English Population Growth in the Eighteenth Century

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Abstract

This paper presents a new version of England's eighteenth century population history. Evidence is produced to show that mortality rather than fertility was the main engine of population growth during this period. Adult mortality approximately halved from the beginning to the end of the century, with reductions occurring amongst all socio-economic groups and in all areas of the country. Infant and child mortality fell at a later date from the middle of the eighteenth century onwards, reducing first amongst the wealthy.

New evidence suggests that nearly all women were married in the seventeenth century, contradicting Hajnal's theoretical notion of a European marriage pattern. The proportion of married women reduced during the eighteenth century in all age groups, particularly amongst the wealthy and literate, resulting partly from a major increase in female literacy. This was counter-balanced by a decrease in the mean age at marriage amongst the poor, compared to an increasing age of marriage amongst the wealthy. The net effect of these developments was the stabilisation of fertility levels.

It is argued that the reduction in mortality was largely independent of economic growth. The fall in mortality probably resulted from an autonomous reduction in disease virulence, along with a number of medical innovations and an improvement in personal and public hygiene. The result of growing population was an increase in a surplus of labour, contributing to the development of capitalism and the growth of the English economy.

I - INTRODUCTION

Malthus is the most important influence on thinking about the relationship between economic and demographic development. In his theoretical work, he emphasized the impact of economic factors on fertility and population levels, through shifts in the incidence of marriage. He had been influenced by Adam Smith, who had argued that 'the demand for men, like that for any other commodity, necessarily regulates the production of men; quickens it when it goes on too slowly, and stops it when it advances too fast.'[1] Malthus's work in turn influenced Ricardo, Marx, Marshall and other classical economists, who all assumed the primacy of economics over demography. The exception was Keynes, who accepted that population affected levels of aggregate demand – he was a strong admirer of Malthus – but had little or nothing to say about the impact of population growth on the supply side, in particular the supply of labour.[2]

Malthus's writings reflected the anxieties of his contemporaries in their concern to prevent a decline in their standard of living and economic privileges. His "preventative" method applied particularly to the middle and upper classes, whereas the "positive" checks were mainly applicable to the poor. Malthus's theory of population stressed the economic basis of marriage and fertility, with a growth in income leading to earlier marriage and a rise in fertility. However, there was a contradiction between his theoretical arguments and his empirical analysis of

[1] Smith (1976), p. 98. Smith emphasized the impact of poverty on mortality.

[2] Keynes (2010); Keynes (2012).

England's population history. In the latter he emphasized the role of mortality rather than fertility in shaping changes in population levels:

> *It would appear, by the present proportion of marriages, that the more rapid increase of population, supposed to have taken place since the year 1780, has arisen more from the diminution of deaths than the increase of the births.*[3]

He elsewhere amplified this summary statement:

> *... there is good reason to believe that not only in London, but other towns in England, and probably also country villages, were at this time [the 1760s] ... less healthy than at present. Dr William Heberden remarks that the registers of the ten years from 1759 to 1768, from which Dr Price calculated the probabilities of life in London, indicate a much greater degree of unhealthiness than the registers of late years. And the returns pursuant to the Population Act [of 1801], even allowing for great omissions in the burials, exhibit in all our provincial towns, and in the country, a degree of healthiness much greater than had before calculated ...The returns of the Population Act in 1811 ... showed ... a greatly improved healthiness of the people, notwithstanding the increase of the towns and the increased proportion of the population engaged in manufacturing employments.*[4]

He argued that falling mortality had led to a reduction in the incidence of marriage:

> *... the gradual diminution and almost total extinction of the plagues which so frequently visited Europe, in the seventeenth and the beginning of the eighteenth centuries, produced a change [in the incidence of marriage] ... in this country [England] it is not to be doubted that the proportion of marriages has become smaller since the improvement of our towns, the less frequent return of epidemics, and the adoption of habits of greater cleanliness.*[5]

He concluded that disease environment played a critical role in shaping mortality levels: 'A married pair with the best constitution, who lead the most regular and quiet life, seldom find that their children enjoy the same health in town as in the country'[6]

Malthus in his empirical writings gave a sociological rather than an economic analysis of marriage: 'It is not … among the higher ranks of society, that we have most reason to apprehend the too great frequency of marriage … [it is] squalid poverty ... [which] prompt universally to early marriage ...'[7] He argued that the 'carelessness and want of frugality' so prevalent among the poor, was 'contrary to the disposition generally to be remarked among petty tradesmen and small farmers,'[8] and that

[3] Malthus (1803), p. 311.
[4] Malthus (1989), Vol. 1, pp. 256, 267.
[5] Malthus (1989), Vol. 2, p. 198. See also Malthus (1989), Vol. 1, p.193 and Vol. 2, p.115.
[6] Malthus (1989), Vol. 1, p. 257.
[7] Malthus (1989), Vol. 1, p. 439; Vol. 2, pp. 114, 150.
[8] Malthus (1989), Vol. 1, p. 359.

> *poverty itself, which appears to be the great spur to industry, when it has once passed certain limits, almost ceases to operate. The indigence which is hopeless destroys all vigorous exertion ... It is the hope of bettering our condition, and the fear of want, rather than want itself, that is the best stimulus to industry, and its' most constant and best directed efforts will almost invariably be found among a class of people above the class of the wretchedly poor.*[9]

It was this emphasis on 'bettering our condition' that led Malthus to stress education as the best way of encouraging the postponement of marriage:

> *... to better the condition of the lower classes of society, our object should be to ... [cultivate] a spirit of independence, a decent pride, and a taste for cleanliness and comfort among the poor. These habits would be best inculcated by a system of general education and, when strongly fixed, would be the most powerful means of preventing their marrying ... [and] consequently raise them nearer to the middle classes of society.*[10]

Malthus is expressing here the insight which has informed much of the literature on modern birth control practices: that education − particularly of women − combined with economic opportunity, is the most powerful way of encouraging fertility reduction.

II – THE RELIABILITY OF PARISH REGISTERS

There is an element of uncertainty in all historical demographic measures, including local and regional variations. In order to address these issues, a methodology involving the triangulation of data has been adopted in this paper. This allows independent checking of all findings, important where these findings are unexpected and potentially controversial. An example of this is the finding that virtually all women were married in England during the seventeenth century, contradicting the theoretical notion of a European marriage pattern.[11] This conclusion was reached by using five different sources – censuses, church court depositions, burial registers, wills and family genealogies.[12] Likewise, the finding of the halving of adult mortality in the eighteenth century is based on the analysis of apprenticeship indentures, marriage registers, family genealogies, and data on elite groups such as Members of Parliament.[13]

The same methodological principle applies to the measurement of parish register reliability. Central to all discussion of population history before the introduction of civil registration in 1837 is the reliability of parish registers. Nine objective methods measuring burial register reliability are available, involving the triangulation of data.[14] The most important two methods are: (i) the same-name technique and (ii) the comparison of individual entries in probate and burial registers.

The same-name technique is based on a custom in England which gave the name of a dead child to a subsequent child of the same sex. Evidence from local censuses and other listings suggests that

[9] Ibid, p. 439.
[10] Malthus (1989), Vol. 2, p. 155.
[11] Hajnal (1965), p. 101.
[12] Razzell (2016), pp. 60-70.
[13] Ibid, pp. 45-56.
[14] Ibid, 15, 16.

there were no living children with the same names in individual families in the period 1676-1849.[15] However, according to probate data for different parts of England during the period 1600-1649 there were thirteen living same-name children out of a total of 2,144 – 0.6 per cent – although some of these children may have been step-siblings.[16]

Where two children of the same family were baptised with an identical name, it is therefore possible to measure the completeness of burial registration by searching for the first same-name child in the burial register. The technique can only be applied to families with at least two recorded baptisms of children of the same sex, but it is a valuable method of assessing the quality of burial registration.

The most important work on England's demographic history using parish registers is that carried out by E.A Wrigley and colleagues of the Cambridge Group. Their main findings were that after a period of stagnation in the second half of the seventeenth and first half of the eighteenth century, population began to grow rapidly after the middle of the eighteenth century, with about two-thirds of the population increase due to a rise in fertility, and one third to decreasing mortality.[17] They have argued that the growth of population was mainly the result of the increase in fertility associated with a fall in the age of marriage, which in turn was due to growing real incomes lagged over time, a conclusion largely confirming the theoretical work of Malthus.

Because of deficiencies in parish registration, it was necessary to inflate the number of burials, baptisms, and marriages in order to establish reliable measures of deaths, births, and marriages. During the period in which the Cambridge Group's research was carried out there were no methods available to independently measure the reliability of inflation ratios. This was recognized by Wrigley et.al. when they concluded that 'the lack of a reliable alternative data source makes it impossible … to test effectively the completeness of Anglican registration', resulting in 'arbitrary' inflation ratios which can only be based on 'internal plausibility and internal consistency of the results obtained.'[18]

However there are now available new objective methods of measuring parish register reliability. The following table summarizes a same-name analysis of 15 Cambridge Group reconstitution parishes during the period 1650-1837.

Table 1: Proportion of untraced same-name cases in 15 Cambridge Group reconstitution parishes, 1650-1837

Period	Total Number of Same-Name Cases	Number of Same-Name Cases Traced in Burial Registers	Proportion of Untraced Cases
1650-99	1,160	873	24.7%
1700-49	1,533	1,246	18.7%
1750-99	1,227	903	26.4%
1800-37	907	705	22.3%

[15] Galley, Garrett, Davies and Reid initially argued that there were some living same-name English children enumerated in the 1695 Marriage Duty Census, but subsequently conceded that these same-name siblings were a consequence of transcription errors. Galley, Garrett, Davies and Reid (2012), p.82. See also Galley, Garrett, Davies and Reid (2011a); Razzell (2011); Razzell (2012). Galley et.al successfully established that there were some living same-name children in Highland Scotland at this time, but all the research reviewed in this paper relates to English demographic experience.

[16] See Razzell (2011), p. 67 for a list of the places and dates involved.

[17] Wrigley, Davies, Oeppen and Schofield (1997), p. 126.

[18] Wrigley and Schofield (1989), p. 137; Wrigley, Davies, Oeppen and Schofield (1997), pp. 91-92.

There appears to have been a slight improvement in burial registration reliability in the first half of the eighteenth century, although other data suggests no significant change in the period between 1650 and 1837.[19]

Research comparing probate with burial register data covering 147 parishes indicates that there were no significant changes in burial registration reliability in the parish register period.[20] The most detailed research available is on the county of Bedfordshire, where a study of all 124 parishes has been carried out.[21]

Table 2: Proportion of probate cases traced in 124 Bedfordshire burial registers, 1543-1849.[22]

Period of probate	Total number of probate cases	Proportion of burials untraced
1543-99	610	26%
1600-49	3731	21%
1650-99	4626	26%
1700-49	6030	23%
1750-99	3744	22%
1800-49	3303	27%
Total	22044	24%

Wrigley & Schofield had assumed in their aggregative research that other than defective periods, burial registration was perfect in the period leading up to the middle of the seventeenth century and only deteriorated significantly at the end of the eighteenth century.[23] This is reflected in the inflation ratios they used to translate burials into deaths which were as follows: 1540-99: 0%; 1600-49: 0%; 1650-99: 1.9%; 1700-49: 4.6%; 1750-99: 10.0%: 1800-39: 25.8%.[24] Data on same-name and probate/burial register research, indicates that approximately 25% of all burials were missing from parish registers in the period 1600-1837, with no clear linear trends in register reliability over time.

The absence of significant changes in burial register reliability is similar to the findings of research on baptism register reliability. This involved research comparing information in censuses and baptism registers, including an evaluation of the quality of the census data through cross-matching censuses at different dates.[25] There was no linear trend found in the eighteenth century, with about 30 per cent of all births missing from the baptisms registers.[26]

Wrigley and Schofield's inflation ratios for baptisms in the period 1710-1836 are as follows: 1710-42: 11.5%; 1743-62: 13.9%; 1763-80: 16.4%; 1781-1800: 26.0%; 1801-20: 42.9%; 1821-36: 39.1%.[27] They assumed that birth under-registration was relatively low in the period 1710-80, but deteriorated sharply from the 1780s onwards, particularly after 1801. This assumed pattern is at

[19] Razzell (2016), pp. 18-23.
[20] Probate data tends to exclude the poorest members of a community, but data for Bedfordshire suggests that the poorest occupational group – labourers – experienced similar levels of burial under-registration as the rest of the population. Razzell, Spence and Woollard (2010), p. 45.
[21] Ibid.
[22] Ibid, p. 42.
[23] Wrigley and Schofield, (1989), p. 561.
[24] Ibid, p. 561.
[25] Razzell (1994), pp. 84-89.
[26] Razzell (2016), pp. 22, 23.
[27] Wrigley and Schofield (1989), pp. 541-44.

variance with the findings outlined above, which essentially show no major changes in the eighteenth and early nineteenth century.

There is also evidence of a high level of marriage under-registration which is confirmed by Baker in his study of eighteenth century Cardington in Bedfordshire. He with colleagues attempted to trace both native and other adults who had migrated from all parts of the county, and found that 40.1% of baptisms, 31.5% of marriages and 24.9% of burials could not be traced in parish registers.[28] According to a range of evidence, this non-registration of births, marriages and deaths was mainly due to the negligence of clergyman and clerks in compiling parish registers.[29]

Wrigley and colleagues attempted to address the problems of parish register reliability by constructing a complex mathematical back projection model. The model suffers from a range of arbitrary assumptions, including the sharp inflation of baptisms and burials at the end of the eighteenth and beginning of the nineteenth century. Additionally, these models are very sensitive to changes in assumption. For example, as a part of their back projection programme, Wrigley and Schofield reduced the size of the age group 90-94 enumerated in the 1871 Census by 44%; if they had chosen instead to reduce this by 40%, their estimate of the English population in 1541 would have been 9% larger.[30]

III – ESTIMATES OF POPULATION GROWTH

Given that there were no major changes in parish register reliability in the parish register period, the most valuable data created by the Cambridge Group are the raw uncorrected national figures of baptisms, marriages and burials. These raw national figures provide the basis for the calculation of population changes in the eighteenth century, but with the assumption of zero net migration. Approximately 30% of baptisms and 25% of burials went unregistered in the eighteenth century,[31] and applying these correction ratios to the raw national figures yields the following population figures.

[28] Baker (1973), p. 18.
[29] Razzell (1994), pp. 108-111.
[30] Lee and Lam (1983), p. 446.
[31] These proportions are based on figures discussed previously, but rounded for purposes of analysis. Twenty-two per cent of same-name cases in the Cambridge Group and rural parish samples were untraced in the period 1650-1837, but the number of untraced cases in urban areas appears to have been higher. For example the proportion of untraced cases in London and Liverpool in the period 1700-49 was significantly higher than elsewhere in the parish register period. Razzell (2007), pp.134, 138.

Table 3: Estimated population sizes of England, 1695-1801.[32]

Period	Baptisms x 130/00	Burials x 125/100	Estimated births minus estimated deaths	Population Size
				1695: 4,632,0000 (Glass)[33]
1695-99	950392	856190	94202	1699: 4,726,202
1700-09	1939220	1656696	282524	1709: 5,008,726
1710-19	1919766	1730584	189182	1719: 5,197,908
1720-29	1924209	2114755	-190546	1729: 5,007,362
1730-39	2217874	1884734	333140	1739: 5,340,502
1740-49	2129258	1936279	192979	1749: 5,533,481
1750-59	2249703	1799673	450030	1759: 5,983,511
1760-69	2407096	2052756	354340	1769: 6,337,851
1770-79	2679378	2023006	656372	1779: 7,008,408
1780-89	2848378	2230761	617617	1789: 7,626,025
1790-99	3151233	2219859	931374	1799: 8,557,399
1800-01	585113	475775	109338	1801: 8,666,737
				From National Censuses: [34]
				1801: 8.561,000
				1811: 9,476,700
				1821: 11,198,604

The start date of 1695 has been used because it is partly based on the marriage duty census of that year, and the end date of 1801 because it is the year of the first national census. The estimated population figure for 1801 – 8,666,737 – is slightly greater than the figure that Rickman calculated for 1801 – 8.561 million.[35] However, there have been a number of different estimates of population sizes for the years 1695 and 1801, and the figures in Table 3 are within the range of these different estimates.[36]

Table 3 indicates that population diminished in the 1720s but increased gradually after that period, accelerating rapidly at the end of the eighteenth and beginning of the nineteenth century. The raw data suggests that it was a fall in mortality rather than a rise in fertility that was responsible for the increase in population.

[32] For the raw national figures see Wrigley and Schofield (1989), pp. 537-552, column 5.
[33] Ibid, p. 571.
[34] Ibid, pp, 577, 588.
[35] Ibid, p. 571.
[36] Glass and Eversley (1965), p. 240.

Table 4: English baptism and burial rates (Per 1000) in England calculated from Cambridge Group data.[37]

Period	Estimated population	Baptism rate	Burial rate
1701-40	5,160,000 (1721)	30.4	28.7
1741-80	6,054,000 (1761)	30.3	25.9
1781-1820	8,667,000 (1801)	29.4	20.6

It is only because Wrigley & Schofield disproportionately inflated the number of baptisms in the period 1781-1820 that they concluded that there was a rise in the crude baptism rate in this period, and yet as we have seen the direct evidence on baptism registration reliability suggests that there were no significant changes in this period.[38] Gregory King's work on the age structure of the English population in 1695 indicates it was very similar to that in 1821 based on national enumeration returns,[39] suggesting that there was no long-term change in age-specific fertility during this period.

Table 4 indicates that it was falling mortality that fuelled population growth, but in order to further clarify the exact demographic changes in the eighteenth century, it is necessary to consider in detail the empirical evidence on mortality, nuptiality and fertility in the parish register period.

IV – THE HISTORY OF INFANT AND CHILD MORTALITY

Most studies of infant and child mortality have suffered from the lack of an objective method of measuring burial registration reliability.[40] The same-name method allows objective measurement, stating its procedures in advance and not making adjustments to resulting findings. I have used the technique for the analysis of 11 Cambridge reconstitution parishes, as well as in 15 rural parishes from other areas of England.

[37] The figures of baptisms and burials were those listed in Wrigley and Schofield (1989), pp. 541-544, 549-552. The population estimates are derived from those in Table 3.

[38] Inflating the baptism rate in 1781-1820 by thirty per cent indicates that the crude birth rate was 38.2 per 1,000. The birth rate during the early period of civil registration - allowing for birth under-registration - was of the order of 36.5 per 1,000, slightly less than the estimated figure for 1781-1820. See Razzell (1994), p. 137; Mitchell and Deane (1971), p. 79.

[39] Glass and Eversley (1965), p. 215.

[40] There are a number of historical studies of infant and child mortality which suffer from this difficulty. See Jones (1980); Landers (1991); Houston (1992); Huck, (1994); Dobson (1997); Galley (1998).

Table 5: Infant and child (1-4) mortality in 11 Cambridge Group and 15 rural parishes, 1700-1837.[41]

Period	Number of infants at risk	Number of children at risk	IMR	CMR
11 Cambridge Group parishes				
1700-49	11933	8842	174/1000	110/1000
1750-99	12591	9897	148/1000	97/1000
1800-37	15362	9230	110/1000	99/1000
15 rural parishes				
1700-49	8332	5603	182/1000	128/1000
1750-99	9629	6950	150/1000	126/1000
1800-37	9375	6183	94/1000	81/1000

The pattern of mortality in the two samples is similar, although the reductions in mortality between 1700-49 and 1800-37 are greater in the rural areas than in the Cambridge Group sample. This may be partly a function of population size, as the mean population in 1801 of the Cambridge Group parishes was 1,349 and that of the rural sample 589. The average national mean size of the English population in 1801 was about 860,[42] and so the rural parishes are slightly more representative than the Cambridge Group ones.

From research on birth-baptism intervals and infant mortality, it is estimated that a maximum of 5% of children died before baptism in the period 1761-1834. However, many 'sickly' children were privately baptised, reducing mortality before baptism.[43] The infant mortality rates in both samples in 1800-37 were relatively low – 110/1000 and 94/1000 – and this may be partly a function of the exclusion of infants dying before baptism. However, Woods estimated that the infant mortality rate in rural areas during the Victorian period was 97 per 1,000 as against 218 per 1,000 in urban areas, with a national average of 150 per 1,000.[44] Woods calculated the rural rate from data for Dorset, Hertfordshire and Wiltshire, southern counties like those forming the basis of the samples in Table 5. Similar consideration are likely to apply to child mortality rates, for although the child mortality rate for the age group 1-4 nationally in 1838-54 was 134 per 1,000,[45] it is likely to have been significantly less of that in rural areas, similar to that depicted in Table 5.

However, the sample sizes are small and are not necessarily representative of the whole country. They do not include any northern parishes or large towns, and under-represent industrial villages.[46] Infant and child mortality was much higher in large towns than in rural and provincial

[41] The 11 Cambridge Group parishes are: Alcester; Aldenham; Austrey; Banbury; Bottesford; Colyton; Dawlish; Great Oakley; Ippleden; Morchard Bishop. The 15 rural parishes are: Ackworth; Ampthill; Arrington; Barton-in-the-Clay; Beeley; Breamore; Canewden; Cusop; Eaton Hastings; Kemerton; Sandy; Stow Maries; Truro; Weston Colville; Woodchurch; Youlgreave.

[42] Wrigley et.al. (1997), p. 20.

[43] Razzell (1994), pp. 106, 107.

[44] Woods (2000), pp. 260, 261.

[45] Registrar-General Supplement, p. v.

[46] A reconstitution study of Ackworth in Yorkshire for the period 1687-1812 indicates that the pattern of infant and child mortality was similar to that in Table 5, although at a somewhat lower level. The figures are as follows: 1687-1749: IMR: 166, CMR: 114; 1750-1812: IMR: 82, CMR: 77. Razzell (2016), p.34.

parishes in the seventeenth and eighteenth centuries. The infant and child mortality rates in 18 rural reconstitution parishes in 1650-1699 were 151/1000 and 106/1000 respectively; the equivalent rates in London, Norwich, Ipswich and Canterbury in a similar period were 304/1000 and 237/1000. [47] Urban infant and child mortality was twice of that in rural and provincial parishes in the late seventeenth century, but by the nineteenth century the average infant mortality rate in these urban areas had reduced to 179 per 1000.[48] However, there is some evidence to indicate that infant mortality grew in some urban and industrial parishes in the first half of the nineteenth century,[49] although the scale of reductions during the eighteenth century in the four urban parishes greatly outweighed the relatively modest increases in urban areas in the nineteenth century.

The pattern of infant and child mortality in the most important urban area – London – is indicated by the results of reconstitution studies of 16 City of London parishes in the period 1539-1849.

Table 6: Infant and child (1-4) mortality (per 1000) in 16 London parishes, 1650-1849.[50]

Period	IMR	CMR	
1650-99	256	282	
1700-49	409	176	
1750-99	263	270	
1800-49	141	118	

Infant mortality increased significantly between 1650-99 and 1700-49, before falling very sharply after the middle of the eighteenth century. There was a similar pattern in child mortality, except for the rise in mortality in the second half of the eighteenth century.

V – SOCIO-ECONMIC STATUS AND INFANT AND CHILD MORTALITY

One further way of exploring the factors shaping infant and child mortality is to analyse the relationship between socio-economic status and mortality.

Table 7: Infant and child (1-4) mortality (per 1,000) amongst elite and control families in 17 Cambridge Group parishes, 1650-1799.[51]

Period	Elite families		Control Families	
	IMR	CMR	IMR	CMR
1650-99	158	143	180	132
1700-49	177	106	223	146
1750-99	113	69	159	134

[47] Ibid.
[48] Ibid. The Northampton Bills of Mortality indicate that child mortality under the age of two did not fall until the 1780s onwards. Ibid, p.36.
[49] See Armstrong (1981); Huck (1994); Szreter and Mooney (1998).
[50] Razzell (2007), pp. 13, 134.
[51] Razzell (2016), p. 37.

An elite family – gentlemen, professionals and merchants – was matched with the next control family in the baptism register, most of whom were artisans and labourers. There was little difference between the two groups in the late seventeenth century, but a sharp divergence thereafter, particularly in child mortality rates. Other sources indicate a variation in findings, although overall it would appear that these forms of early mortality reduced first amongst wealthy families and only later amongst the general population in the eighteenth century.[52] Lower infant and child mortality levels amongst the wealthy continued throughout the nineteenth century,[53] although at significantly reduced levels than in the seventeenth century. However, areas with different socio-economic profiles showed if everything a reverse pattern. This can be illustrated with reference to London, where the Registrar-General provided data on mortality by registration sub-district. He classified districts by poverty levels as measured by average rateable value.

Table 8: Infant, child and adult mortality in London by rateable value of registration district, 1839-44.[54]

Registration districts	Mean annual value of rated property	IMR	CMR	Adult (25-44) male mortality per 1000
10 districts with lowest rateable value	£15	153	52	13
10 districts with medium rateable value	£26	168	59	15
10 districts with highest rateable value	£58	167	58	13

Most of the poor districts were in the East End of London, and the wealthy ones in the West End.[55] The lack of an association between socio-economic status and infant mortality is supported by evidence on Quakers, who by the nineteenth century were mainly wealthy merchants and professionals. The infant mortality rate amongst Quakers in London in 1825-49 was 150 per 1000, similar to the rate amongst the total population in equivalent registration districts in 1838-44.[56]

These surprising findings are replicated in other districts of England. In the period 1851-60, mortality levels in the wealthy towns of Bath, Cheltenham, Richmond and Brighton were significantly higher than in poorer districts in the same county.[57] The wealthy areas were towns,

[52] Razzell, (2007), pp. 91, 103-105, 111, 112, 133; Razzell (2016), pp. 37-41.
[53] Razzell (2007), pp. 202-204.
[54] Ibid, p. 136.
[55] Ibid.
[56] See Ibid, p. 137 and Landers (1991).
[57] Razzell (2016), p. 41.

and the poorer areas rural districts, indicating that disease environment was more important in these instances than poverty in shaping mortality levels.[58]

To summarize, in rural and provincial areas infant mortally fell sharply between the first half of the eighteenth and nineteenth centuries, nearly halving in some areas. Child mortality in these districts was more stable, although there appears to have been a significant fall in some rural areas at the beginning of the nineteenth century. In London and in other urban districts there were marked falls in both infant and child mortality. Child mortality amongst the wealthy reduced in rural and provincial areas at an earlier period – from the beginning of the eighteenth century onwards – than it did among the general population.

It is less clear what the influence of socio-economic status was on urban infant and child mortality, and in London by the mid-nineteenth century there appears to have been little or no association between poverty and these forms of mortality. Also, as we have seen, in a number of provincial districts mortality was significantly lower in poor than in wealthy areas in the 1850s.

The general timing and extent of reductions in early childhood mortality cannot fully explain the scale of population increase in the eighteenth century. For a full explanation of this surge in population growth we must look elsewhere.

VI – THE HISTORY OF ADULT MORTALITY

There are a number of problems with the reconstitution study of adult mortality, in particular the unreliability of raw burial registration data. Only about ten per cent of the original sample can be included the analysis, which is not likely to be socially or demographically representative of the total population.[59] There is also the difficulty of establishing accurate nominal record linkages between baptisms/marriages and subsequent burials, as most parish registers only list the names of people buried without further identifying information. There are however a number of sources which allow the direct measurement of adult mortality, the most important of which are: i. apprenticeship indenture records, and ii. marriage licences.

In the year 1710 the government introduced a national tax on apprenticeship indentures – the Inland Revenue Register (INR Register) – which was in existence until the early nineteenth century. Details of these indentures have survived and are currently being digitised by the Society of Genealogists.[60] The indentures in the early period provide the following information on fathers: name, place of residence, occupation, and whether or not they were alive or dead. Additionally the name of the apprentice was recorded along with the amount paid for the indenture.

A sample of 1,578 cases was selected from the national register, and data on the mortality status of fathers was established. It is estimated that a minimal annual mortality rate for England in 1710-13 was 20.9 per 1,000, which can be compared to figures published by the Registrar-General for a similar age group – 25-44 – in the period 1838-42 – 11 per 1000.[61] This indicates

[58] See Woods (2000), pp. 170-202 for an analysis of the mortality differences between urban and rural districts in this period.

[59] Razzell (2016), p. 43.

[60] I would like to thank the Society of Genealogists for making available the digital version of the INR Register, covering the surnames beginning with the letters A to M.

[61] Mitchell and Deane (1971), p 38.

that male adult mortality approximately halved in the period between the early eighteenth and middle of the nineteenth century, a conclusion borne out by a number of other sources.[62]
Marriage licences are one of the most informative sources, covering between 30 and 90 per cent of the population.[63] For children under the age of 21, they required parental permission, and where a father was dead, permission of a widowed mother or guardian was required. The licences are available from the beginning of the seventeenth to the end of the eighteenth century, and an analysis of available licences yields the following results:

Table 9: Fathers of spinsters under twenty-one: proportions dead in English regions, 1600-1799.

Period of Marriage	*London*	*South of England*	*East Kent Diocese*	*Durham Diocese*
1600-46	46%	40%	47%	-
1661-99	47%	44%	43%	-
1700-09	48%	47%	50%	-
1710-19	47%	44%	48%	-
1720-29	45%	39%	48%	-
1730-39	46%	39%	34%	-
1740-49	55%	45%	37%	42%
1750-59	40%	41%	27%	28%
1760-69	35%	35%	22%	27%
1770-79	39%	31%	24%	29%
1780-89	31%	32%	28%	25%
1790-99	31%	27%	22%	-

According to this table, male adult mortality nearly halved in all regions in the eighteenth century.[64] As the figures relate to fathers who were alive on average nineteen years before the marriage of their daughters, mortality first began to fall in East Kent between 1710 and 1730, and in London, the South of England and Durham between 1730 and 1750.
According to Table 9 there were gains in life expectancy throughout the whole of the eighteenth century, although in East Kent most of this took place in the first half of the century. Other evidence indicates that reductions of mortality in Nottinghamshire also appear to have occurred mainly in this period, with the estimated paternal death rate falling from 22 per 1,000 in 1661-63 to 14 per 1,000 in 1754-58 and 10 per 1,000 in 1791-93.[65]
However data on the fathers of masons' apprentices who lived in all areas of the country suggests paternal mortality fell equally in the first and second halves of the century.

[62] Razzell (2016), pp. 45-56.
[63] Razzell (2007), pp. 62, 63.
[64] Information from civil marriage registers in Lancashire and Yorkshire in 1653-60, indicates even higher levels of adult mortality than depicted by Table 9 during the mid-seventeenth century. Razzell (2007), p. 84.
[65] Razzell and Spence (2007), p. 283.

Table 10: Mortality amongst fathers of London indentured masons' apprentices.[66]

Date of indenture	Number of fathers dead	Total number of fathers	Proportion of fathers dead
1663-99	94	223	42%
1700-49	124	375	33%
1750-1805	43	202	21%

Approximately four-fifths of these fathers lived outside London, residing in every county and country of Great Britain.[67]

Evidence from the marriage licences and apprenticeship indentures suggest that adult mortality was higher amongst the wealthy than the poor, and this may have been the case until the end of the nineteenth century.[68] This was probably due to the 'hazards of wealth' – the consumption of very rich food and alcoholic drinks, and a relative lack of exercise – as well as the result of avoiding childhood infections such as smallpox, which took their toll in adulthood.[69]

However, this reverse socio-economic gradient appears to have been established in the eighteenth century, as revealed by the association between occupation and mortality in East Kent during the period between 1619-46 and 1751-1809.

Table 11: Proportion of dead fathers of spinsters marrying under 21, by occupation of husband in East Kent, 1619-1809.[70]

Occupation	*Period*		
	1619-46	1661-1700	1751-1809
Gentlemen, Merchants & Professionals	39%	38%	28%
Yeomen & Farmers	41%	42%	15%
Tradesmen & Artisans	46%	49%	26%
Husbandmen	50%	39%	19%
Mariners & Fishermen	42%	45%	24%

Mortality declined significantly during the eighteenth century, approximately halving in most occupational groups. In the seventeenth century gentlemen, merchants and professionals appear to have lower mortality than other groups, but by 1751-1809 the position had been reversed, with this elite group having the smallest reduction in mortality.

However, there is very detailed evidence of the gains in adult life expectancy amongst wealthy Members of Parliament and the aristocracy. The former data allows a very detailed breakdown of men of different ages living in all areas of England.

[66] For the source of this data see Webb (1999).
[67] Ibid, pp.45-53.
[68] Razzell (2007), pp. 197-226.
[69] Riley (1987).
[70] Razzell (1994), p. 197. For higher paternal mortality amongst gentlemen and professionals than in other groups in Nottinghamshire and Sussex during 1754-1800 see Razzell (2007), p. 117.

Table 12: Mean number of years lived by Members of Parliament, 1660-1820 (Number of cases in brackets).[71]

Period of first entry	Age at First Entry – Mean Number of Years Lived		
	Under 29 years	30-39 years	40 years plus
1660-1690	25.7 (429)	22.6 (458)	17.9 (633)
1715-1754	30.8 (541)	28.2 (422)	18.5 (347)
1755-1789	37.1 (480)	29. 9 (354)	21.2 (431)
1790-1820	38.1 (571)	32.0 (432)	22.4 (572)

All age groups experienced mortality reductions, but the greatest mortality gains were amongst the youngest age cohort under the age of 29. There was an increase in life expectancy of over 12 years in this group, distributed evenly in the entry period between 1660 and 1789. There were also substantial gains in the 30-39 age cohort – of about 10 years – but these were mainly confined to the entry period between 1660 and 1754. There was a modest increase in life expectancy of nearly 5 years in the oldest 40+ group, which was fairly evenly spread between 1660 and 1820. The above pattern of adult mortality is similar to that found by Hollingsworth in his study of the aristocracy.[72] Although all the evidence considered on adult mortality is for males, his study of the aristocracy suggests that females experienced even more mortality reductions in the eighteenth century.[73]

The timing of the reduction in adult mortality was different from the falls in infant and child mortality which appear to have occurred mainly in the second half of the eighteenth century, and given that life table models assume that infant/child and adult mortality move in the same direction, this suggests that these models are not a reliable basis for understanding eighteenth century mortality trends. The Cambridge Group have used such models in calculating figures of adult mortality, but different assumptions may have been one of the reasons why their figures have changed significantly in recent years. In 1997, Wrigley et.al. published life expectancy figures for men aged twenty-five as follows: 1640-89: 30.4 years; 1750-1809: 35.4 years.[74] More recently in 2004, Wrigley has claimed that 'reconstitution data suggest that adult mortality moved from the equivalent of level 5 in model North in the period 1640-89 to the equivalent of level 9 in 1750-1809, or a rise of 10 years.'[75] The latter figure represents a very significant increase over earlier estimates, and is now compatible with the marriage licence and other data reviewed earlier.[76] Wrigley concluded that 'there seems little reason to suppose that the evidence relating to male adult mortality drawn from marriage licences and that drawn from reconstitution are at odds'[77], representing a welcome new consensus.

[71] Razzell (1994), p. 199.
[72] Hollingsworth (1965), p. 56.
[73] Ibid, p. 57
[74] Wrigley et.al., (1997), p. 291.
[75] Wrigley (2004), pp. 427, 428.
[76] According to calculations prepared by Jim Oeppen using the East Kent marriage licence data, there was an increase of 9 years in life expectancy at age 25 between 1650-99 and 1750-1800. Razzell (1994), p. 201.
[77] Wrigley (2004), p. 431.

VII – EXPLAINING MORTALITY REDUCTIONS

The factors responsible for mortality levels are complex. For example, smallpox became much more virulent between the sixteenth and nineteenth century: case fatality rates amongst unprotected children in London rose from about 5% to 45% in this three hundred year period. It is possible that the increasing fatality of smallpox was the result of the importation of more virulent strains with the growth of world trade. It was only the practice of inoculation and vaccination that prevented the disease from destroying a large part of the population.[78] Smallpox also varied in its age incidence between different areas of the country: in the South of England it was a disease of both adults and children, whereas in the North and elsewhere it affected mainly young children. This is important as case-fatality rates differed markedly between different age groups.[79]

To some extent, disease had its own internal logic, so that for example the disappearance of the plague in England in the 1660s does not appear to be the result of any environmental or other improvements. However, it is known that environmental factors did influence the incidence of disease. Mortality was higher in marshland areas, in industrial and urban districts, in certain coastal and estuarine regions, and lower in isolated rural areas with the right geographical and ecological characteristics.[80]

It is possible that the lower levels of infant mortality amongst the wealthier socio-economic groups in Table 8 are partly a function of wealth, although falling elite mortality in the second half of the eighteenth century suggests that non-economic factors were responsible.[81] The rapid fall in child mortality in elite families in the eighteenth century, at a time when it was stable amongst the control population, indicates that this reduction of mortality was exogenous to economic development. Also, the negative association between socio-economic status and child mortality in the mid-nineteenth century depicted in Table 9 and found elsewhere, suggests that disease environment rather than poverty was the most important factor in shaping the level of mortality.

The explanations of these trends are complex: the wealthy are known to have fled London and other towns during the plague, to have escaped childhood diseases such as smallpox by moving away from areas known to be affected by the disease, and to have avoided marsh areas known to suffer from endemic malaria.[82] It is possible among other factors that by the mid-nineteenth century the avoidance of disease was no longer important in protecting wealthy groups from infection, particularly when they lived in urban areas.

The falls in infant mortality in rural and provincial parishes from the middle of the eighteenth century may have been in part due to an autonomous reduction in disease incidence,[83] as well as the result of a variety of health improvements. These included better breastfeeding practices, inoculation/ vaccination against smallpox, and improved personal and domestic hygiene,[84] linked to growing literacy amongst women.

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[78] Razzell (2003).
[79] Ibid, pp. xi-xix.
[80] Dobson (1997); Razzell (2007), pp. 98, 99.
[81] Also, the level of infant mortality in Bedfordshire was higher amongst the elite than the control population in 1700-49. See Razzell (2007), p. 133.
[82] Riley (1987)*;* Dobson (1997).
[83] Chambers (1972).
[84] Jones and Falkus (1990); Porter (1991); Razzell (1994), pp. 224-229; Razzell (2003).

The dramatic reduction of infant mortality in London was also probably a result of major improvements in public health – increased water supplies, better drainage, and rebuilding of the urban landscape[85] – as well as much better maternal and neo-natal care.[86]

Although most of these measures were not the result of economic developments, clearly economic change did have an indirect influence on mortality. Agricultural improvements led to the drainage of marshland which may have contributed to the elimination of malaria,[87] and the production of cheap cotton cloth enabled working class families to improve their standard of personal hygiene. There was also an economic element in some of the other factors responsible for mortality decline: for example, the rebuilding of houses and house floors in brick and stone. The increasing use of coal enabled water to be boiled more easily, important for personal and domestic hygiene.[88] However, elite social groups had always had the economic resources necessary for these improvements, and the majority of them probably resulted from new attitudes towards disease, personal hygiene and the environment.[89] These changes in attitude and belief appear to have first influenced the educated and wealthy, and gradually spread to the general population later in the eighteenth and nineteenth centuries.

However, the reduction in adult mortality occurred more-or-less equally amongst all areas of the country and in all socio-economic groups, suggesting that there was an 'autonomous' fall in the adult death rate from the early eighteenth century onwards.[90]

VIII – THE HISTORY OF NUPTIALITY ND FERTILTY

The Cambridge Group data in Table 5 suggest that there was no long-term rise in fertility in the eighteenth century, as there were no significant changes in baptism registration reliability or changes in the age structure of the national population. However, the factors shaping fertility are complex and need to be examined in some detail. The Cambridge Group found from their reconstitution research that there was a decline of about two-and-a-half years in the average age of marriage of spinsters during this period.[91] This finding is somewhat contradicted by data from marriage licences – which indicate that average age of marriage rose by about a year in the eighteenth century – but these licences tended to exclude the poorest socio-economic groups.[92]

There is a difficulty with reconstitution calculation of marriage ages. Marriage registers in the early period rarely give information on the marital status of grooms or brides, and there was a major shift in marital status during the eighteenth century. Wrigley and Schofield concluded that 'perhaps as many as 30 per cent of all those marrying were widows or widowers in the mid sixteenth century … By the mid nineteenth century, in contrast, it is clear from civil registration

[85] George (1966); Jones and Falkus (1990); Porter (1991).
[86] George (1966), p. 61; Loudon (1992); Loudon (2000), p. 61.
[87] Dobson (1997).
[88] I would like to thank Tony Wrigley for pointing out the potential importance of coal in boiling water for improving personal hygiene. For the use of boiling water and milk in preventing infant diseases see Marks and Worboys (1997), p. 192.
[89] This shift in attitudes was partly associated with the eighteenth century enlightenment movement. The Royal Society's statistical investigation in the 1720s into the effectiveness of inoculation − comparing natural smallpox mortality with that amongst the inoculated − is perhaps the first historical example of a scientific assessment of a medical treatment. Razzell (2003), pp. 172-74.
[90] Chambers (1972).
[91] Wrigley et.al., (1997), p. 149.
[92] Razzell (2016), p. 71.

returns that a comparable proportion was much lower at 11.27 per cent.'[93] Marriage Licence data confirm this conclusion, but it represents a problem for reconstitution research on marriage ages. During the late seventeenth century about 26 per cent of spinsters in East Kent married widowers, and on average they married 3.8 years later than spinsters marrying bachelors.[94] A twenty per cent reduction in the number of widower marriages would lead to a fall of 0.76 years – 3.8 x 1/5 – in the overall marriage age of spinsters, and this would be the result of the changing marital status of grooms and brides during this transition period.

Nevertheless, new evidence suggests that the fall in the average marriage age of spinsters found by the Cambridge Group is largely genuine. Marriage licences indicate that there was a radical shift in the relative ages at which the wealthy and the poor married in the seventeenth and eighteenth centuries. In Nottinghamshire and Gloucestershire during the seventeenth century the average age of spinsters marrying labourers and husbandmen was over 26 years, whereas the average for yeomen, gentlemen and professionals was between 22 and 24 years.[95] These figures include spinsters marrying both bachelors and widowers, but an analysis of the 100 first cases of spinsters marrying bachelors reveals a similar pattern:

Table 13: Marriages ages of spinsters marrying bachelors in the Diocese of Nottinghamshire, 1672-1685.[96]

Gentlemen & professionals	Yeomen	Artisans & tradesmen	Labourers
Mean = 23.0 Years	Mean = 23.5 Years	Mean = 24.1 Years	Mean = 25.2 Years
Proportion Under 21 = 29%	Proportion Under 21 = 23%	Proportion Under 21 = 9%	Proportion Under 21 = 5%

The high marriage age of spinsters marrying labourers is confirmed by a reconstitution study of marriages occurring in Bedfordshire in the period 1650-1749. It was possible to trace 77 marriages in the baptism register, yielding a mean age at marriage of 26.7 years with 18 per cent marrying under the age of 21.[97] The mean age is higher than that listed in Table 13 for labourers, and this may be because it included marriages to widowers as well as bachelors.

A transition in this pattern occurred in the eighteenth century and was very marked in the Archdeaconary of Chichester, as revealed by the proportions of spinsters marrying under the age of 21:

[93] Wrigley & Schofield (1989), pp. 258, 259.
[94] Razzell (2007), p. 131.
[95] Ibid,, pp. 242, 243.
[96] Blagg and Wadsworth (1930). The Diocese of Nottinghamshire included not only that county, but a number of other northern areas, such as Yorkshire and Derbyshire.
[97] The analysis was carried out on data in the Bedfordshire Family History Database covering 124 parishes in the county, selecting all marriages where the groom was listed as a labourer and the bride as a spinster.

Table 14: Proportion of spinsters marrying under 21 in the Archdeaconary of Chichester, Sussex, 1754-1799.[98]

Period	Labourers		Yeoman, Gentlemen & Professionals	
	Number	Proportion Under 21	Number	Proportion Under 21
1754-69	142	9%	142	22%
1770-99	163	25%	163	14%

By the nineteenth century there were significant differences in marriage ages between these socio-economic groups. Marriage ages were sometimes included in civil registration returns, and an analysis of Surrey and Bedfordshire parishes where such information was recorded, yielded the following differences.

Table 15: Marriages of brides marrying bachelors in Surrey and Bedfordshire, 1837-71.[99]

Grooms occupation	Proportion of brides signing the marriage register	Mean age of marriage (years)	Proportion marrying under twenty-one
Surrey			
Labourers	68.0%	23.0	31.4%
Artisans & Tradesmen	90.0%	24.4	17.2%
Farmers	96.0%	26.1	12.9%
Elite Occupations	99.4%	25.3	17.8%
Bedfordshire			
Labourers	34.2%	22.2	37.6%
Artisans & Tradesmen	67.0%	23.0	26.4%
Farmers	83.3%	25.1	10.5%
Elite Occupations	100%	27.8	15.8%

There was approximately a three year difference in the mean age of marriage between labourers and farmers/ elite occupations, with artisans and tradesmen occupying an intermediate position. There were similar differences in marriage ages of spinsters in England & Wales in 1884-85. The mean age of brides marrying bachelor labourers was 23.7 years, farmers 28.9 years, and professionals 26.4 years.[100] This is the reverse to what was found in the seventeenth century, as a result of labourers' marriage ages falling significantly and those of elite occupations rising during the eighteenth and early nineteenth centuries.

[98] The yeomen, gentlemen and professional cases were matched in sequence to those of labourers' brides. Razzell (2007), p. 244. Hollingsworth found a similar significant increase in marriage ages of aristocratic women in the eighteenth century. Hollingsworth (1965), p. 11

[99] The marriages were selected from parishes in alphabetical sequence up to the parish of Ham in Surrey and Potsgrove in Bedfordshire for the period 1837-71. The numbers of marriages in the calculation of marriage ages were as follows: Surrey: labourers: 1,759; artisans & tradesmen: 2,039; farmers: 102; elite occupations (gentlemen, professionals & merchants): 102. Bedfordshire: labourers: 1,955; artisans & tradesmen: 1,268; farmers: 102; elite occupations: 38.

[100] Woods (2000), p. 86.

As we saw earlier, this was the socio-economic pattern of marriage described by Malthus, with the poor marrying at a much earlier age than the wealthy. He was born in the parish of Wotton, Surrey, where in later life he became curate, and his family home was in the neighbouring village of Albury.[101] He was very familiar with the marriages of the poor of these parishes, as well as the marriage habits of his wealthier contemporaries. It is probable that reduced adult mortality led to the rich to marrying much later, contrasted with the poor marrying much earlier as a result of pauperisation.[102] The artisan and tradesmen class appear to have occupied an intermediate position, with little change in their marriage ages. However, the frequency of marriage was also a major determinant of fertility, and as Wrigley and colleagues have concluded 'that until the middle of the eighteenth century the substantial swings in nuptiality were produced almost exclusively by wide variations in the proportion of women never marrying.'[103]

There is now evidence that marriage was nearly universal in the seventeenth century. Shepard and Spicksley have compiled data from church court depositions covering nearly all areas of England, showing that only about 3 per cent of women aged above 45 were single.[104] Information from a range of other sources – censuses, church court deposition, burial registers, wills and family genealogies – confirm this conclusion.[105] This changed during the eighteenth century as illustrated by data for the London Consistory Court.

Table 16: Proportion of female deponents single in the London Consistory Court, 1583-1817.[106]

Period	Age Group – Proportion Single			
	15-24	25-34	35-44	45+
1586-1611	62%	15%	1%	0%
1703-1713	72%	25%	7%	4%
1752-1783	77%	43%	14%	5%
1792-1817	76%	53%	13%	15%

There were significant reductions in the frequency of marriage in all age groups during the eighteenth century, and this was also the case in Yorkshire and other areas of England.[107] The explanations for this trend are complex but it appears that it occurred particularly amongst the wealthy and the well-educated.[108] There were major changes in literacy levels amongst wealthy

[101] James (1979), pp. 13, 34, 40.
[102] As we saw earlier, Malthus stressed the link in England between poverty and early marriage. There is no consensus on patterns of real income and economic inequality in the eighteenth and early nineteenth century. For example, see Clark (2007), Clark (2009), Broadberry et.al. (2015). However, the increasing pauperisation of labourers at the end of the eighteenth and beginning of the nineteenth century was described by nearly all contemporaries, including Horatio Nelson. See Nicolas (1845), p. 295. See also Howlett, (1796); Davies (1796); Cobbett (2001); Hammond (1911); Hammond (1917); Hammond (1919); Taylor (1969); Inglis (1972); Thompson (1980); Vincent (1981); Humphries (2013).
[103] Wrigley and Schofield (1989), p. xix.
[104] Razzell (2016), p. 65.
[105] Ibid, pp. 60-70.
[106] Ibid, p. 67.
[107] Ibid, pp. 60-70. Recently Szreter and Garrett have argued that there was a decline in the frequency of marriage from the middle of the eighteenth century onwards. Szreter and Garrett (2000), p. 67.
[108] Razzell (2016), pp. 74-77.Church court depositions tended to exclude the very poor.

women in the eighteenth century, as illustrated by the proportion of women signing wills in London.

Table 17: Proportion of women signing London wills, 1599-1851.[109]

Period	Proportion signing wills	Number of cases
1599-1601	2%	100
1639-1641	15%	100
1699-1701	38%	100
1749-1751	64%	100
1799-1801	77%	100
1849-1851	86%	100

However, literacy was not a sufficient condition to sustain a single marital status, as in the late eighteenth century many of the poor were literate but with very high levels of marriage frequency.[110] It was important to have the economic resources to be able to sustain a single marital status, although these are complex issues requiring further clarification.

The socio-economic patterns of marriage age and the frequency of marriage had a direct impact on fertility levels. The general relationship between status and fertility was widely recognised by contemporaries in the nineteenth century, summarised by Wrong as follows:

> *In England most of the writers who took part in the Malthusian controversy in the early part of the nineteenth century were full aware of the existence of a negative relationship between fertility and socio-economic status. It was referred to by Malthus himself, by William Godwin, John Stuart Mill, Harriet Martineau, and Nassau Senior, to mention only a few of the better know intellectual figures of the day.*[111]

Glass was the first to analyse the relationship between socio-economic status and fertility which occurred in the middle of the 19th century. He found a strong correlation between the status of a London registration district and its gross reproduction rate in the period 1849-51, even allowing for the presence of servants.[112] There were similar associations in other wealthy and poor districts, with the wealthy areas having higher literacy and lower fertility rates.[113] Data for Bedfordshire indicates that fertility was particularly high amongst labourers compared to other occupational groups:

[109] Ibid, p. 86. The figures are based on the first 100 women leaving wills selected alphabetically in the periods in question.
[110] Ibid, pp. 75-77.
[111] Wrong, (1958), p. 67.
[112] Glass, (1938), p. 118.
[113] Razzell (2016), pp. 81-83.

Table 18: Bedfordshire baptism fertility rates, 1849-51.[114]

Occupational Group	Number of Baptisms 1849-51	Number of Men Living Aged 20-50 in 1851	Annual Fertility Rate per 100 Living
Labourers	5,280	10,887	16.2
Artisans, Tradesmen & Others	3,008	11,120	9.0
Farmers	294	1,148	8.5

The findings on status and fertility are consistent with the evidence on the relationship between status and nuptiality previously discussed. The overall impact of nuptiality patterns and fertility levels is more difficult to assess. The falling mean age of marriage amongst labourers – and they formed a large part of the total population – has to be contrasted with the declining frequency of marriage amongst other groups. The best evidence on changing fertility levels in the eighteenth century is provided by Table 5, which indicates that there was no significant change during this period, suggesting that the decline in mean marriage age was balanced by an overall reduction in the frequency of marriage.[115]

VIII – CONCLUSION

There is an increasing consensus that much of England's economic development was fuelled by the growth of capitalism. Harley has recently concluded that 'the emergence of Britain modern growth depended more on a long history of capitalism than on the industrial revolution,'[116] a conclusion supported by the work of Leigh Shaw-Taylor of the Cambridge Group.[117] Much of this development was shaped by the availability of cheap labour, as recognized by Malthus when he wrote that 'farmers and capitalists are growing rich from the real cheapness of labour.'[118] On the central argument of this paper, the supply of labour was largely determined by population growth.

There is a parallel between England's demographic and economic development and that which is currently occurring world-wide. There is now evidence that world population growth was not mainly shaped by economic factors, but was largely the result of changes in the disease environment, particularly the adoption of improved personal and public hygiene and the application of modern medicine.[119] This has led to rapidly falling mortality even in very poor countries, creating labour surpluses, which have been exploited by multi-national companies for the maximisation of profits. This has led to the growth of world-wide capitalism, transforming the economic structures of both developing and developed countries, a process which is only likely to change when labour surpluses are eliminated through long-run reductions in fertility.

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[114] Ibid, p. 84.
[115] I had previously argued that fertility reduced during this period, but the new evidence on nuptiality suggests that it was unchanging during the eighteenth century.
[116] Harley (2014), p. 492.
[117] Shaw-Taylor (2012).
[118] Malthus (1992) Vol. ?, p. 28 ???.
[119] Easterlin (1999); Cutler, Deaton and Llera-Muney (2006); Easterlin (2012).

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