Table 6.1 Surviving Children per Male Testator, England, 1580-1640

Location	Number of wills with information on children	Children per testator	Sons per testator	Ratio Sons/ Daughters
London	177	1.96	0.83	0.77
Town	344	2.39	1.19	1.02
Rural	2,210	2.92	1.50	1.06
ALL	2,731	2.79	1.42	1.04

As can be seen in table 6.1 the average numbers of children per testator were modest. For a population to be just reproducing itself the numbers of children surviving each male at time of death would have to exceed two. It has to exceed two since some of these children are minors who would die before they would reach the age (sixteen or more) where they would be potentially writing wills. For the average testator in our sample to get 2 children who survived to age 16 at least they would need to have left 2.07 children when they died. Thus London testators circa 1620 were definitely not reproducing themselves. Those outside London in smaller towns, with 2.39 surviving children per testator, were experiencing a population growth of less than 15 percent per generation. Country testators, however, were growing by 40 percent per generation.

It might be still possible that poor families, having little to leave, more often omitted both boys and girls equally, which our

gender ratio test will not discover. We can control for this kind of gender neutral omission by also examining the relationship between wealth and the frequency of either no child being named as an heir, or of no male heir being named.

The reasoning is as follows. Even if poorer testators omit some children from their wills because they have few assets, or chose to leave everything to one child, they will certainly not omit all their children for this reason. Further given the preference for males as heirs, while they might leave assets only to the oldest son, they would not omit all their surviving sons from a will. Thus if we take as an index of fertility either just the frequency of at least one child being named, or the frequency of at least one son being mentioned in the will, this should be proof against the type of omission of children possibly to be found in poorer families. We shall see below that when our analysis of fertility is carried out using these as alternative measures the results remain as strong as when using all children.

Figure 6.2 shows the estimated numbers of children per male of each of eight bequest classes - £0-9, £10-24, £25-49, £50-99, £100-199, £200-499, £500-999, £1000+ - revealed by the wills. The bottom four income groups cover the bottom half of testators. The numbers of children are shown both for all men, and for married or widowed men only. In both cases there is a very powerful connection between assets and surviving children.

For all men, someone with less than £25 in bequests would typically have fewer than two children, while someone with £1000 or more, more than four children. The link between assets and surviving children was thus extremely strong.[148] The link shown

---

[148] Given that we have a noisy measure of assets bequeathed, the true relationship between assets and children is most likely even stronger than shown in the figure.
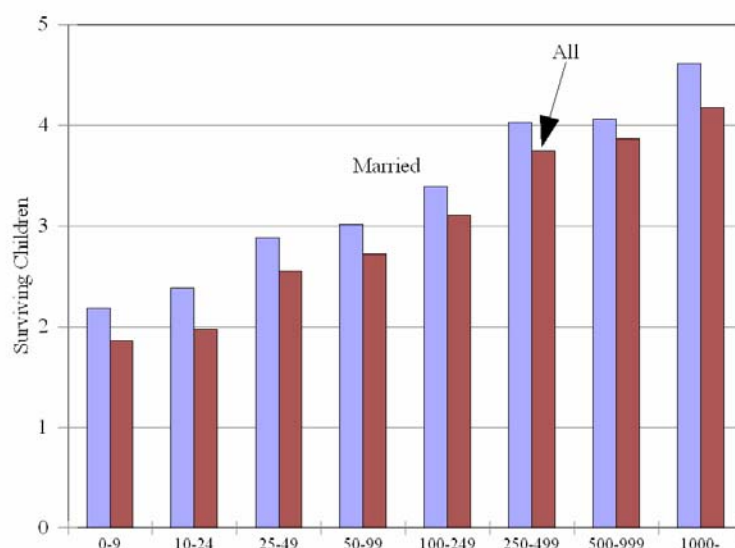
Figure 6.2 Surviving Children by the Assets of the Testator in £

here between assets and surviving children cannot be an artifact created by poorer testators omitting some children because they had nothing to bequeath them. This is evident in a number of ways. We know, for example, from the work of Wrigley and his associates that the typical male testator in England in these years would leave 2.58 surviving children.[149] So the richest testators with more than four children per family must be producing substantially more surviving children than the general population, and by inference than the poorest testators also.
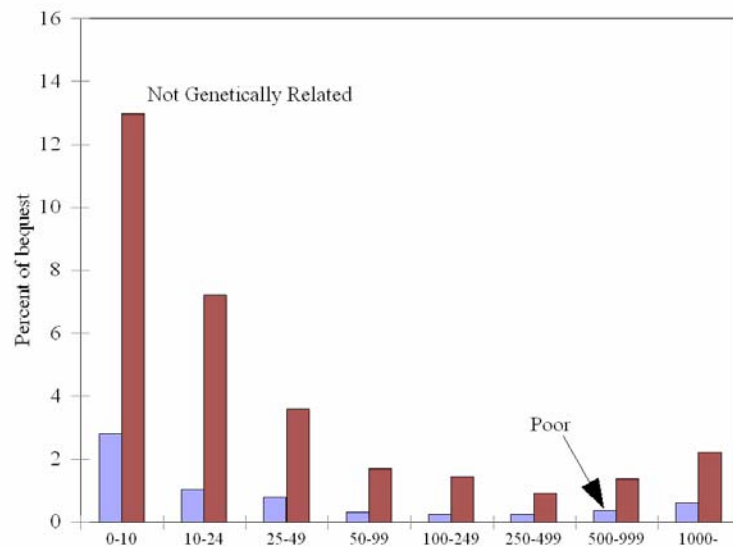
Interestingly assets predict reproductive success much better than social status or literacy. Economic status rather than social class is what mattered for reproductive success in England in

---

[149]Wrigley et al., 1997, 614.

these years. Presumably this was because the occupational labels used to form people into status classes were imprecise. There were husbandmen who were literate and wealthier than yeomen who were illiterate. There were carpenters who worked for others and owned no assets, and there were carpenters who were employers and engaged in building and leasing property.

It could be that economic success was an idiosyncratic element, created by luck, or by personality factors that were non-hereditable. In this case while survival of the richest would have the social consequences illustrated below, it would have no possible long run effects on the characteristics of the population.

However, the children of the rich had one significant advantage over those of the poor, which was the significant amount they inherited from their parents. One thing that stands out in these wills is that the major concern of the writers was to ensure that their assets passed to their biological children, and absent these to others genetically related to them: nephews, nieces, brothers, sisters or cousins. Where wives were young enough to have children by another husband the fear was that the children of another man would benefit from the testators assets. Wives were sometimes forbidden to remarry, or were required to surrender bequests on remarriage. Even though the early seventeenth century was a time of relatively heightened religiosity, and the wills came from an area of England which produced many of the early Puritan settlers in New England, the amounts bequeathed to the poor were extremely small. Little also was left to the many servants the rich would have. Figure 6.3 illustrates the dominance of transmission of assets to those genetically related to the testa-

tor.[150] Bequests to the poor were typically less than 0.5 percent of the testator's assets. Bequests to those not genetically related were between 1 and 12 percent. The greater frequency of such bequests by poorer testators probably just reflects them more often having no genetic relatives to leave property to.

Thus the sons of the rich would typically end up inheriting, counting the dowry their bride would bring, about half their father's bequest. There is evidence that they used that advantage to out-reproduce the children of poorer testators.

The first form of this evidence is the numbers of grandchildren mentioned in the wills of richer and poorer testators. Only some grandchildren were mentioned in these wills. But if omissions were equally likely for the poor as for the rich, then if the children inherited some of the reproductive success of their

---

[150]Wives were counted as genetically related since the assets bequeathed to them were typically to raise children, or would pass on to children on their deaths

parents, the ratio of grandchildren to children should be greater for the children of the wealthy. If there was no inheritance of reproductive advantage the ratio should be the same for the children of the rich and the poor. Figure 6.4 shows this ratio for a sub sample of the wills. It is clearly higher for the children of the rich. However it is only about 50 percent higher for the children of the two richest groups of testators than for the children of the poorest. So clearly this advantage is not perfectly hereditable, or this ratio would have been close to double for these groups.

A second check on the hereditability of these differences in reproductive success is to look at the correlation of assets between the wills of fathers and sons, since the size of the bequest is so closely linked to reproductive success. Figure 6.5 shows this relationship for 72 father-son pairs, where the bequest size has been transformed into units roughly equivalent to the intervals used in figures 6.2 and 6.3. Clearly there was a correlation between the wealth of fathers and sons where they both left wills. Rich fathers tended to have rich sons and vice versa

There are some problems with this data that limits what is can demonstrate, since the chances of a man making a will were much greater if they had a larger bequest to make. But if that was all that was happening we would expect poorer fathers, those who left less than £100 for example, to have a significantly richer son where their sons left wills. In practice the 20 fathers in this group whose average bequest was £51 left sons whose average bequest was only slightly higher at £123. So this effect cannot be purely selection. Economic status was indeed inherited.
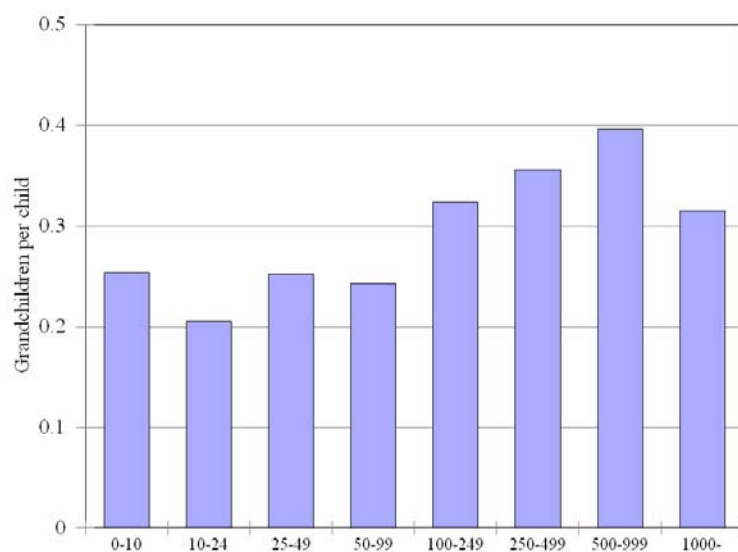
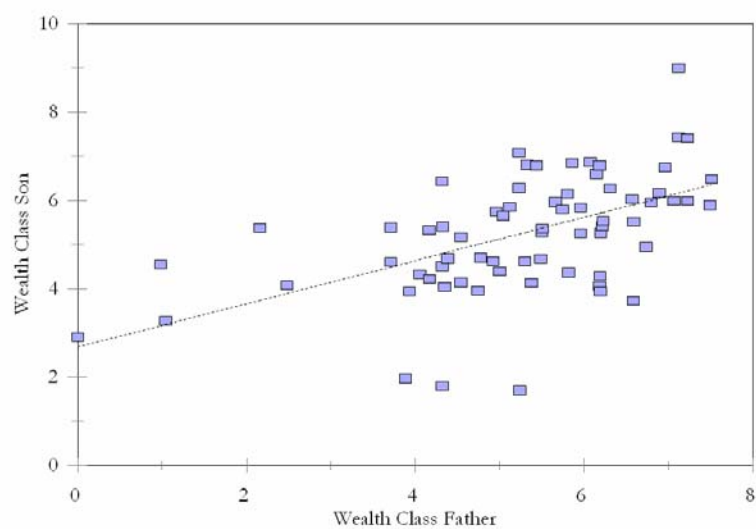**Figure 6.4 Grandchildren per child, by bequest class**

Figure 6.5 Bequests of the father, and of the son[151]

---

[151]The bequest measure here is ln(1+bequest).

There is evidence that the pattern uncovered here of much higher net fertility by richer groups existed in England at least by 1250. Medieval kings had a financial interest in the deaths of their tenants in chief, those who held land directly from the crown in the feudal system. These individuals were mostly an economically privileged group, and included the highest nobility of the land. Thus from 1250 on the king's officials conducted *Inquisitiones Post Mortem* on the deaths of these tenants, which are preserved in the Public Record Office. These inquisitions record only the following information, however, about surviving children: the oldest surviving son or his descendants; failing a male heir all daughters or their descendants.

The evidence of the wills in 1580-1640 provides a way to infer total numbers of surviving children from measures such as the fraction of times there was an heir, or the fraction of times there was a male heir, for wealthy groups such as royal tenants before 1500. Figure 6.6 shows two series by decade. The first is the average number of males per adult inferred for the whole population of England by decade from data on the aggregate movement of population. As can be seen, except for the phase of population growth up to 1315, this number was one or below one. The second is the implied average number of adult male children produced by royal tenants. This was calculated by using the proportions revealed for 1585-1638 between total male surviving children and the fraction of testators leaving a son or leaving some child.

In the two periods in medieval England where the population was stable or growing, 1250-1349, and 1450-1500 tenants in chief were producing on average about 1.8 surviving sons, nearly double the population average. Even in the years of population decline
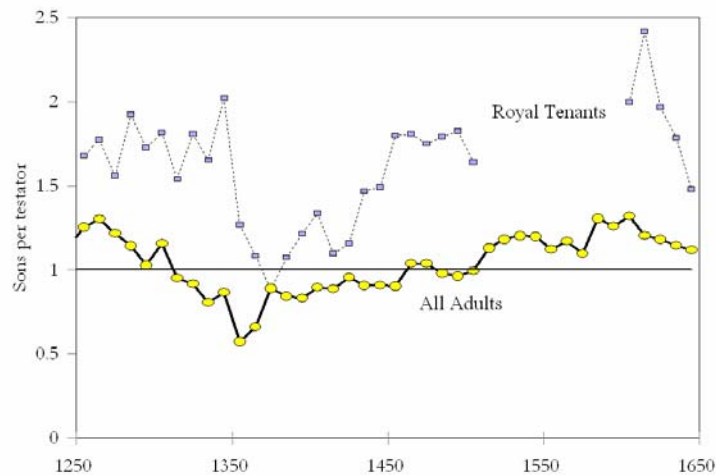
Figure 6.6 Sons per Testator, 1250-1650[152]

Table 6.2   The Demography of English Aristocrats, 1330-1829[153]

Period	Net Re-placement Rate	Male Life Expectancy at Birth	Male Life Expectancy at 20	Fraction of Deaths Violent
1330-1479	-	24.0	21.7	26
1480-1679	1.04	27.0	26.3	11
1680-1729	0.80	33.0	30.0	7
1730-1779	1.51	44.8	39.9	3
1780-1829	1.52	47.8	42.7	4

---

[152]Clark and Hamilton, 2006, 733.

[153]Hollingsworth, 1965, 8-11.   Hollingsworth considers only legitimate children, but argues that illegitimate children were few, less than 10 percent of these totals.

from 1350 to 1450, though implied surviving sons per tenant in chief declined, it remained at above the replacement rate of in most decades. Thus, as later, in medieval England the rich seem to have been out-reproducing the poor.

Note that in England the reproductive success of the class that engaged in warfare on a large scale in the pre-industrial era, the aristocracy, was much poorer than for economically successful commoners, and was probably less good than that of the average person. Table 6.2 shows for the English aristocracy - kings, queens, dukes and duchesses - the Net Reproduction Rate, as well as life expectancy at birth for males by period from 1330 (when Dukes were first created) Medieval manorial tenants, for example, had a life expectancy at age 20 of about 30, compared to 22 for the aristocracy.[154]

These excess deaths at relatively young ages contributed to the low net fertility of aristocrats. Thus in the earliest period we observe fertility, 1480-1679, the aristocracy, despite its privileged social position was barely reproducing itself. Only after 1730 when death rates from violence declined to levels little above the general population, did aristocratic life expectancy come to exceed the general population. Only in this latter period also did aristocrats finally enjoy more reproductive success than the average person.

Thus from the earliest times we can observe in the pre-industrial era reproductive success in a settled agrarian economy like England seemingly went to those who succeeded in the economic sphere, and avoided occupations where violent death was a hazard. It is plausible that ever since the arrival of institutionally stable agrarian societies with private ownership of land and capital, and secure transmission of assets between generations,

---

[154]Razi, 1980, 130.

those who were economically successful, and in particular those who accumulated assets, were also reproductively successful.

Sources of Mortality

The likelihood that reproductive success was determined by very different means in settled, institutionally stable agrarian societies, than in hunter-gatherer and shifting cultivation communities is reinforced by studies of mortality in modern forager and non-market societies. These suggest that deaths from accidents and homicide – to use the old legal terminology, deaths from *misadventure* - formed a surprisingly high proportion of all deaths compared to settled agrarian societies, and to modern societies.

Part of this stemmed from the way of life of early societies. In the mobile societies of foragers there were heightened risks of death from encounters with dangerous animals, drowning, thirst, and falls. But homicide was a still greater killer than these accidental causes. Despite romantic notions of the noble savage, violent conflict within groups and between bands of foragers seems to be frequent.

Table 6.3 shows for some modern hunter gatherer societies the deaths per 1000 males per year overall and from accidents and homicide. Forager societies where we have a complete breakdown of causes of death are few. And the small size of these groups implied a lot of random variation in the causes of death in the observation periods. But these observations suggest that homicide, including intergroup conflicts, was the source of death of 7-55 percent of people in such communities, averaging 21 percent of deaths. The reason for these high rates of violent deaths in forager societies is not clear. In part it may stem from

Table 6.3 Causes of Male Deaths in Forager and Subsistence Societies[155] * = male and female deaths.

Group	Death Rate/1000	Accident/1000	Homicide/1000
Neolithic France (5500 BC – 2200 BC)[c]	-	-	1.4
Ache, Forest period[a]	27	3.5	15.0
Yanomamo, 1970-4[a]	-	2.1	3.6
!Kung before 1973[a]	32	4.4	
New Guinea - Gebusi[b]	-	0.6	6.9
New Guinea – Goilala, Hewa[b]	-	-	*6.6
Agta[b]	42	-	*3.3
United Kingdom, 1999[d]	12	-	0.01
USA, 1999[d]	12	0.5	0.10

the absence of supervening legal authorities which could settle disputes without resort to violence. But we shall see that there is also the possibility that the people of long established forager societies were inherently, maybe even genetically, more violent.

Jean Guilaine and Jean Zammit estimate the numbers of people who died violently in Neolithic France from skeletal evidence. Figure 6.7 shows the kind of graphic evidence of violence that can be found in skeletal remains. Though there must be many caveats about their estimate, they conclude that 3 percent of the dead

---

[155] [a]Hill and Hurtado, 1996, 174. [b]Knauft, 1987. [c]Guilaine and Zammit, 2005, 133, 241-9 (very rough estimate). [d]World Health Organization, 2002, table A.8.
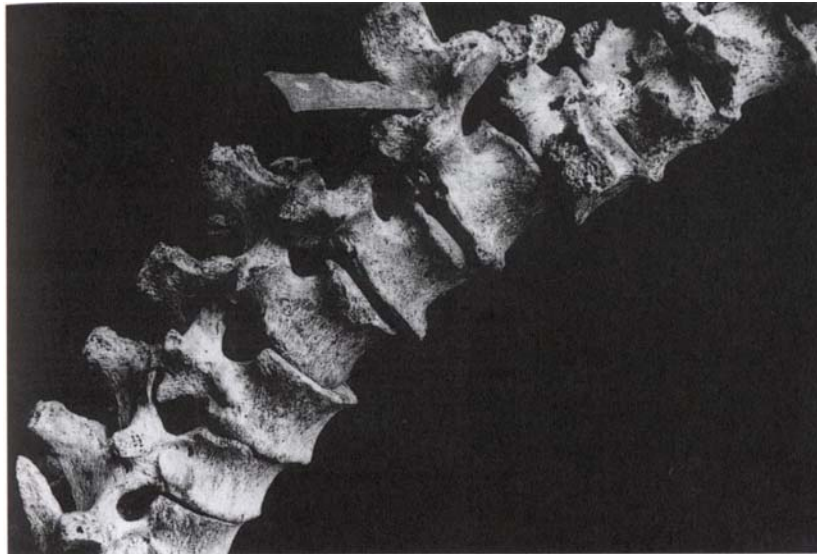
Figure 6.7 Copper dagger blade lodged in a vertebra, third millennium BC[156]

were killed or injured by violence. Assuming based on their appendix tables that the ratio of killed to injured was 2:1, that these were all male, and that life expectancy was 35 at birth gives the estimate in the table. This suggests much lower rates than for modern foragers, but much higher than modern high income societies.

In most modern societies deaths from violence occur at a low rate. In typical modern western European societies, such as the UK, male deaths from violence are only 0.01-0.02 per thousand per year. There seemingly was a transition from early societies where interpersonal violence was a major contributor to death rates, to modern ones where violence is not an important source of mortality. When did that transition occur?

---

[156] Guilaine and Zammit, 2005, 137 (very rough estimate).

In England we can trace back sources of mortality all the way to the late twelfth century. Since in medieval England the property of anyone who killed unlawfully reverted to the king, the king had an incentive to discover all murders. English kings thus early established a system of coroners' inquests on all accidental and violent deaths. These inquests establish the numbers of homicides and accidental deaths per year for various counties in England back to the late twelfth century.[157]

Figure 6.8 shows the trend in these various local estimates as well as later national homicide rates for males, per 100,000 of the population. Though there was a steady decline in homicide rates between 1200 and 1800, Medieval England was already very peaceable compared to modern forager societies. Male death rates per year from unorganized violence in England even circa 1200 averaged 0.2-0.25 per 1,000 males. This shows the toll from unorganized violence. War deaths, the results of organized violence, have to be added to get the overall losses from homicide.

Figure 6.9 shows estimated English male death rates from the various external and internal wars by decade from the 1170s to the 1900s.[158] Here the average losses were surprisingly small, in the order of .12-.15 per 1,000 males for most of the period 1150-1800. Thus even in medieval England before 1350 the average annual death rates from all violence for males were 0.32 per 1,000. This is an order of magnitude less than forager societies observed currently. It is also less than the estimated Neolithic rate.

Early European wars produced few casualties because the size of armies before 1700 was typically small. In the 1290s, when Edward I assembled the largest armies of his long reign, before he

---

[157] Cockburn, 1977, 1991. Given 1977. Hair, 1971. Hanawalt, 1976, 1979.

[158] There is a good historical record of all the battles and campaigns of the English, many with casualty estimates. For the earlier battles casualty numbers were estimated from those conflicts where a count was available.
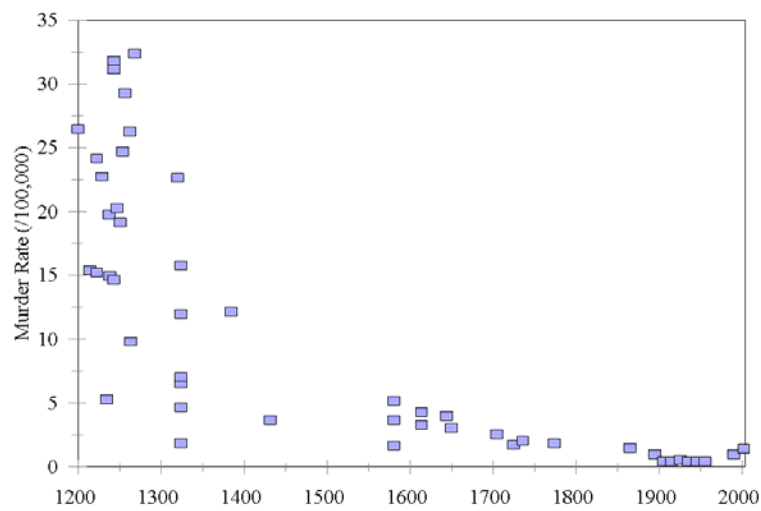
156

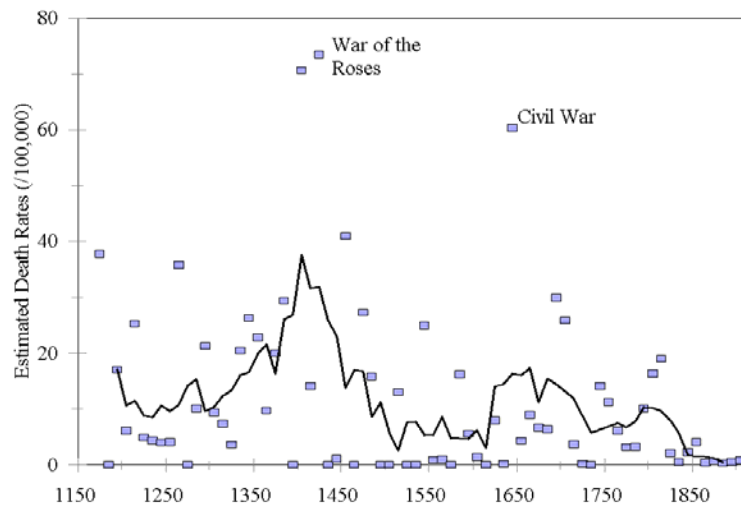**Figure 6.8 Homicide rates for males, England 1190s-2000**

Figure 6.9 Death Rates from Military Conflicts, England 1170s-1900s. The line shows a 50 year moving average of combat death rates in England.

was severely constrained by financial problems, his army to suppress the Welsh rebellion of 1294-5 was 31,000 at its maximum. This was about 0.6 percent of the English population. When the locus of the fighting switched to France in the Hundred Years War, the size of armies was even smaller because of development of smaller, more professional and better equipped armies, and the costs of moving troops to France. When Henry V invaded France in 1415 he had only about 10,000 men.[159] And casualties in war from violence were limited, because battles were infrequent, and the battles themselves did not always produce large casualties. Edward I, who reigned for 35 years from 1272 to 1307, and who led armies in Wales, Scotland, Flanders and the Holy Land, took part in only one full battle, at Falkirk in Scotland in 1298.[160] Thus one reason that forager living standards were probably as high even as those in Europe by the eighteenth century was the relatively low rates of death from violence in these settled agrarian economies, though England was probably a particularly stable and peaceable pre-industrial society.

Reproductive Success in Earlier Societies

The Malthusian assumptions imply that in all societies, those who command more income will have more reproductive success. This probably held even more strongly with other pre-industrial societies that, unlike Europe, were polygamous. For in these environments men could more effectively translate income into reproductive advantage.

---

[159] Prestwich, 1996, pp. 116-8.
[160] Prestwich, 1996, pp. 305-11.

Thus anthropologists have demonstrated that among pastoralists in modern Kenya, ownership of cattle correlates strongly with reproductive success through marrying more and younger wives.[161] The Ache of Paraguay, hunter-gatherers, moved every day in search of game, so property ownership was minimal in this society, limited to what a person could carry. Reproductive success in this group was still correlated with economic success. But it was the success of males in bringing in meat to camp each day. All the adult males hunted, and Ache hunters who brought home more meat had higher fertilities. The most successful hunters at the mean age of 32 had .31 children per year compared to 0.20 for the least successful. Survival rates were about the same for children of successful and unsuccessful hunters.[162]

But the mechanisms by which people commanded more income seem to have been very different in hunter gatherer societies than in the settled agrarian economies that preceded the Industrial Revolution.

As we saw for the case of the upper classes in England, violence was not a successful reproductive strategy. Rates of violent death were very low. This contrasts with conditions in modern hunter gatherer or shifting cultivation societies where accidents and violence are a much more important source of mortality. There mortality rates from accidents and violence for males were typically 3-18 per 1000 males per year. At the extreme, among the Ache violence was the cause of most male deaths.

In these societies violence was a way of gaining more resources and hence more reproductive success. Thus Napoleon Chagnon in a famous study of the warlike Yanomamo society

---

[161]Borgerhoff-Mulder, 1987. Cronk, 1991.
[162]Hill and Hurtado, 1996, 316-7.

Table 6.4 Reproductive Success of Male Yanomamo, 1987[163]

Age	Killers n	Killers Average Offspring	Non-killers N	Non-Killers Average Offspring
20-24	5	1.00	78	0.18
25-30	14	1.57	58	0.86
31-40	43	2.83	61	2.02
41+	75	6.99	46	4.19

found that a major predictor of reproductive success was having killed someone. Male Yanomamo sired more children at a given age if they had murdered someone than if they had not.[164] Table 6.4 shows the numbers of children male Yanomamo had fathered as a function of age, and of their status as a "killer" or "non-killer."

Social Mobility with Survival of the Richest

England in the years 1585-1638 was still a relatively static society, with little change in income per person. It was, as noted, a society still in the Malthusian grip where economic change was slow or non-existent. Consequently the relative numbers of

---

[163]Chagnon, 1988.

[164]Of course, this raises the question of whether murder is a successful reproductive strategy for males, since some of those who fail in the attempt will die themselves, and not be reported upon here.

occupations, the wage rates for different occupations, and the stock of housing per person changed little. Land per person fell, but land values were increasing with the growth of population, so the value of land per person also changed little. The great reproductive success of richer testators thus meant that their children had to be on average moving down the social ladder in terms of assets and occupations, and moving down reasonably rapidly.

Table 6.5 illustrates this for Suffolk in 1620-1638. The second column of the table shows the sample of male will makers from Suffolk arranged by asset class. Added to the observed wills are the appropriately sized group of males who made no will, assumed to have 0 assets, as well an appropriately sized group of testators whose wills were approved in higher courts, and whose assets are assumed to all exceed £1000. The next column shows the share of each class of males in the population in the first generation. The next column gives the observed numbers of male children from each asset class who reach at least age 16. We assume the non-mill makers had the same numbers of children as those making wills whose assets were £0-9. For those whose wills were proved in higher courts we assume they had the same numbers of children as those of the highest observed asset class. This implies that of a population of 3,613 wills in the first generation we end up with 4,266 adult male successors in the next generation, an increase of 18 percent per generation. This is close to the 21 percent gain per generation found by Wrigley et al's. for England in this period.

The last column of the table shows the shares of the children of each asset class in the next generation. Testators with less than £10 in assets and those who left no will were 65 percent of the first generation. But their sons constituted only 53 percent of the next generation. Testators with more than £500 in assets were 7.9

Table 6.5 Inter-generational Mobility in Suffolk, 1620-40[165]

Assets	Males in First Generation	Share of first generation (%)	Male Adult Children	Share of second generation (%)
0 (no will)	2,204	61.0	(2,125)	49.8
0-10	140	3.9	135	3.2
500-999	116	3.2	220	5.2
1000-	168	4.7	338	7.9
All	3,613	100	4,266	100

percent of the initial generation. Their sons were 13.1 percent of the next generation. Given that assets per person in the population probably stayed constant over this interval, there thus must have been considerable net downward mobility in the population. Nearly half of the sons of higher class testators would end up in a lower asset class at death. Indeed net mobility would be downward for testators in all the groups with £25 or more in assets.

Zvi Razi's evidence from the court rolls of Halesowen 1270-1430 is consistent with the suggestion of the *Inquisitiones Post-Mortem* that the rich were much more successful in reproducing themselves in medieval England. Table 6.6 shows the percentage

---

[165]The numbers in brackets in column 4 are estimates from the observed reproductive success of he highest and lowest group of will makers in the archdeaconry courts.

Table 6.6 Survival of Landowners, Halesowen, 1270-1348[166]

Family Type in 1270-82	Numbers of Families	Number with descendants holding land 1348	Percentage with descendant land holders
Rich	40	40	100
Middling	64	58	91
Poor	70	25	36
ALL	174	123	-

of families showing up in the court rolls of 1270-82 who had direct descendants holding land in the manor 70 years later in 1348. All the families with the largest holdings in 1270-82 still had direct descendants holding land. But only 25 of the 70 families holding the smallest amounts of land had a descendant holding land.

However the distribution of holding sizes had not become more unequal because though families with larger holdings in 1270-82 on net acquired land, they also often divided up their holdings between multiple heirs, keeping the size distribution in balance. Since Ravi's data does not allow us to know whether the small landholders were in fact suffering demographic collapse, or simply either disappeared from the court rolls, or leaving the manor, the data does not demonstrate that medieval England was

---

[166]Razi, 1981, 5.

experiencing the same population dynamics as later.[167] But it is consistent with that interpretation.

This story of the reproductive advantage of the rich is also found in a collection of surveys of communicants in villages in Austria and southern Germany for the seventeenth to nineteenth centuries assembled by Joerg Baten. Villagers of higher social status, and those revealed to be more likely literate had at the time of the surveys more surviving children.[168]

Thus economic orientation had a dynamic of its own in the static Malthusian economy. Middle class values, and economic orientation, were most likely being spread through reproductive advantage across all sections of stable agrarian societies. Chapter 8 explores the implications of these Darwinian selection proc-esses.

The Malthusian Scissors

The data from the wills on assets and occupations, combined with information from parish registers, allows us to portray the birth and death schedules of seventeenth century England as a function of income over a large range of the income distribution, though excluding the very poorest families. Income for each testator was calculated as his likely wage income from his occupa-tion, combined with asset income. Figure 6.8 shows these curves for England around 1630.   The Malthusian "scissors" is very evident. At the income level of a farm laborer, the birth rate

---

[167]Inhabitants without land were less likely to appear in court rolls since they do not show up in land transactions or as pledges.

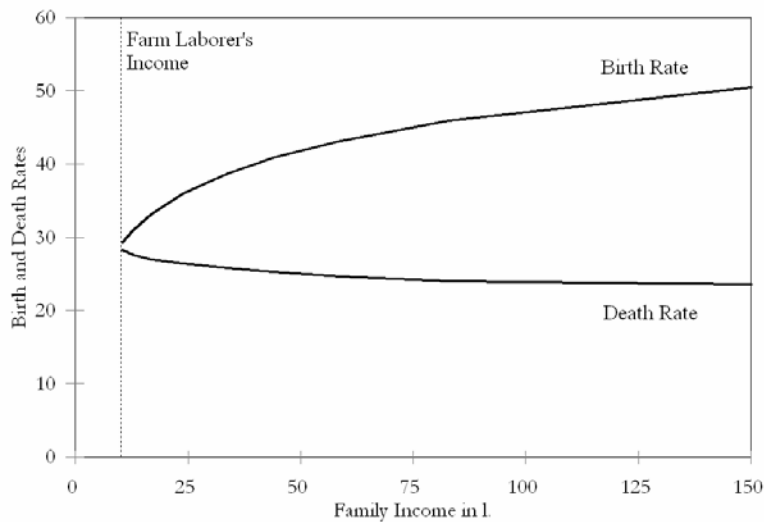[168]Joerg Baten, personal communication.

Figure 6.8 Birth Rate and Death Rate Schedules, England, c. 1630

barely exceeded the death rate. Implied birth rates are low for the pre-industrial era at 29 per thousand. For those in the highest income group, with average implied incomes of about £160 per family per year, more than 5 times the national average implied birth rates were nearly 50 per thousand, close to the highest levels observed for pre-industrial populations as a whole. Since the implied death rate of this high income group was only 24 per thousand, the implied population growth rate of this group was nearly 2.6 percent per year.

Thus there is no sign that even pre-industrial England in the period 1600-1800 had escaped the grip of the Malthusian trap. The curves displayed in figure 6.8 imply that any significant increase in average incomes would have led immediately to rapid population growth.