Genetically Capitalist

Greg Clark

What were societies like at the dawn of the settled agrarian era with the Neolithic Revolution of c. 8,000 BC? Based on observation of modern forager and shifting cultivation societies we expect that the early agriculturalists were impulsive, violent, innumerate, illiterate, and lazy. Ethnographies of such groups emphasize high rates of time preference, high levels of interpersonal violence, and low work inputs. Abstract reasoning abilities were limited.

Before 1800 all societies, including England, were Malthusian. The average man or woman had 2 surviving children. Such societies were also Darwinian. Some reproductively successful groups produced more than 2 surviving children, increasing their share of the population, while other groups produced less, so that their share declined. But unusually in England, this selection for men was based on economic success from at least 1250, not success in violence as in some other pre-industrial societies. The richest male testators left twice as many children as the poorest. Consequently the modern population of the English is largely descended from the economic upper classes of the middle ages. At the same time, from 1150 to 1800 in England there are clear signs of changes in average economic preferences towards more "capitalist" attitudes. The highly capitalistic nature of English society by 1800 – individualism, low time preference rates, long work hours, high levels of human capital – may thus stem from the nature of the Darwinian struggle in a very stable agrarian society in the long run up to the Industrial Revolution. The triumph of capitalism in the modern world thus may lie as much in our genes as in ideology or rationality.

A recent study of Mikea forager-farmers in Madagascar found, for example, that the typical Mikea household planted less than half as much land as was needed to feed themselves. Yet the returns from shifting cultivation of maize were enormous. A typical yielded was a minimum of 74,000 kcal. per hour of work. Foraging for tubers, in comparison, yielded an average return of 1,800 kcal. per hour. Despite this the Mikea rely on foraging for a large share of their food, consequently spending most time foraging. This implies extraordinarily high time preference rates.[39] James Woodburn claimed that Hadza of Tanzania showed a similar disinterest in distant benefits, "In harvesting berries, entire branches are often cut from the trees to ease the present problems of picking without regard to future loss of yield."[40] Even the near future mattered little. The Pirahã of Brazil are even more indifferent to future benefits. A brief overview of their culture included the summary,

> *Most important in understanding Pirahã material culture is their lack of concern with the non-immediate or the abstraction of present action for future benefit, e. g. 'saving for a rainy day.' (Everett, 2005, Appendix 5).*

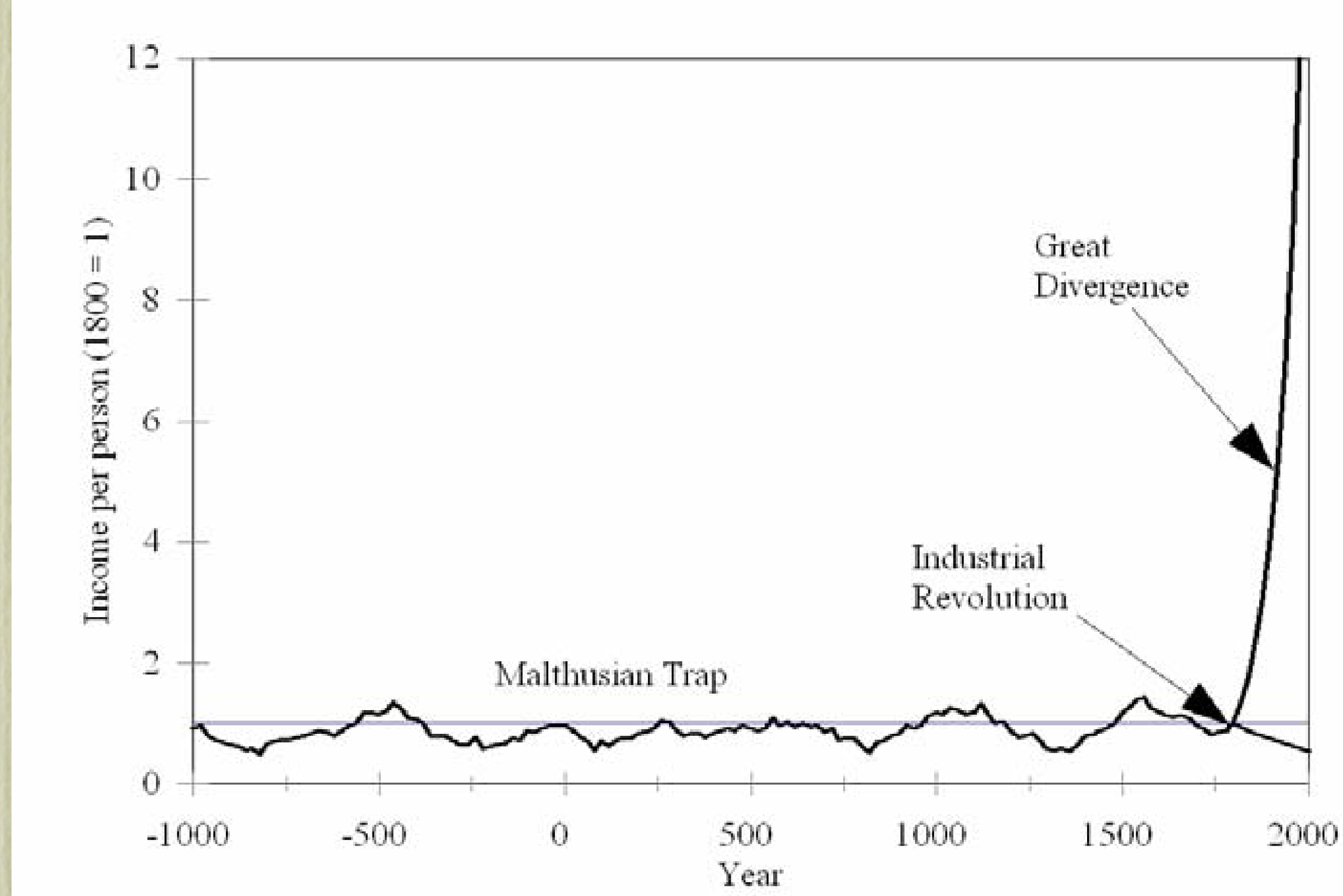

Figure 1 World Economic History in One Picture. After 1800 income in some societies rose sharply, while in others it declined.

Table 1 Populations in Western Europe, 1300-1800[1]

Year	c. 1300	c. 1800	Surviving Children per woman
Norway[a]	0.40	0.88	2.095
Southern Italy[c]	4.75	7.9	2.061
France[d]	17	27.2	2.056
England[b]	5.8	8.7	2.049
Northern Italy[c]	7.75	10.2	2.033
Iceland[a]	0.084	0.047	1.930

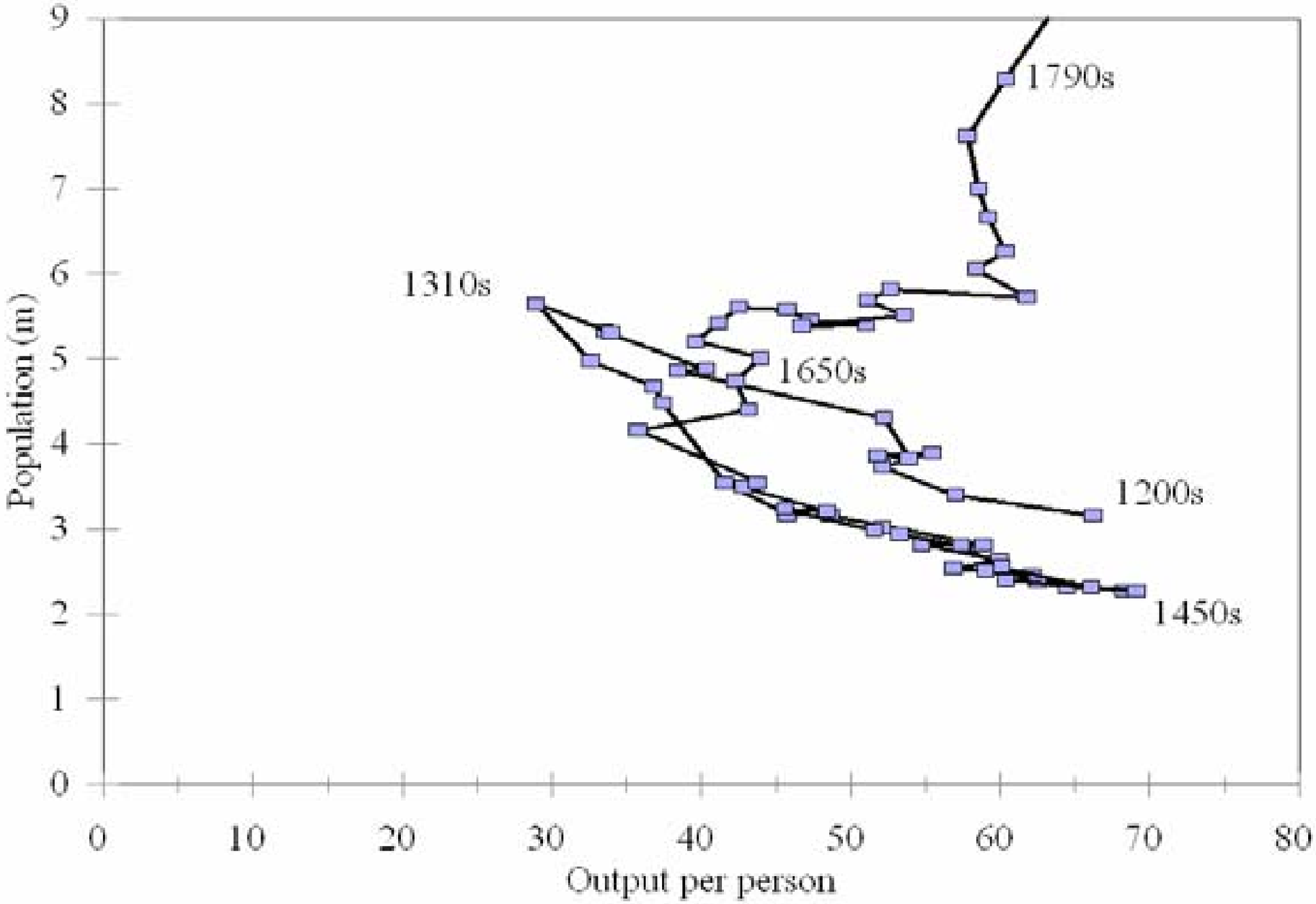

Figure 4 Revealed Technological Progress in England, 1200-1800

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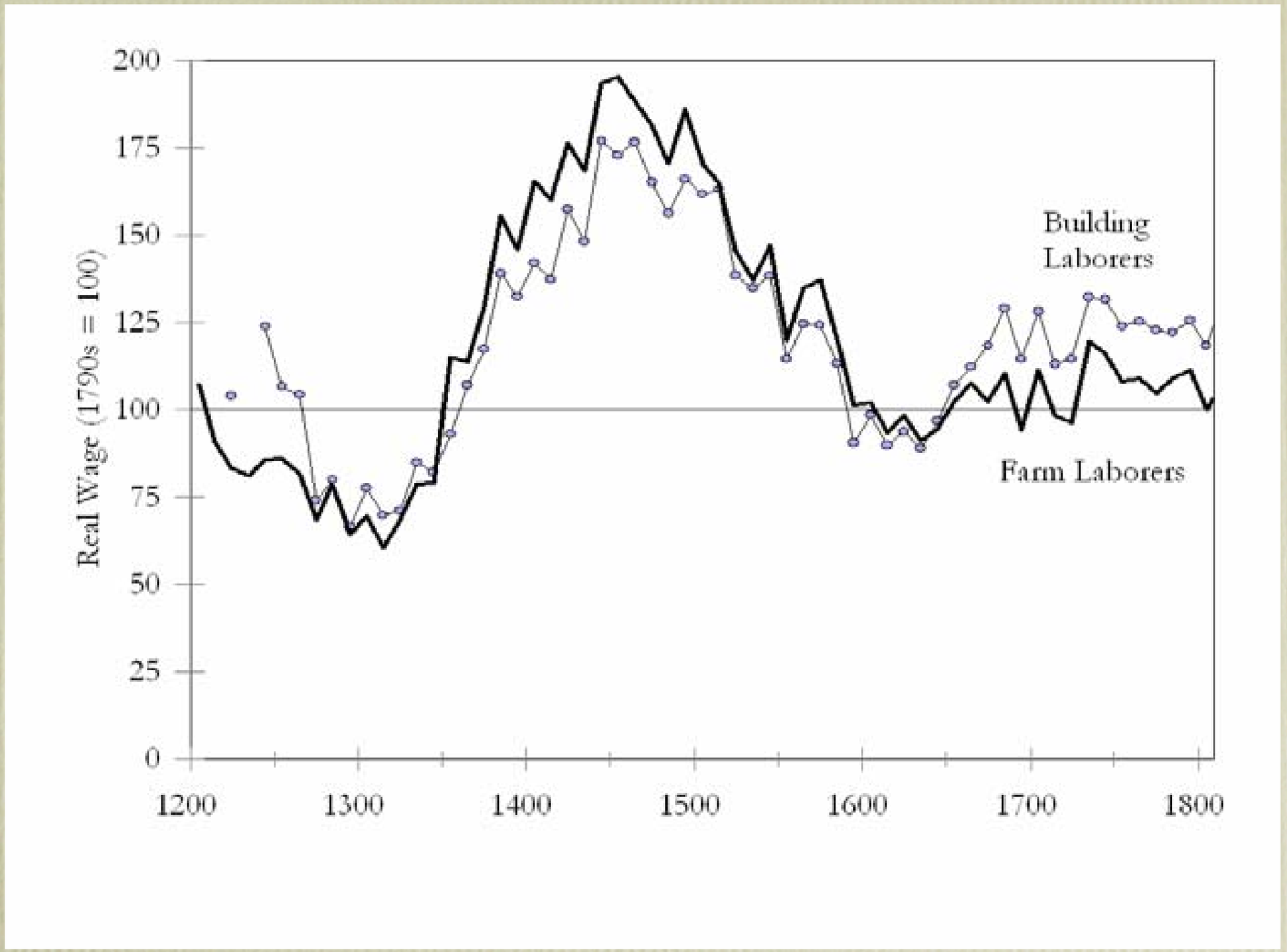


Figure 7 English Laborer's Real Wages 1209-1809.

Table 2 Calories and Protein per Capita[7]

Group	Years	Kcal.	Grams Protein
England, farm laborers[a]	1787-96	1,508	27.9
England, all[a]	1787-96	2,322	48.2
Belgium, all[b]	1812	2,248	-
Ache, Paraguay[c]	1980s	3,827	-
Hadza, Tanzania[h]	-	3,300	-
Alyware, Australia[h]	1970s	3,000	-
Onge, Andaman Islands[h]	1970s	2,620	-
Aruni, New Guinea[e]	1966	2,390	-
!Kung, Botswana[c]	1960s	2,355	-
Bayano Cuna, Panama[g]	1960-1	2,325	49.7
Mbuti, Congo[h]	1970s	2,280	-
Anbarra, Australia[h]	1970s	2,050	-
Hiwi, Venezuela[c]	1980s	1,705	64.4
Shipibo, Peru[f]	1971	1,665	65.5
Yanomamo, Brazil[d]	1974	1,452	58.1

Table 4 Testators by Social Rank, 1585-1638

Social Group	Numbers of wills	Fraction of testators literate	Average value of bequests (£)	Maximum value of bequests (£)
Gentry	59	0.94	1,084	10,935
Merchants/ Professionals	87	0.84	268	1,739
Farmers	659	0.50	406	7,946
Unknown	345	0.44	154	1,360
Traders	84	0.47	112	1,390
Craftsmen	267	0.40	85	525
Husbandmen	333	0.24	87	1,898
Laborers	100	0.14	42	210

Origins of Industrial Revolution: Genetics?

- Genetic models useful because there is theory
- Quantitative genetics, i.e. AgSci 101, works well
  - $r=h^2s$
- Humans used quantitative genetics to make maize, wheat, guernseys, beagles, etc.
- They never knew the genes involved, mostly still don't

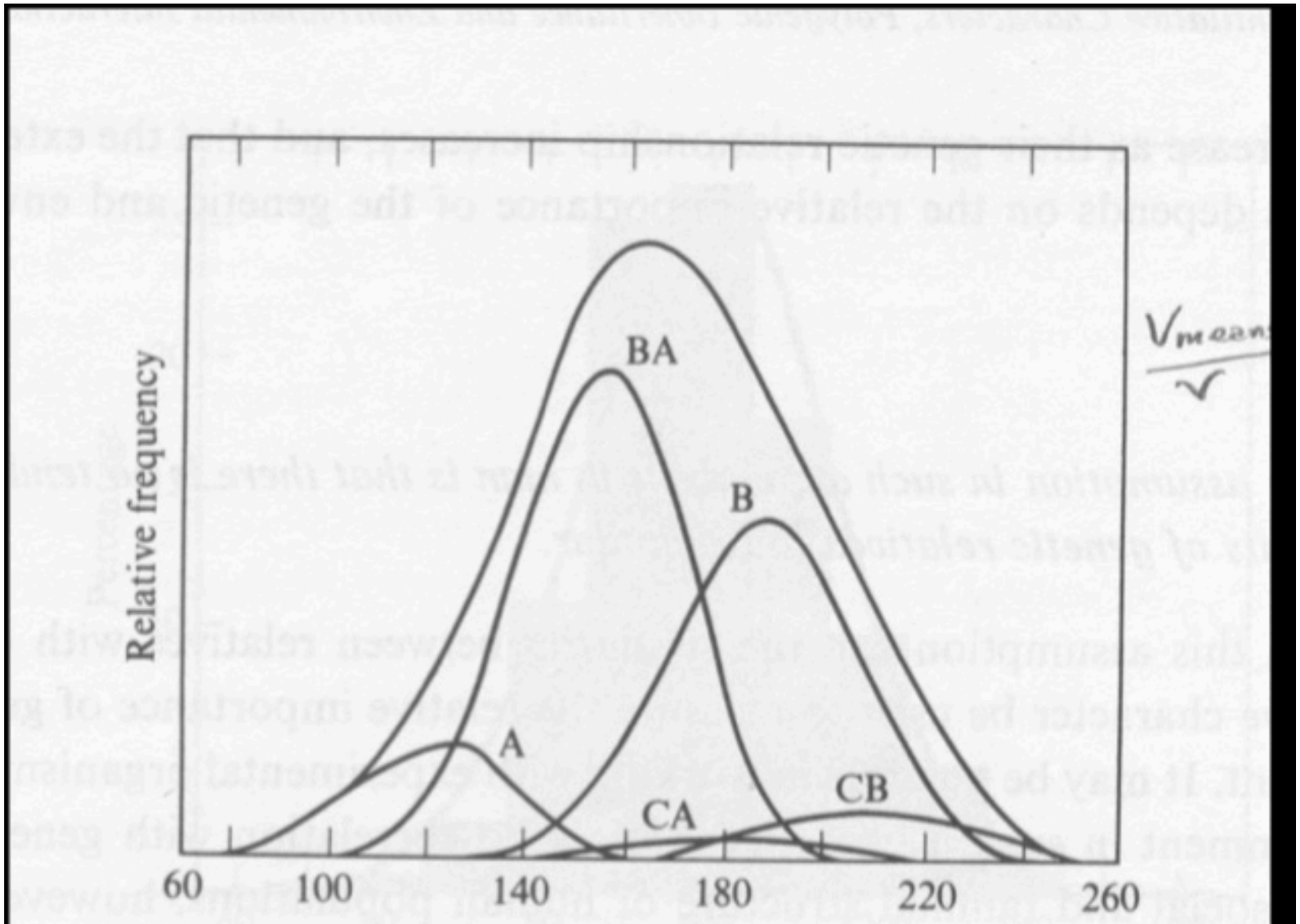
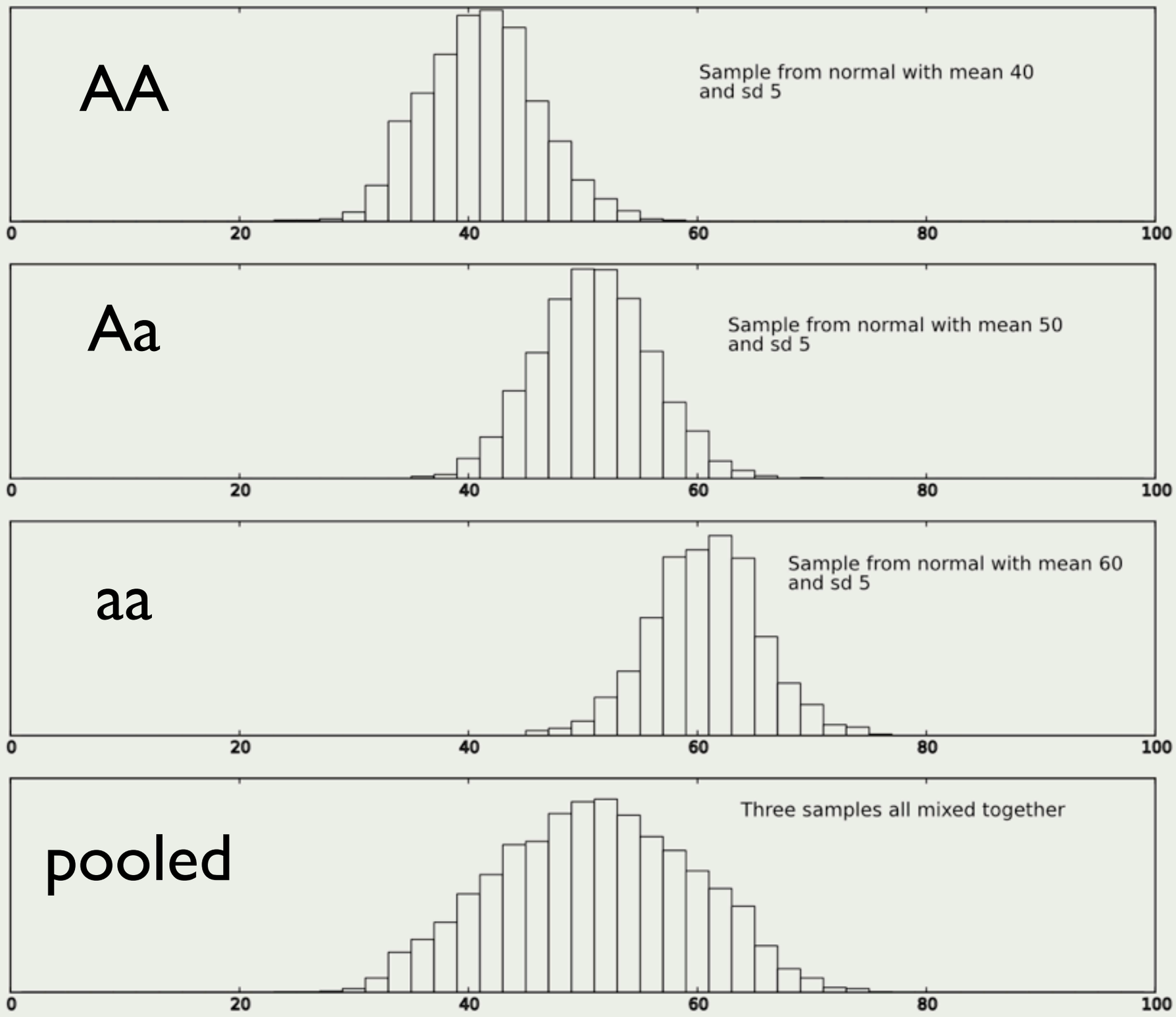
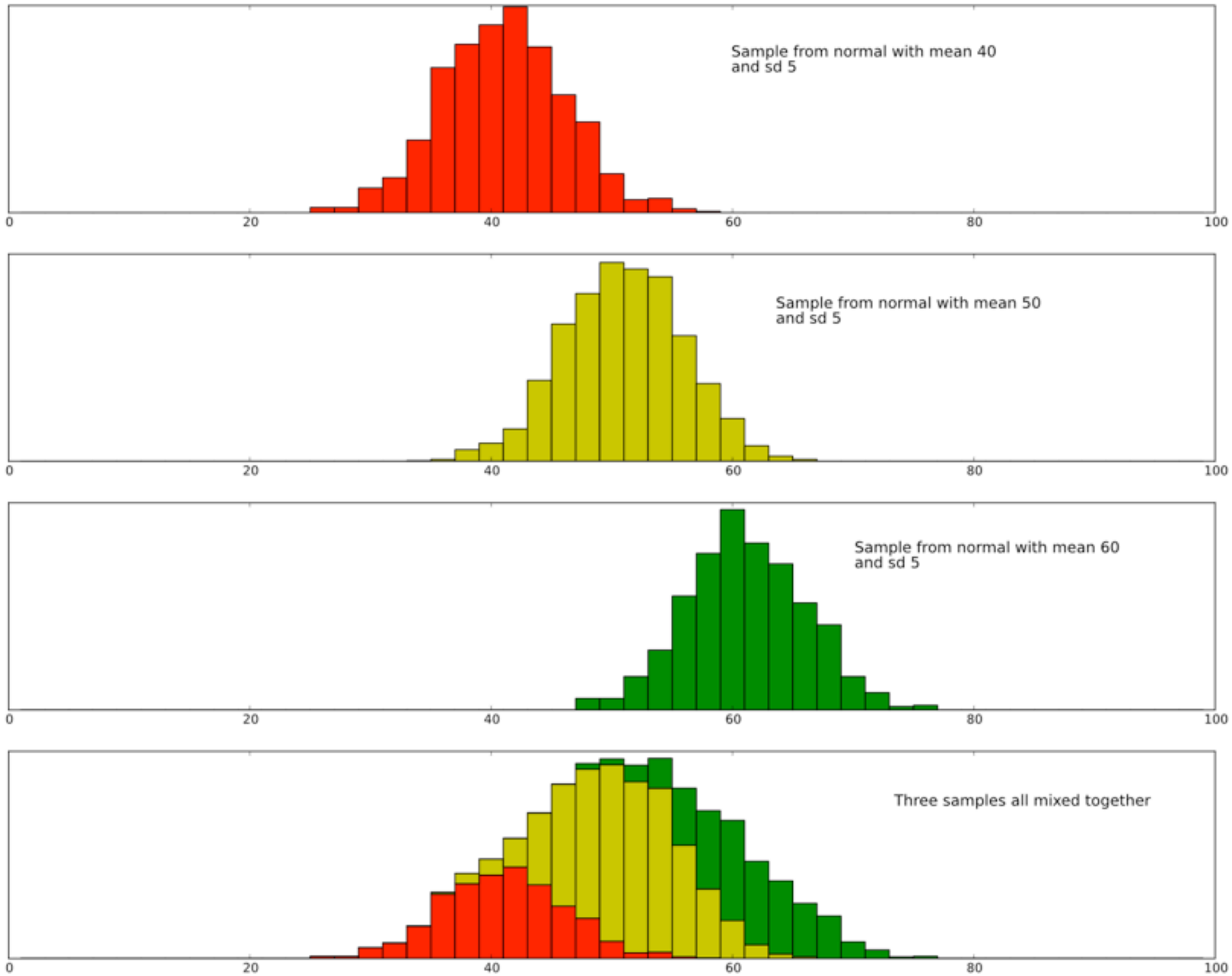


FIGURE 9.3
Distribution of red-cell acid-phosphatase activities in the general population (top line) and in the separate phenotypes (A, BA, B, CA, CB). The curves are constructed from values of the enzyme activities and from the relative frequencies of the phenotypes observed in a randomly selected population. (From Harris, 1966.)


AA
Sample from normal with mean 40
and sd 5
0
20
40
60
80
100
Aa
Sample from normal with mean 50
and sd 5
0
20
40
60
80
100
aa
Sample from normal with mean 60
and sd 5
0
20
40
60
80
100
pooled
Three samples all mixed together
0
20
40
60
80
100


Sample from normal with mean 40
and sd 5
0
20
40
60
80
100
Sample from normal with mean 50
and sd 5
0
20
40
60
80
100
Sample from normal with mean 60
and sd 5
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Three samples all mixed together
0
20
40
60
80
100

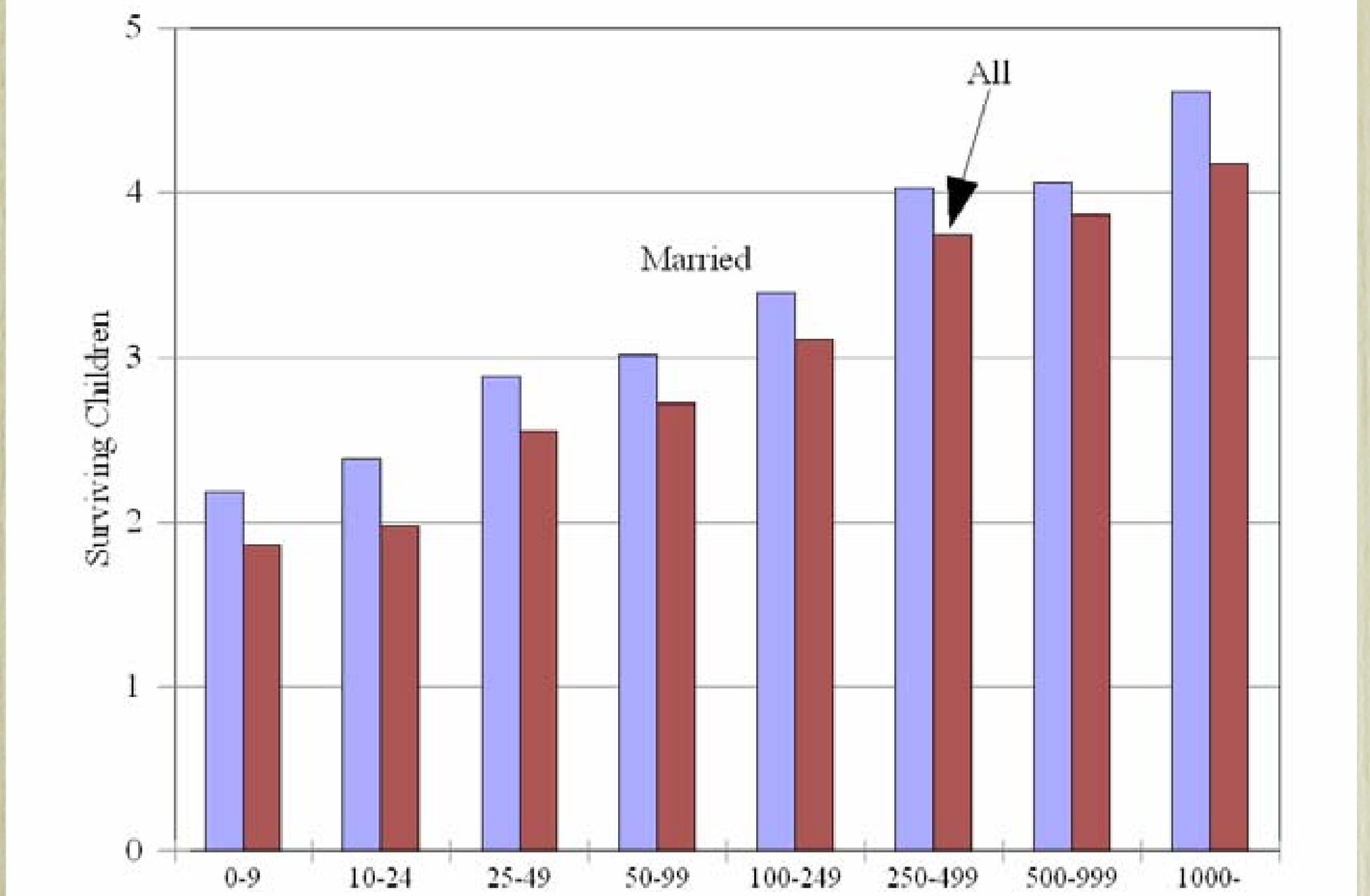


Figure 8 Surviving Children by Testator's Assets in £

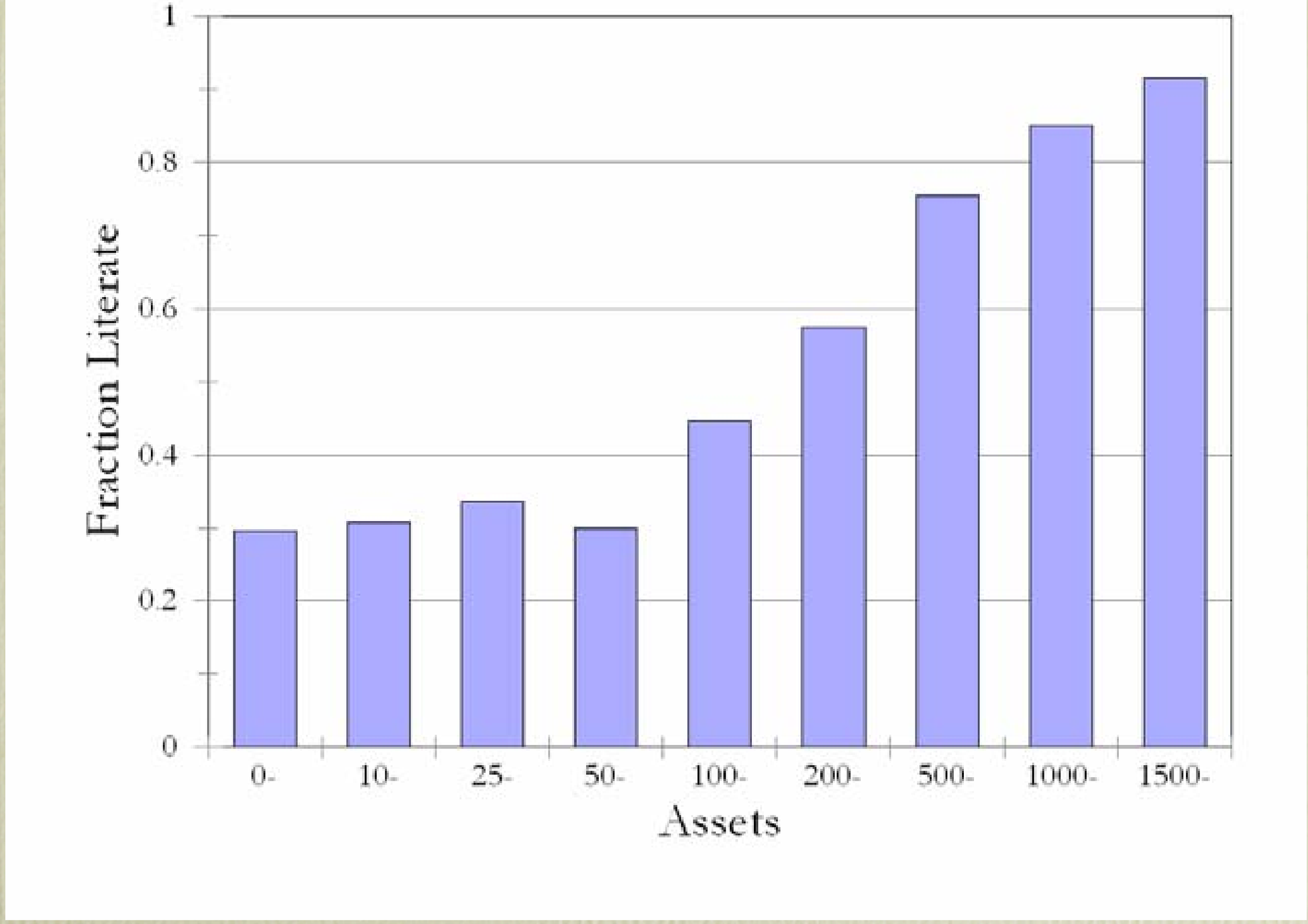


Figure 14 Literacy and Assets, England, male testators, 1630

Table 7 Inter-generational Mobility in Suffolk, 1620-38[25]

*higher courts

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
10-24	101	2.8	107	2.5
25-49	125	3.5	158	3.7
50-99	211	5.8	294	6.9
100-199	260	7.2	398	9.3
200-499	288	8.0	491	11.5
500-999	116	3.2	220	5.2
1000-	68	1.9	137	3.2
1000- *	100	2.8	(201)	4.7
All	3,613	100	4,266	100

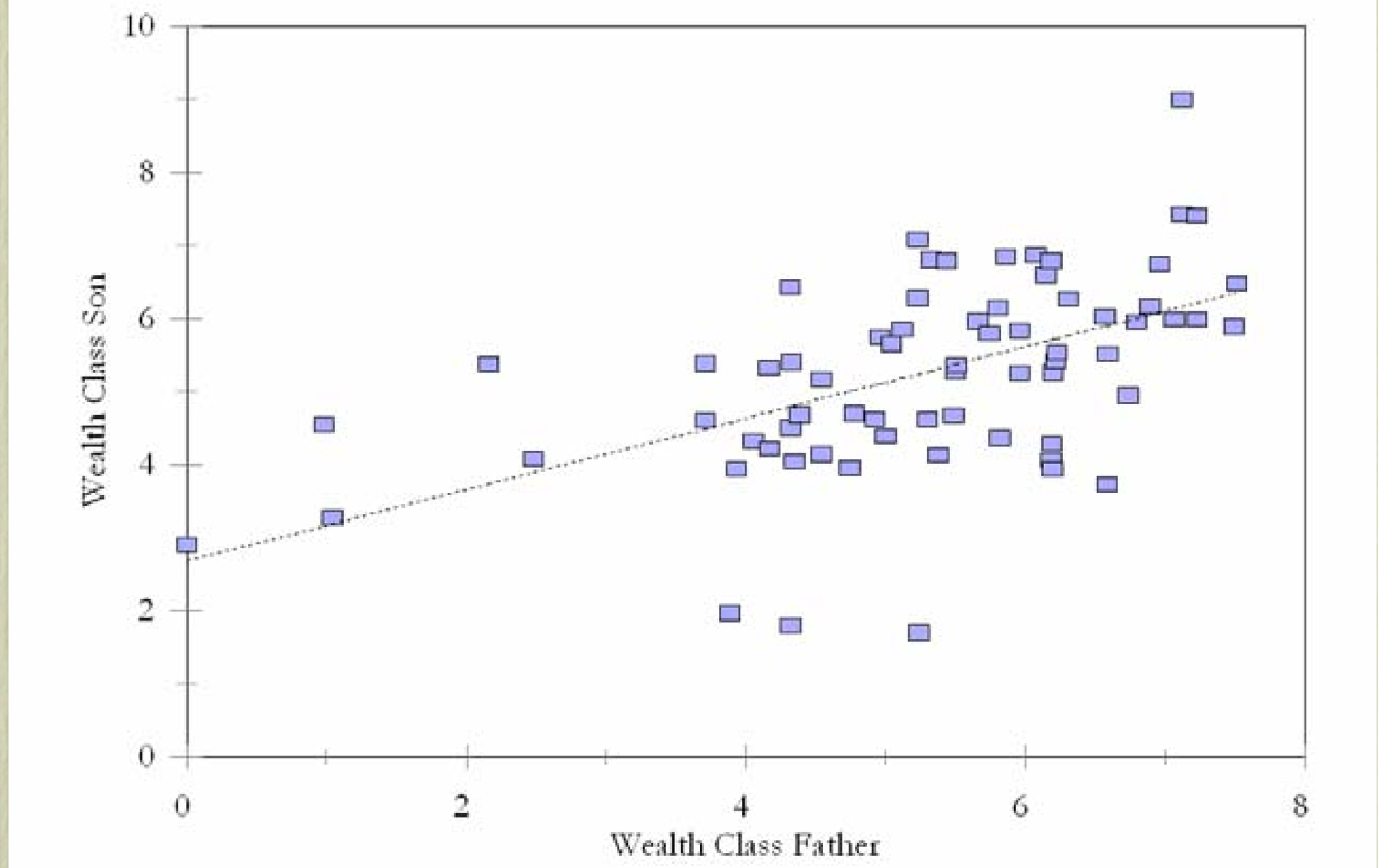


Figure 11 Bequests of the father, and of the son[18]

Table 5 The Demography of English Aristocrats, 1330-1829[20]

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

Table 6 Reproductive Success of Male Yanomamo, 1987[24]

Age	Killers	Killers	Non-killers	Non-Killers
	n	Average Offspring	N	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

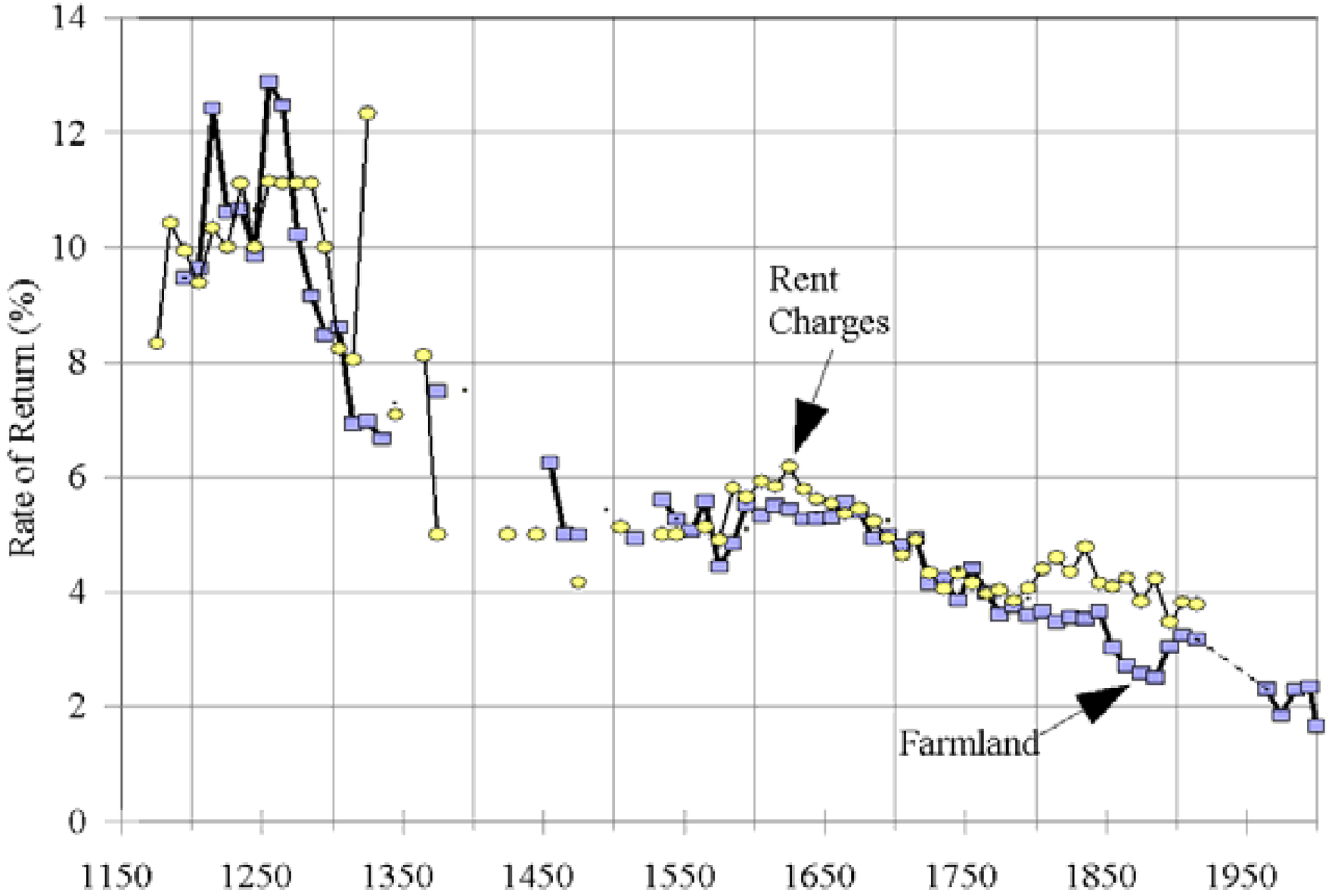


Figure 13 The Return on Land and on Rent Charges, 1170-2003 (by decade)[33]

Table 9 The Rate of Return on Capital across Europe, 1200-1349[34]

Place	Land	Rent Charges
England	10.0	9.5
Flanders	-	10.0
France	11.0	-
Germany	10.2	10.7
Italy	10.1	10.7

[33]For the years before 1350 the land returns are the moving average of 3 decades because in these early years this measure is very noisy. Clark, 1988, 1998. Modern returns from farmland ownership from UK, DEFRA, prices and rents of agricultural land.

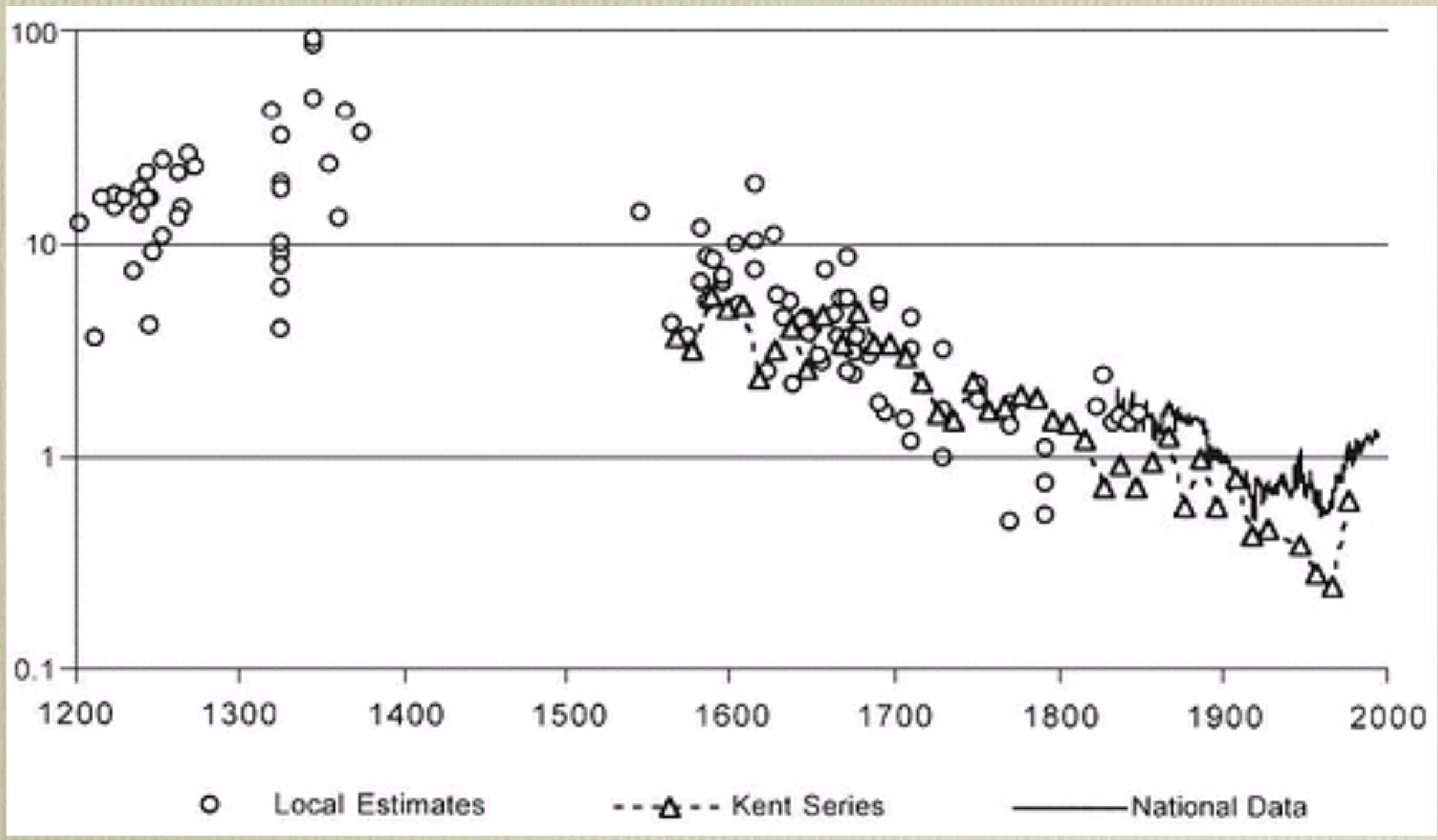
[34]Clark, 1988, table 3. Herlihy, 1967, 123, 134, 138, 153 (Pistoia, Italy).

Your happy Freedom of your Isle
Can slavery-Stretch'd ingenuity
And wreathed with Fortune and Toil
Can chase each wishful Heart.

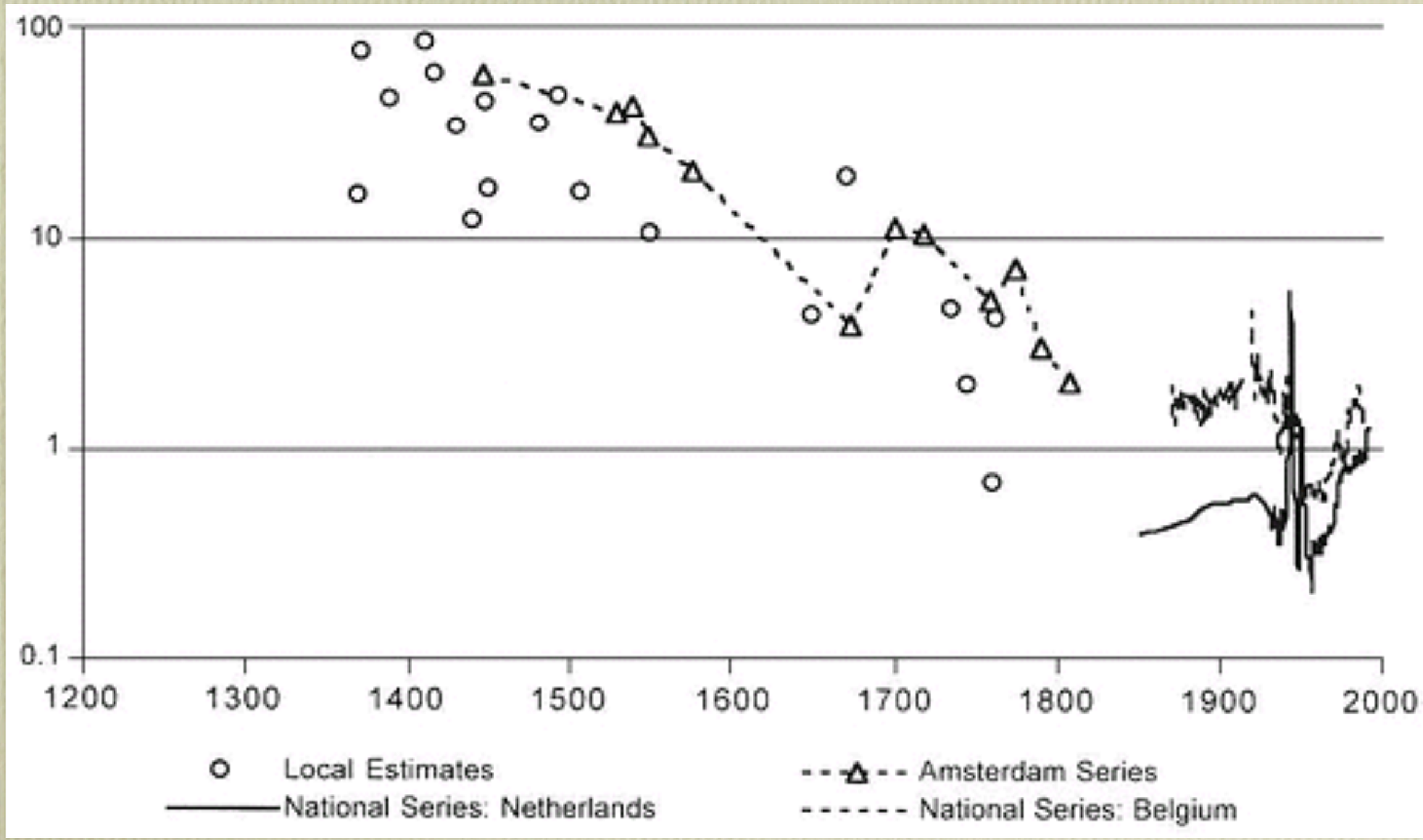
Labour and Art upheld by Thee
Successfully advance,
We quaff the barley-liquor with glee
And Water leave to France.

Genius of Health, thy grateful Taste
Rivals the Use of Wine;
And nectar'd ale Englishmen cheerful Pleasure
With Liberty and Love.

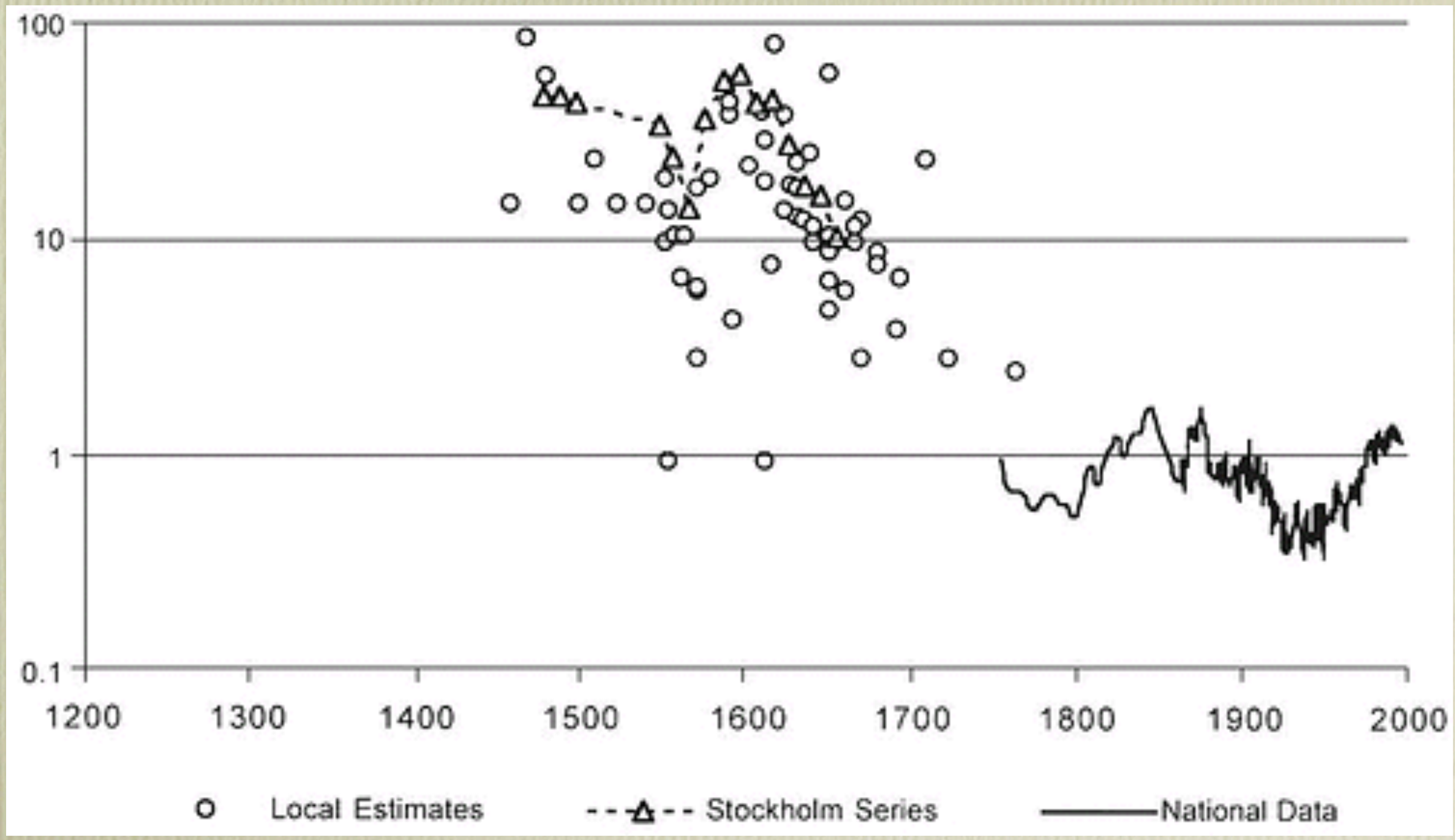
England:Homicides per 100,000
Note log scale



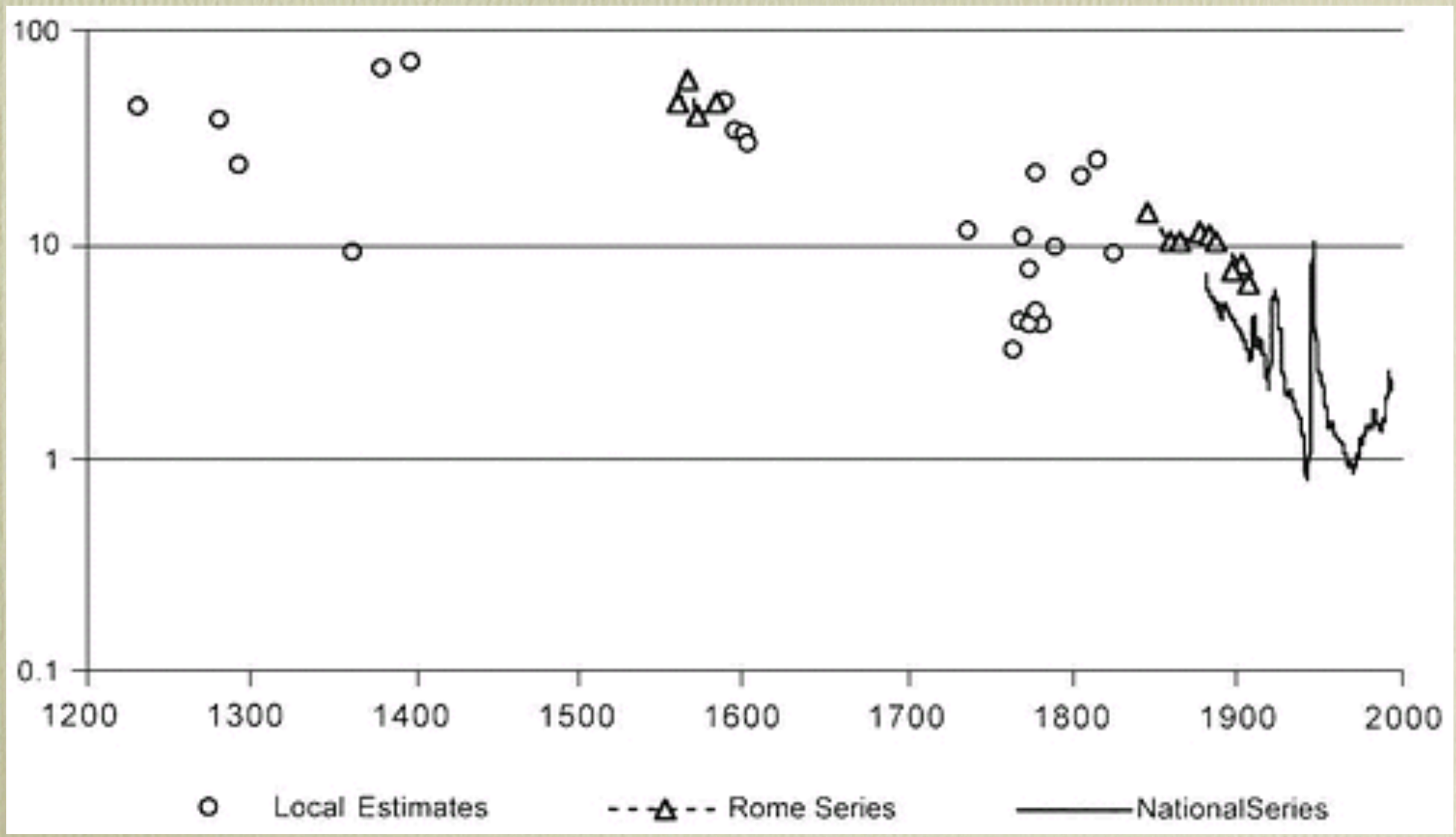
Belgium and Netherlands



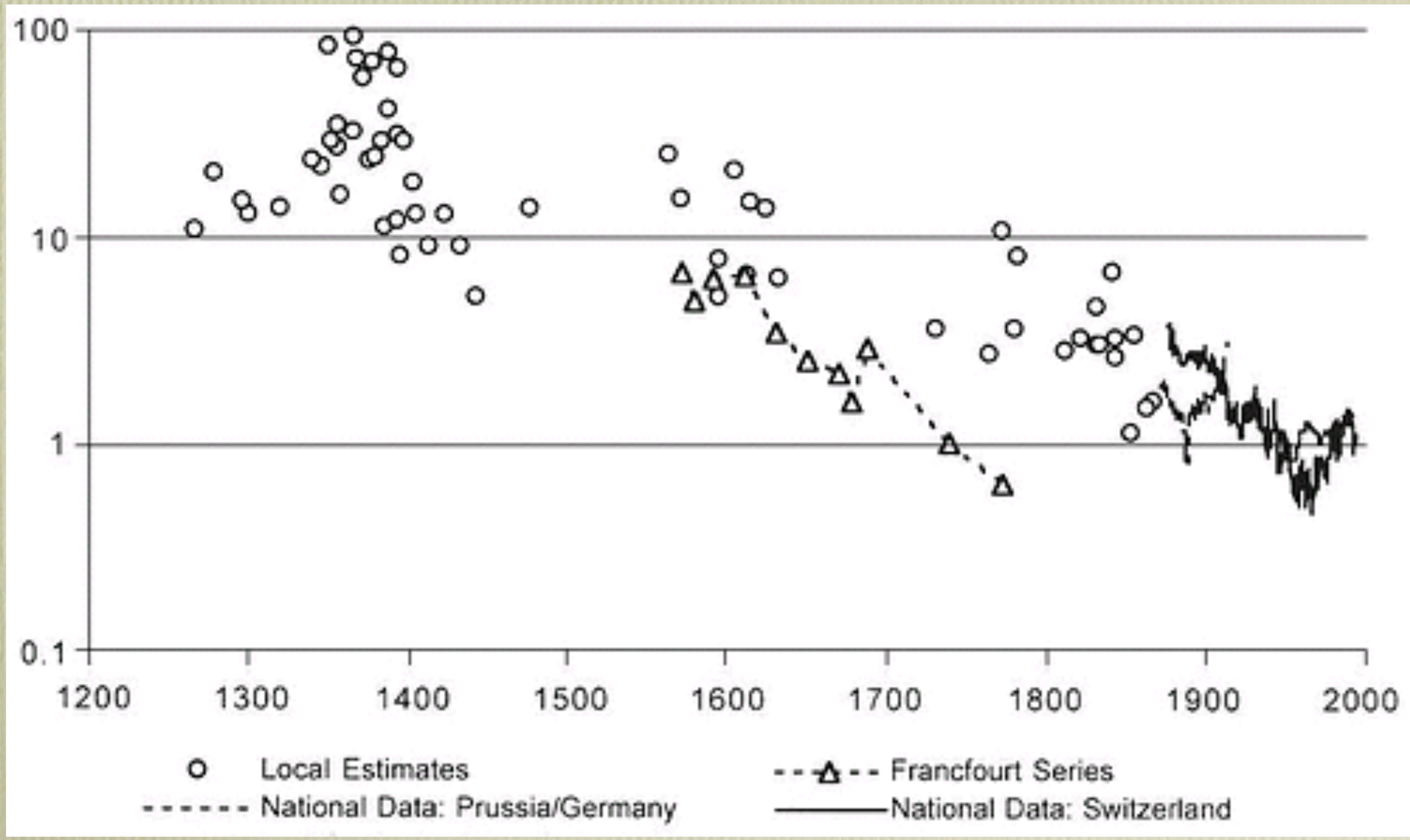
Scandinavia



Italy


100
10
1
0.1
1200
1300
1400
1500
1600
1700
1800
1900
2000
Local Estimates
Rome Series
NationalSeries

Germany and Switzerland



Breeder's Equation

$$r=h^2s$$

r = response to selection
h^2 = heritability
s = selection differential

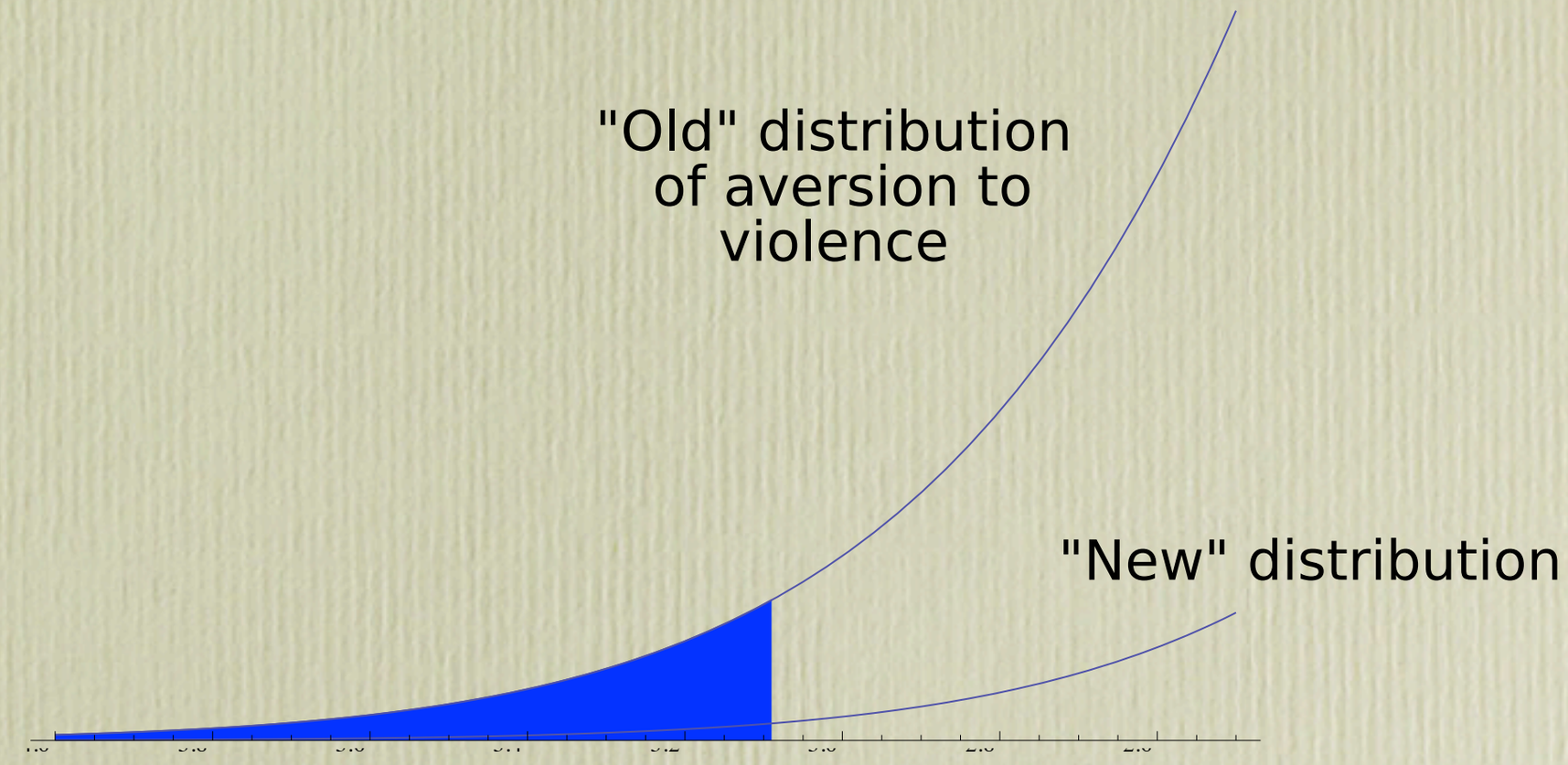
Homicide Decline

- Decline by a factor of 20 in 800 years, from 50 to 2.5 per hundred thousand
- Treat lethal violence as a quantitative trait with a threshold, this decline corresponds to a change of 0.7 sd
- Like a decline of 2 in. in stature in 800 years, about .02 sd per generation
- If trait heritability is 50%, this corresponds to the most violence prone 4% of the population failing to reproduce each generation

Two Normals .6sd Apart

Hypothetical distributions of aversion to violence: distributions are 0.62 sds apart

Left Edge of Two Normals



Change of .6 sd

- Comparable to change of 1.5-2 inches in stature
- In 600 years this is .025 sds per generation

Has it Happened Many Times?

- Pax Romana may have had similar effects
- Augustus's pleas and demands for more birth
- Rapid spread of Christianity
  - "Turn the other cheek"
- Cordial welcome to the Barbarians

The Roman State and Genetic Pacification

Peter Frost
Université Laval

This perspective is applied here to the Roman state, specifically to the behavioral and ideological changes that coincided with its internal war against banditry and other forms of entrepreneurial violence. By late imperial times, this effort had succeeded so well that the Romans saw themselves as being inherently less violent than the 'barbarians' beyond their borders. In creating a pacified and submissive population, the Empire also became conducive to the spread of Christianity—a religion of peace and submission. In sum, the Roman state imposed a behavioral change that over time altered the mix of genotypes, thus facilitating a subsequent ideological change.

The Roman State and Genetic Pacification

Peter Frost

The *Pax Romana* punished those men who had previously enjoyed high reproductive fitness, i.e., the *latrones*. First, their access to resources, including women, was cut off through ostracism. They became non-persons without the rights of other lawbreakers. "The person stigmatized with the label of bandit did not have normal access to courts for judgements, a marriage was declared to be null and void if one of the partners was discovered to be a *latro*, and so on" (Shaw, 1984, pp. 22-23). The stigma even survived death, as indicated by Galen, a second-century physician:

> On another occasion we saw the skeleton of a bandit lying on rising ground by the roadside. He had been killed by some traveller repelling his attack. None of the local inhabitants would bury him, but in their hatred of him were glad enough to see his body consumed by the birds which, in a couple of days, ate his flesh, leaving the skeleton as if for medical demonstration.
> [Galen. On Anatomical Procedures 1.2] (Shaw, 1984, p. 5)

Second, the Roman state made violence against individuals an offense against the community. All citizens were given access to law courts and, more importantly, the courts could enforce their decisions (Liebeschuetz, 2006, p. 40). In the case of *latrones*, justice was summary and procedure minimal. Punishment likewise set them apart from other criminals, being typically a death sentence by one of the brutal methods allowed: throwing to the beasts, burning alive, and crucifixion (Shaw, 1984, p. 20).