The High Wage Economy of Pre-industrial Britain

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2006

Chapter 2

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> "The working manufacturing people of England eat the fat, and drink the sweet, live better, and fare better, than the working poor of any other nation in Europe; they make better wages of their work, and spend more of the money upon their backs and bellies, than in any other country."
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> –Daniel Defoe, The Complete English Tradesman, 1726, chap XXII

'Did the standard of living of the British working class rise or fall during the industrial revolution?' This must be the most frequently asked question in economic history, and–for far too long–the history of the industrial revolution has been written under its spell. The problem is this: Whether one contends that real wages rose or fell, everyone accepts that workers were very poor at the start of the industrial revolution. They certainly were poor by today's standards, but what about those of the eighteenth century? The main point of this chapter is that British workers were more prosperous than their counterparts in most of continental Europe or Asia. While British workers did not share in the economic expansion of the early nineteenth century (a theme to be taken up in chapter xx), they had already reached a high income position in international terms.

The view that British workers were extremely poor during the industrial revolution runs back to the fierce nineteenth century debates about 'the poor,' and, in particular, to the views of the classical economists. Their language is part of the problem, for they usually spoke of wages being at 'subsistence.' The term is loose and misleading. To the modern ear, it suggests that wages were only enough to buy a physiologically minimum diet, rags for clothes, and a bit of thatch for a roof. If all wages were at this 'subsistence,' then workers around the globe led a uniformly miserable existence. In fact, classical views were more complex because 'subsistence' was a very elastic term. Sometimes, it meant the physiological minimum that barely kept a family alive; sometimes, it was 'socially determined' and meant a higher standard of comfort.

Rather than seeing everybody at the bare bones minimum needed for survival, the classical economists saw the world in terms of a wage ladder on which workers in northwestern Europe had the highest standard of living and workers in Asia had the lowest. Adam Smith (1776, pp. 74-5, 91, 187, 206) put it like this: "In Great Britain the wages of labour seem, in the present times, to be evidently more than what is precisely necessary to enable the labourer to bring up a family." Workers' living standards were even a bit better in the Low Countries: "The wages of labour are said to be higher in Holland than in England." Within Britain, England was above Scotland: "Grain, the food of the common people, is dearer in Scotland than in England...The price of labour on the contrary, is dearer in England than in Scotland." Hence, a days work bought more food in England than in Scotland. However, in Scotland, "labour is somewhat better rewarded than in France." Asia lagged far behind Europe: "The real price of labour, the real quantity of the necessaries of life which is given to the labourer...is lower both in China and Indostand...than it is through the greater part of Europe." Smith saw the maritime centres of southern England and the Low Countries as having the highest real wages. Real wages were lower on Britain's Celtic fringe. Most of continental Europe also lagged behind the mercantile leaders, and Asia was at the bottom of

the wage ladder. That was where wages were at the physiological minimum in the classical view.

During the nineteenth century, the mainstream explanation of these facts was demographic. Malthus believed that population expands until birth and death rates are equal. The wage that corresponded to that outcome was the 'subsistence' wage since it was just enough to allow parents to raise children, and for the population to reproduce itself without expanding. In the original, positive check version of his theory, the birth rate was always at its maximum while mortality declined as wages rose. Under these circumstances, the subsistence wage had to be low enough to push mortality up to equal the high birth rate. In the later, preventive check version of the theory, fertility also declined as income dropped, and this modification meant that births and deaths equalled each other at a higher 'subsistence' wage. The wage in a society, therefore, depended on whether the positive or the preventive check predominated. That was a question of marriage customs, law, and what Malthus called 'habit'.

Malthus (1803, pp. 116, 124, 251-2) applied the model by arguing that 'habits' differed between Europe (in particular England) and Asia. In England, "the preventive check to population operates with considerable force throughout all the classes of the community." The sons of farmers and tradesmen deferred marriage "till they are settled in some business or farm, which may enable them to support a family." Even the labourer "will hesitate a little before he divides that pittance [of a wage] among four or five" family members. Late marriage restrained fertility and kept the English wage high. In Asia, on the other hand, several customs led to early and universal marriage, and that practice meant that the positive check reigned, and wages were lower than in Europe. Ancestor worship, the expectation that children would support their parents in old age, and infanticide all meant that China was "more populous, in proportion to its means of subsistence, than perhaps any other country in the world." Malthus entertained the possibility that Hindu asceticism depressed fertility (a preventive check) but concluded, "from the prevailing habits and opinions of the people there is reason to believe that the tendency to early marriages was still always predominant." As a result "the lower classes of people were reduced to extreme poverty...The population would thus be pressed hard against the limits of the means of subsistence, and the food of the country would be meted out to the major part of the people in the smallest shares that could support life". Disaster was never far away. "India, as might be expected, has in all ages been subject to the most dreadful famines."

The generalizations of Smith and Malthus about European and Asian wages are supported by the reports of contemporary travellers and by historians who have reviewed the evidence on diet and consumption. We are particularly concerned with people who were regularly employed and at the bottom of the earnings distribution--peasants and unskilled labourers. Skilled workers, of course, did better everywhere. The aged, the disabled, the ill, and infirm all fared worse, but their circumstances depended on public welfare and private charity rather than the labour market. Travellers' accounts suggest that it was Chinese, Indian, French, and Italian workers who were at rock bottom subsistence, while English workers enjoyed a far higher standard of living.

We need a standard to interpret this evidence, which becomes very detailed. A key benchmark is the subsistence income defined as the 'physiological minimum.' A family with that income spends virtually all its resources on food. The diet has to be nutritionally adequate in the sense that it supplies enough calories and protein for the family to survive–but no more. The cheapest way to get that level of nutrition is generally to buy the least

expensive grain and boil it into a gruel. Bread (especially wheat bread) is usually avoided as too expensive, and if any bread is taken, it is usually made with inferior grains that are often ground at home to avoid the loss entailed by commercial milling. Some legumes are also eaten for protein. Meat is a rare treat and is often obtained from some natural source like fishing rather than animal husbandry. Small amounts of butter or oil are eaten for their fat. The physiological minimum diet is, thus, a quasi-vegetarian diet based mainly on the cheapest grain prepared in the way that minimizes the loss of food value in milling and cooking. The physiological minimum diet lacks wheat bread, meat, alcohol, and many dairy products. These are all expensive ways to get nutrients. In addition, very little else is purchased.

It is important to distinguish the 'physiologically minimum' standard from a pleasing or a respectable standard of living. While people can, by definition, survive on the physiological minimum diet, they generally prefer more food and a greater variety of highly processed foods (as well, of course, as more non-food items). Meat was an important preferred food. Engels (1845, p. 85), for instance, described how 'the normal diet of the individual worker...varies according to his wages.'[1] The best off workers "have meat every day and bacon and cheese for the evening meal." Less well off are workers who "have meat only two or three times a week, and sometimes only on Sundays." They substituted potatoes and bread for meat. Below these workers are those "who can afford no meat at all and they eat cheese, bread, porridge and potatoes." Finally, there were "the Irish for whom potatoes are the staple diet." The emphasis on potatoes as the cheaper food marks this as a nineteenth century hierarchy, for potatoes came into wide consumption only around 1800. Before that, the cheaper grains like rye, barley, and especially oats, played that role. Meat, however, was always a food with a high income elasticity of demand, and so the amount of meat consumed was an important dimension along which working class living standards varied.

Another dimension along which consumption varied was the character of bread. Charles Smith (1766) analysed regional consumption patterns and found that wheat bread predominated in southern England, while the consumption of rye and barley bread increased as one went west and north. Oats, eaten both as bread and porridge, predominated in the northern English counties and Scotland Dr. Johnson exaggerated only a little when he remarked that oats were "a grain which in England is generally given to horses but in Scotland supports the people." Peterson (1995, pp. 220-35, 284-316) estimated the quantities and values of the various kinds of bread from 1770 onwards. He calculated that wheat accounted for 60% of the value of British bread in the 1770s. This proportion increased to 81% in the first decade of the nineteenth century and 90% in the middle of the century. Not only was wheat bread consumption extensive in the middle of the eighteenth century, but it expanded during the industrial revolution. Much of the growth, of course, took place in northern manufacturing towns where more and more workers shifted from oats to wheat bread. The diet accompanying the high wage economy was spreading northwards in the late eighteenth century.

Systematic information on English diet dates from the end of the eighteenth century when the first surveys of English spending patterns were conducted. The high grain prices of the 1790s prompted Sir Frederick Eden's famous three volume inquiry into The State of the Poor in which he detailed the income and consumption of many working families across the

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[1]Somerville (1843, pp. 12-3) provides a numerical summary of similar consumption pattern.

country. By the middle class standards of the day, the people were poor, but their circumstances look better than those of many of their counterparts across Europe and Asia, as we will see. The representativeness and accuracy of these budgets is, of course, a question. We will address this later by calculating what people could afford to buy with the incomes they earned. The calculations confirm that the budgets are, indeed, guides to feasible life styles. Three examples[2] help fix thought:

The first is a forty year old gardener living in Ealing (at the time just outside London) with a wife and four young children. By combining several jobs, he managed to earn about 30 d per day, which was a labourers' wage in London in the 1790s. On this income, the family could afford per day: one quatern loaf of wheat bread, about one half pound of meat, a few ounces of cheese, a pint of beer, tea and sugar. The family bought new shoes and clothes and sent the eldest two children to school. They bought coal in the winter for heat and paid rent for a house and garden, which doubtless provided them with vegetables and perhaps some animal foods. This family was living towards the top of Engel's meat scale.

The second example is a spectacle frame maker in Wolverhampton who earned about 33 d per day, which was a skilled wage in northern England. His family, which also included a wife and four children, consumed per week: 14 lbs of flour, one half bushel of potatoes, 12 pounds of meat, 2 pounds of cheese, 2 pounds of butter, 3 quarts of milk, 7 or more pints of beer, plus, tea, sugar, cloths, and house rent. Again, we find a consumption pattern laden with meat, dairy products, and beer.

The third is a 38 year old weaver in Cumberland with a wife, who also wove part time, and three children. Each week, they ate one half bushel of barley, one stone of oatmeal, one half bushel of potatoes, three pounds of meat, one pound of butter, seven quarts of milk, and bought sugar, tea, candles, soap, clothes, fuel, and house rent. This family had not yet entered the white bread economy, but their consumption of meat and dairy products remains impressive.

Was life as good across the Channel? The situation depends on where we land. The diet in the Low Countries looks prosperous. De Vries and van der Woude (1997, pp. 621-7) reviewed the history of orphanage diets, which they contend are representative of consumers was a whole. From the sixteenth century through the eighteenth, most of the money spent on orphans' food went for rye bread, meat, and beer. In the eighteenth century, average consumption was about 140 kg of bread per orphan per year, 20 kg of meat, and 14 kg of butter. These figures compare well with the English diets discussed, especially bearing in mind that the orphans were children. The main difference between the orphanage diets and the consumption of the general public was in the type of bread consumed–the general public ate more wheat bread.

When we look to France rather than the Low Countries, conditions look worse. Hufton (1974, pp. 44-48) summarized many studies of eighteenth century worker and peasant diets. They were restricted to a narrow range of food stuffs of which at least 95% were cereals. These were eaten either as bread or "some kind of liquid broth or gruel." Generally the cereals were "rye, barley, oats, buckwheat, maize, or chestnuts" rather than the wheat eaten by English agricultural labourers. The cereal was supplemented with vegetable soup made from "cabbages and turnips, onions, carrots, and greenery from the hedgerows," and it might be thickened with more grain. Milk was added if the family had a cow. "In fact, milk,

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[2]The examples are derived from Eden (1797, II, pp. 99, 433-5, 652, 655, 660-1).

an occasional egg, scraping of cheese, a little pork fat" and fish along the sea coast were the only sources of animal protein. They only had meat if they were in a position to raise their own stock. Not surprisingly, nutritional deficiency diseases were wide spread. Hufton concluded that "if outright starvation vanished with the seventeenth century, permanent undernourishment was the lot of the poor." If this was, indeed, the norm for French labourers, their standard of living was certainly lower than the English or the Dutch, and the French were consuming a diet like the physiologically minimum subsistence wage.

These views can be tested with wages and prices, and Arthur Young (1792, pp.314-5), who was a leading 'political arithmetrician' and toured England and France in the late eighteenth century, was one of the first to try that with the data he collected about the two countries. Expressing the averages for his tours in French sous, he found the average wage in England to have been 33 ½ sous per day compared to the French average of 19 sous. Meat prices were similar in the two countries (8 ½ sous per pound in England versus 7 sous in France), while bread cost more in England than in France (3 ½ sous versus 2 sous per pound). "If meat and bread be combined into one price, it follows, that labour in England, when proportioned to labour in France, should be at 25 ½ *sous* in a day, instead of 33 ½ *sous*." By Young's reckoning, the standard of living of French labourers was only 76% of the English standard. "It may be inferred, that all those classes which depend on labour, and are the most numerous in society, are 76 per cent less at their ease; worse fed, worse clothed and worse supported, than the same classes in England." This was manifest in a low French consumption of meat, "which the French poor rarely eat." Indeed, Young believed that his calculation understated England's advantage over France because the French bread whose price he quotes was of lower quality. "In England, it is very generally made of wheat, and the poor in many parts of the kingdom eat the whitest and best; but in France, the bread is often of rye and other grain, so that the price is not double for the *same* bread." French wheat bread cost more than 2 sous per pound, and using that higher figure implies an even lower standard of living in France. Young was aware that his argument was limited since he used the prices of only bread and meat to gauge the purchasing power of wages, and that the comparison should be broadened to include more consumer goods. "One could wish to see these naked facts ascertained, whatever conclusions may be drawn from them." We will broaden the comparisons later in this chapter to see if England's lead holds up when the full range of consumer goods prices is examined.

The situation was similarly grim in Italy where living standards declined to a very low ebb in the late eighteenth and early nineteenth centuries. This was marked by the spread of maize cultivation, which provided a much cheaper source of calories than wheat bread, which had been the medieval norm. Bread gave way to polenta as the staple food.

> In short, a labourer, a countryman who only ate two pounds of bread during the day would still need a soup in the evening: whereas, for the same price as two pounds of bread, he could buy at least six to seven pounds of polenta, which takes the place of both soup and bread and is more than enough for a man's sustenance. (Quoted by Wolf 1986, p. 59.)

"Meat had vanished from the peasant diet." (Wolf 1986, p. 59). Tobias Smollett in his Travels through France and Italy, 1766, remarked "The nourishment of these poor creatures consists of a kind of meal called Polenta, made of Indian corn, which is very nourishing and agreeable." (quoted by Langer 1975, p. 59) In fact, polenta lacks niacin, so the all-maize

diet led to endemic pellagra and chronic diarrhea. Wolf (1986, p. 58) concluded that "during the eighteenth century the frontier between subsistence and poverty was shifting, in both city and countryside, to the detriment of the former." Not only was the trend downward, but the level was far below that of workers in England.

What about the other end of Eurasia? The common diet in most of Asia was based on the cheapest available grain. "It appears from contemporary accounts that the articles in the diet of the common people in most parts of India consisted chiefly of rice, millets and pulses" (Raychaudhuri and Habib 1982, I, p.164). Palsaert, who visited India in the early seventeenth century, called the Indian diet "monotonous." In the Delhi-Agra region, the people "have nothing but a little kitchery [kedgeree] made of green pulse mixed with rice...eaten with butter in the evening, in the day time they munch a little parched pulse or other grain." The workmen "know little of the taste of meat." Indeed, pigs, cattle, chickens, and eggs were all taboo. Where available, fish was the only source of animal protein. It was a similar story in western India. Wheat was not eaten by the labouring population, whose main source of carbohydrates was millet. This was ground into a course flour and fried up as chapatis that were eaten with pulses and vegetables. Charles Lockyer (1711, p. 258), who toured Asia in the early eighteenth century on the East India Company ship Streatham, observed of the Arab sailors in the Indian Ocean, "They serve for small Wages, and are Victual'd at a much cheaper Rate than our Ship's Companys: Salt-fish, Rice, Gee, and Doll, with a few Fowls, being all the Provisions they care for. Doll is a small Grain, less than Fetches, contains a Substance like our white Peas, and being boil'd with Rice makes Kutcheree."

The restricted character of consumption was also pronounced in other areas. Generally, Indians went barefoot. Contemporary accounts emphasized "the scantiness of clothing." For much of the year, men wore little more than a loin cloth and women a sari. Houses were mud huts with thatched roofs. The peasants and workers had few furnishings besides bamboo mats and cots. Metal pots and utensils were rare, and much cooking was done in earthen pots (Raychaudhuri and Habib 1982, I, pp 459-62). It was hard to spend less money on your life style than this.

As with India, travellers to China described a quasi-vegetarian diet. Sir George Staunton (1798, II, p. 55, 213) in his account of the famous Macartney expedition observed that "the labouring poor" of Beijing "are reduced to the use of vegetable food, with a very rare and scanty relish of animal substance." (Minimalism in consumption extended beyond food: "The inhabitants along the Pei-ho bore strong marks of poverty in their dwellings and apparel.") Lockyer (1711, p. 173) gave a more enthusiastic account of the same diet as consumed by the more prosperous in Canton. "Rice is the general Diet." The Chinese also have "a Cup of Shamshoo, Pouchoo, or other Liquor at Meals, to sup off when their Chops are full." They ate little meat. "It is not brought to the Table in Joints, or large Pieces, as with us' but minced, and served up in Cups, or Small Bowls; whence they take it very dextrously with a couple of small Chop-sticks...They are great lovers of Broth, and will drink even the Liquor their Fish is boil'd in." Historians of China accept that "Europeans certainly ate more meat and far more dairy products than most peoples in Asia." (Pomeranz 2000, p. 35.) In his reconstruction of agricultural output in the Yangtze, Li (1998, p. 111) reviewed the uses of farm goods. "For food, rice was basic." In addition, wheat, which was boiled up as porridge, "was also used in the lean summer seasons to survive rice shortages." Some beans were consumed as was rice wine. Scarcely any animal products were produced. Since the diet consisted mainly of rice, the standard methodology used by historians of China to assess living standards is to estimate per capita rice consumption.

The history of diet suggests that there really was a range in living standards around the globe. Northwest Europe stands out as having the highest standard of living in view of the apparent widespread consumption of expensive and highly refined foods like white bread, meat, dairy products, and beer. In contrast, workers and peasants in France, Italy, India, and China ate a quasi-vegetarian diet of grain, often boiled, with scarcely any animal protein. Diets like these were consumed only by the poorest people in Britain or the Low Countries. The contemporary accounts on which these conclusions are based are not as abundant as one would like and necessarily generalized in their descriptions. How representative were the accounts of eighteenth century travellers? Fortunately, we can address the questions with different evidence that points to the same conclusion.

Wages and prices

We can be more systematic in the comparison of living standards by asking what people could afford to buy. There is, for example, a tradition in French economic history of calculating whether a labourer during the ancien régime could support himself on his wage. Lefebre (1962, I, pp. 216-9), who initiated these calculations, assumed that a family with three children needed seven pounds of bread a day. If bread cost 2 sou per pound, the annual expense came to 5110 (=2x7x365) sou. Assuming the worker was at the lower end of the wage hierarchy and earned only 15 sou per day while working 290 days per year, he would have earned only 4350 sou (=15*290), which is less than the cost of the bread. "Le gain de sa femme devait tout juste préserver la famille de mourir de faim." We can extend these calculations to include more countries, more kinds of workers, and with more completely and realistically specified 'consumption baskets.'

Calculations of this sort depend on large databases of wages and prices. Since the mid nineteenth century, historians of Europe have been writing price histories of cities, and these provide the necessary raw material. Typically, the historian finds an institution like a college, hospital, or monastery that has existed for centuries. The historian then searches its financial records abstracting the price of everything it purchased. The result are time series of the prices of foodstuffs, textiles, and building materials, as well as the wages of people like masons, carpenters, and labourers who worked for the institution. Comparable work for Asia has barely begun, and the available data do not yet run as far back into the past. Nonetheless, enough is at hand to assess pre-industrial living standards around the globe.

The study of wages and prices shows that Britain was a high wage economy. This is true in at least four senses:

1) At the exchange rate, British wages were amongst the highest in the world.
2) British wages were high relative to the cost of consumer goods, i.e. British workers could buy more with their money than workers in many other countries, so living standards were higher in Britain than elsewhere.
3) Wages were higher relative to the price of capital in Britain than elsewhere.
4) Wages were higher relative to the price of energy in Britain than elsewhere.

The third and fourth points are particularly relevant for the incentive to invent coal-powered, mechanized technologies and will be considered when we come to those topics. Here we will take up the first two points.

Figure 1 shows the wage rates of building labourers in leading cities in Europe and

Asia from the middle ages to the nineteenth century. The original sources record wages in the monetary units of the countries concerned, and these must be converted to a uniform standard for comparison. Since silver coins were the principal medium of exchange for most countries in this period, the price of silver functioned as the exchange rate. In Figure 1, all wages have been converted to grams of silver.

The figure shows that wages were similar across Europe in the late middle ages. Whatever the currency, labourers earned about 3.5 grams of silver per day. This uniformity broke down during the sixteenth century when European wages and prices inflated as silver was imported from the Americas. The inflation in wages was greater in northwestern Europe, however, than in eastern Europe or even in Spain, where most of the silver arrived. The history of wages has been studied for many cities on the continent, and they were uniformly like those in Vienna and Valencia. By the end of the seventeenth century, wage inflation ceased in the Low Countries but continued unabated in London. The result was that London wages were the highest in the world during the eighteenth century.

Asian wages were very much lower. The history of Asian wages has not yet been pushed back before the late sixteenth century, but from then onward Asian wages were consistently below European wages. The gap between northwestern Europe and Asia was very large. Continental wages were probably marginally above Asian wages, but the differential was less. Asia, in other words, looks a lot like the lagging parts of Europe.

Did the high wages earned in northwestern Europe translate into a high standard of living? The answer depends on the prices of consumer goods. It is unrealistic to assume that there was only one consumer good (for instance, bread), so instead we specify 'baskets of goods' that correspond to different life styles. The basket must be complete and specified in terms of goods whose prices can be measured or inferred, so that its cost can be worked out around the globe. Taking the earlier discussion of diets and subsistence wages as a guide, I define two baskets of goods. The more expensive is a "European respectability" basket[3] and is inspired by budgets that Eden and other observers report for 'respectable' labourers in Britain and the Low Countries. Table 1 shows that budget. It is replete with meat, bread, cheese, and beer. The respectability budget provided 2500 calories and a whopping 112 g. of protein per day.

The respectability budget was not the kind of diet that workers in most of Europe and Asia were consuming–as we will see, it was just too expensive. Instead, they got their calories and protein in the least cost way from the cheapest available cereal. Since maize was eaten in Italy and rice in Bengal, different diets have been specified for different regions, but they have all been tailored to yield a bit over 1900 calories per person per day. This was about the calories availability in many poor countries in the 1950s before the Green Revolution increased their food supplies. 1900 calories is not enough sustenance for a full day of hard work. These subsistence spending patterns are shown in Tables 2 and 3.

Protein supply varied considerably among the subsistence diets. The oat-based diet of

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[3]This basket is a variant on the basket used in Allen (2001). The main difference is that bread consumption has been increased from182 kg to 234 kg per year to boost the calorie content from 1914 calories to 2500 calories. This seems more appropriate for 'respectability.' Increasing bread consumption raises the cost of the basket 5-10% depending on relative prices. These adjustments lower the welfare ratios (now called respectability ratios) by 5-10% everywhere and so have a negligible impact on relative living standards or their trends.

northwestern Europe gave more protein (84 g per day) than the Asian rice diet, which supplied the least (45 g). However, even that was enough to meet modern nutritional norms. The US recommended daily allowance of protein is .8 grams/day per kilogram of ideal body weight. A man of average height in the early modern period (about 165 cm) with a body-mass index of 20 (in the ideal range) would have weighed 54 kg and required 44 grams of protein per day according to the USRDA. The contrast between the 44 grams required for health and the 112 grams supplied by the European respectability diet highlights the extravagant consumption of protein by English labourers.

The spending patterns in Tables 1-3 apply to a single adult male. To analyse subsistence income, we need to inflate them to include the living expenses of wives and children. Since the recommended calorie intake of a woman is less than a man and since, of course, children need even fewer calories, we can say–reasoning rather loosely–that three 'baskets' like those in Tables 1-3 were needed to support a family with a father, a mother, and some children. In addition, the reader will have noticed that none of those baskets includes the cost of renting housing. This, however, amounted to only about 5% of spending. With these considerations in mind, we can estimate the annual cost of supporting a family as 3.15 (=3 x 1.05) times the cost of the subsistence baskets shown in Tables 1-3.

We can check the balance of income and expense by computing the ratio of full time annual income to annual subsistence cost. The latter is 3.15 times the cost of the baskets in Tables 1-3, while the former is the wage rate multiplied by the time employed. In Europe, most of the wage information refers to daily wages, and we assume that a full year was 250 days–the balance is accounted for by Sundays, religious holidays, illness, and slack time. In India, many of the wage contracts we know of were monthly, so we take annual earnings to be twelve times the monthly figure. Dividing income by the cost of the respectability budget gives the 'respectability ratio,' while dividing income by the cost of a subsistence budget gives the 'subsistence ratio.' In either case a value greater than one indicates that the worker had enough money to buy the lifestyle in question with something to spare; values less than one indicate that the lifestyle was beyond his reach on the maintained assumptions.

Figure 2 shows the history of living standards in leading European cities from the late middle ages to the nineteenth century and in Delhi and Beijing from the seventeenth or eighteenth century into the nineteenth. Figure 2 uses the European respectability basket as the standard. The fifteenth century was a peak for labourers across Europe. If they worked 250 days per year, they earned about 50% more than the cost of the respectability basket (i.e. the respectability ratio equalled 1.5). Wages sagged everywhere in the sixteenth century as population grew, but there was a rebound in London and Amsterdam, so workers in those cities maintained high living standards with full time earnings that were ample enough to buy the respectability basket. It was a different story for workers in Vienna and Florence, and, indeed, their experience was the norm for most European workers. The real income slide continued steadily, so that by the mid-nineteenth century, full time annual earnings amounted to half or less of the cost of the northwestern respectability lifestyle.

Starting in the seventeenth century, we can add Asian wages to the comparison. The experience of India and Beijing looks like the pattern in Vienna and Florence. In the seventeenth century, wages in Delhi were almost enough to buy the European respectability basket. Would Indian workers have done even better if we could look further back in time? At the moment we do not know. What we do know is that, by the eighteenth century, Asian workers did not earn enough to buy a respectable European standard of living. They earned only 30-40% of that cost.

How did Asian and European workers survive when they only earned 30 - 40% of the cost of a respectable life style? Could they buy enough to eat? Figure 3 sheds light on this question by summarizing subsistence ratios (full time annual earnings divided by a family's cost of the subsistence lifestyle). The rankings and basic patterns are the same as in Figure 2, although there are some interesting differences. Basing the diet on oats means that workers in Amsterdam generally had greater–as well as less volatile–purchasing power than their counterparts in London. But both groups of workers were very well off, by this measure, earning three to four times the cost of a bare bones subsistence income. In the late middle ages, workers in Vienna and Florence–indeed in other continental cities–enjoyed that high standard of living, but their good fortune did not last, for their incomes in the nineteenth century were barely enough to purchase the physiological minimum. Indeed, the wages of Italian and Chinese men were not quite enough to buy even that–the meagre earnings of the wife or the garden produce of a scrap of land were necessary for family survival. The income and expenditure calculations confirm the observations of the nineteenth century observers of the 'polenta economy.'

India does better in comparisons using subsistence standards of living. In the seventeenth century, workers in north India could earn three times the cost of the subsistence basket if they worked full time for the full year. This income was on a par with the prosperity of their counterparts in London (at its trough) but below that of Amsterdam. In this respect, the calculations provide some support for the revisionist historians who see little difference between pre-industrial Europe and Asia (Parthasarathi 1998, 2001, Pomeranz 2000). By the nineteenth century, however, this prosperity had slipped away, and north Indian workers were barely able to purchase the subsistence basket. Our information about wages in Beijing only begins in 1738, and for the next two centuries, average earnings hovered around the cost of the subsistence basket just as they did in Delhi, Florence, and Vienna. In this period, there was little difference in real income between Asia and the backward parts of Europe.

Wage convergence in Britain

Within Britain, the geographical boundary of the high wage economy shifted over time. In the fifteenth century, real wages were high in all parts of the country. This was a legacy of the Black Death in 1348/9. So many people died that there was a labour shortage everywhere until population growth resumed in the mid-sixteenth century. After 1550, real wages fell everywhere. The dropped was attenuated in London whose population exploded from 50 thousand in 1500 to 200 thousand a century later. The rapid growth of the city's economy led to tight labour markets and rising wages that attracted a flood of migrants from adjoining counties. This is manifest in Figure 4 as London's wage pulled above wages in Oxford and York after 1550: By the early seventeenth century, the earnings of fully employed unskilled workers in rural England dropped to only 60% of the respectability budget. Geographical differentials were then at their greatest, and the high wage economy was confined to London.

By the late seventeenth century, the high wage economy began to spread north as provincial wages began to close the gap with London. Figure 4 shows the daily wage in Oxford rising toward the London level from the late seventeenth century. Throughout the eighteenth century, fully employed labourers in Oxford were earning enough to buy the respectability budget. Incomes also rose in the North but less rapidly. In York, labourers only earned 80% of the respectability budget in the eighteenth century. This gap was not

closed until the industrial revolution when northern wages and southern provincial wages again approached London levels. It was only after 1800 that unskilled workers in York earned enough to buy the respectability budget.[4]

Skilled Workers

Thus far we have spoken only of unskilled workers, people generally described as 'labourers.' In England in the eighteenth century, about half of the population was described in this way. Skilled workers always earned more. In Europe, the wage of a carpenter or a mason was about 60% higher than the wage of a labourer. Our information about Asian wages is fragmentary and not entirely consistent. Some information for early modern India suggests that the skill premium was about 100%; fuller information for eighteenth century China points to a skill premium of 60% as in Europe (van Zanden 2004). For the moment, I will concentrate on the European pattern, which is better established and helps delineate the high wage district on the continent.

Figure 5 shows respectability ratios for building craftsmen across Europe. These ratios were all higher than the corresponding ratios for labourers. Indeed, in most cases, the ratios were greater than one indicating that carpenters and masons who were employed full time could purchase the respectable lifestyle with some money to spare. There were important differences in trend, however. In London and the Low Countries, the real incomes of craftsmen remained high through the early modern period, while living standards fell on the rest of the continent. In contrast, by the second half of the eighteenth century, the real incomes of craftsmen in Valencia and Florence had dropped just below one. They had no surplus income (indeed a slight deficit) if they bought the respectable lifestyle. This was a common pattern in Europe. The situation in Paris and Vienna was not quite as dire, although the respectability ratio for Viennese craftsmen dropped below one in the first half of the nineteenth century. In eighteenth century Paris and Vienna, masons and carpenters could buy the respectable lifestyle with a little left over.

We can now see the boundaries of the high wage economy. Its core was always the maritime ports--London and the cities of the Low Countries. In the core, even unskilled workers always earned enough to buy the respectability budget. Skilled workers, of course, did better. In the course of the seventeenth and eighteenth centuries, the high wage economy advanced north through England, so that unskilled workers in northern cities could buy the respectability lifestyle early in the nineteenth century. On the continent, there is no evidence of geographical spread, but there were pockets of moderately high incomes in cities like Paris and Vienna. In Paris, for instance, skilled workers certainly earned enough to buy the respectable lifestyle, and the earnings of the unskilled came close, although they were noticeably less than in London or Amsterdam. As a result, some of the consequences of the high wage economy extended to Paris in attenuated form.

What the high wage economy meant for the quality of life

One reason that high wages and high subsistence ratios were important is because they indicate the presence of purchasing power beyond that required for basic needs. There were

[4]This issue was first addressed by Gilboy (1934).

many ways to spend that surplus, and the choices people made had a big impact on the quality of their lives and the growth of their economies. Here are six aspects of life that were influenced by real incomes:

food quantity

People earning enough money to buy the physiological subsistence income did not (by definition) starve to death, but neither were they well fed. At 1920 calories per day, most people feel hungry, particularly if they have to do heavy physical labour. Higher incomes, therefore, led to greater calorie consumption. This pattern has been confirmed by many budget studies. Table 4 shows one set of figures. These budgets were compiled by Alexander Somerville(1843) and were apparently based on a survey of workers in northern England.[5] The highest wage corresponds to skilled tradesmen like masons or carpenters. The next highest (186 d per week or 31 d per day) corresponds to building labourers. The third highest (120d per week) represents the average earnings of cotton mill operative. The lowest income corresponds to intermittent employment

Budgets collected by social investigators often look stylised or censored–in this case by under reporting alcohol consumption. Nonetheless, they indicate some important trends in consumption. Table 4 shows, in particular, that food consumption increased steadily with income. Calories consumed per adult male rose from 1605 per day in the poorest paid job, a rate which barely sustains basal metabolism, to 3937 calories among the skilled trades. This is a twenty first century level of intake.

The patterns in Table 4 apply internationally and, thus, highlight the connections between wages and diets that we discussed earlier. The low consumption of meat by French and Italian workers was the result of their low wages. More broadly, Fogel (1991, p. 45) has estimated the average calorie consumption in England and France in the late eighteenth century, and his results are consistent with these patterns. He found that the average Englishman consumed 2700 calories per day, while the average Frenchman only had 2290. Forty per cent of the French population received less than 1958 calories, while only 20% of the English were in a similar situation. The lack of consumer purchasing power explains why the French ate so little food.

In the mideighteenth century, international trade in food was limited, so most food consumed in a country was also produced in that country. Consequently, there is an agricultural production story that corresponds to the wage and diet story. Based on wages and prices, I have estimated per capita food consumption across Europe. In 1750, more food per head was produced in England than anywhere else. In the Low Countries, food production per capita was 92% of the English level. Elsewhere, production per person was much lower: French production per head was 71% of the English–about the difference in the average real wage as estimated by Arthur Young–while Italy was at 60% of the English level. It is common place to say that unproductive agriculture on the continent caused a low standard of living for the people living there, but it is equally possible that it was high wages and high food demand in England that led to the high productivity of its farmers. We will take up this

[5]Horrell and Humphries (1992) provide a statistical analysis of many budgets spanning the industrial revolution. Their work focuses on spending categories rather than food quantities and, in that regard, supports the conclusions from the Somerville budgets.

chicken and egg problem in chapter xx.

food quality

Not only did people in the high wage economy eat more food, they ate more expensive food. One of the unpleasant features of the physiological subsistence diet was its 'monotony' as Palsaert noticed. A repetitive diet of the cheapest grains is unpalatable. During the fifteenth century, when real wages were very high, desirable diets emphasized bread, meat, and alcohol (Dyer 1989, pp. 158-9). During the seventeenth and eighteenth centuries, imported commodities were added to the list of preferred foods. By the middle of the eighteenth century, sugar and tea were universally consumed. Middle class Englishmen enjoyed coffee, chocolate, and tobacco, but they do not appear regularly in working class consumption. By the nineteenth century, potatoes were widely consumed amongst workers, but they were regarded as cheap but inferior source of calories.

The preference for these foods is shown by the increased expenditure on them shown in Table 4. It indicates that the poorest workers did not consume the tropical goods like tea and sugar. Protein consumption increased from 64 grams/day for the poorest men to a staggering 147 grams/day for the best paid. An index of the shift in preferences is the rise in the cost of a calorie shown in Table 4. As food consumption was tilted towards expensive sources of nutrition like meat, the cost per calorie rose almost 50%.

Physical well-being, health, and stature

The higher level of food consumption in northwestern European led to better health, longer life, and a more productive workforce.

The most widely studied indicator of health outcomes is stature. Beginning in the seventeenth century, European armies recorded the heights of recruits, and historians have used this information to estimate the average height of the adult population. The task is not simple since armies often required soldiers to be taller than a specified minimum (so there is no information about shorter men), and, in the absence of universal conscription, the recruits were not a random sample of the population. The latter problem is alleviated after the mid-nineteenth century when universal conscription was introduced in many European countries. Around 1880, the average Frenchman was about 165 cm. tall, while the average Italian was only 163 cm. At the same time, recruits in the British army (which was not raised by universal conscription) were close to 170 cm. The situation a century earlier was similar: the heights of British army recruits imply an average height of about 169 cm for the male population (Floud, Wachter and Gregory 1990, pp. 140-9). French records indicate that Frenchmen were only 162 cm tall in the seventeenth century. Their average height jumped to 168 centimetres in the 1740s and dropped again to 165 cm in the 1760s (Komlos 2003, p. 168). The heights of men in Lombardy dropped from 167 cm in the 1730s to 164 cm in the early nineteenth century. In the late eighteenth and early nineteenth centuries, men in the Austrian empire were even shorter–about 162 cm. (A'Hearn 2003, pp. 370-1). Heights are determined by net nutritional intake during childhood. To the degree that low real wages implied restricted food consumption, one would expect Frenchmen and Italians to be shorter than the English counterparts, as they were.

Real incomes had other implications for health. Fogel (1991, p. 48) has shown that short men were more likely to have been rejected as recruits for the American Union army in

1861-5 because of chronic diseases. More dramatically, middle aged men who are short are more likely to die than are tall men. If these relations hold generally, then one would expect that health and longevity were significantly greater in early modern England and the Low Countries than in most other parts of Europe. Indeed, the death rate was higher in eighteenth century France than in England. Fogel (1991, p. 46) has claimed that much of that gap reflected differences in food consumption.

The income and diet differences also had implications for economic performance. One was work intensity. People subsisting on low calorie diets had less energy to work. On the basis of his calorie estimates, Fogel (1991, p. 46) claimed that 20% of the French population could do no more than three hours of light work per day. The corresponding proportion was much smaller in England. The inability of people to do a hard day's work severely limited the output of the economy when so much still depended on human muscle. Conversely, historians have devoted much attention to the 'industrious revolution' in the seventeenth and eighteenth centuries when, it is contended, most people worked more hours per year than they had previously (de Vries 1993, Voth 2000). This was only possible when people had enough food for long, hard work. For that reason, the industrious revolution was the result of the high wage economy and was confined principally to England and the Low Countries. Elsewhere in Europe, many people were too hungry to be very industrious.

consumer revolution

The 'consumer revolution' has been an important theme in recent writing on the eighteenth century. McKendrick, Brewer, and Plumb (1982, p. 1) first proclaimed "There was a consumer revolution in eighteenth-century England." Two sorts of evidence point to the change. One is contemporary discussions of trade and 'luxury' consumption; the second is statistical evidence of the increased consumption of 'luxuries' and novelties. These goods included tropical foodstuffs (tea, sugar, coffee, chocolate), imported Asian manufactures (cotton textiles, silk, and Chinese porcelain), and British manufactures (imitations of the Asian imports and a wide range of other items like books, furniture, clocks, glassware, crockery, and metal products). While the consumer revolution was regarded by contemporaries as a British phenomenon (Berg 2005, pp. 7-8), it also characterized the Low Countries and extended to cosmopolitan centres like Paris (de Vries 1993, Fairchilds 1993).

Who was buying these consumer goods? There is no doubt that the upper and middle classes were major purchasers. It is less clear how far down the social hierarchy this upsurge in consumer spending extended. Working class budgets recorded the purchase of sugar and tea but little was spent on manufactures other than textiles or shoes. The budgets were often stylized depictions, however, and probably portrayed spending in more prudent terms than actually occurred, so 'luxury' consumption may have been under reported.

We need another approach to see if workers were part of the consumer revolution. Probate inventories are important in this regard, for they provide a glimpse into people's homes. When someone died, the executor of his or her estate listed and valued the deceased's personal property, and recorded many consumer durables. The detail in English inventories is particularly good from the middle of the sixteenth century until about 1730 after which summary valuations only are given. This is unfortunate, for the consumer revolution reached its apogee in the second half of the eighteenth century. Inventories usually indicate the deceased's occupation and residence, so consumption can be related to these variables.

Weatherill (1996, pp. 76, 78) has studied the ownership of 17 manufactured goods in English inventories between 1675 and 1725. Some are traditional (tables, cooking pots,

pewter plates and dishes, silver or gold), and, indeed, almost everyone had a table, cooking pots and some pewter. The other items were novel, and these included sauce pans, earthenware, books, clocks, pictures, looking glasses, window curtains, table linen, china, knives and forks, and utensils for hot beverages. London emerges as a trend setter that was followed by provincial towns with villages far behind. Moreover, the ownership of novel items was increasing over the period. Not unexpectedly, Weatherill finds that people with more money and status were more likely to own 'luxuries.'

Ownership of novel items is a marker of the consumer revolution. Labourers participated to some degree: Earthernware was British manufactured crockery that was displacing pewter. 43% of the labourers owned earthenware, and that was about the proportion of all social classes. 10% - 20% of the labourers owned saucepans (which were a new style of cooking utensil), pewter plates (another new food serving item), and table linen. These proportions were much lower those of higher social classes but do indicate some participation in new trends–and some disposable income. Labourers owned virtually none of the other novelties like books, clocks, mirrors, etc. It would be intriguing to know whether they bought more of these items as the eighteenth century progressed, but the inventories, unfortunately, are silent on this.

Weatherill (1996, p. 168) tallied the possessions of skilled workers under the headings of tradesmen of low and intermediate status. Like the labourers, they owned a basic complement of tables, cooking pots, and pewter. They were very much more likely to own saucepans, pewter plates, and table linen. Many of them owned books, clocks, looking glasses, pictures, and window curtains. About one tenth of the tradesmen of intermediate status owned knives and forks (these were novel eating utensils), imported China, and apparatus for brewing tea or coffee. This proportion was not much different from that of the gentry. Again, our understanding of the consumer revolution would be strengthened if we could follow these trends to 1800, but the sources give out.

The inventory evidence does suggest that in England, the market for imported and novel consumer goods extended down to the working class. The skilled workers earning the highest wages were the most active buyers, and their purchases extended to many new and imported goods. Less well paid labourers were more modest buyers, but even they were purchasing some of the British products. Inventory evidence for the Low countries and eighteenth century Paris suggests a similar pattern. Outside of these areas there is not much evidence of working class purchases of these kinds of goods.

These patterns make very good sense in terms of the wage history developed here. The high wage economy was centred on England and the Low Countries with some lesser offshoots in capital cities like Paris and Vienna. These, indeed, were the places where the consumer revolution occurred. Desire for consumer goods may have been more widespread, but it was the high wage economy that gave the workers the cash to turn their dreams into reality.

<u>education and learning, skill differentials</u>

Workers in northwestern Europe could enjoy their new found affluence in ways other than eating or consuming; in particular, they could acquire learning and skills. Sometimes this was done for pleasure and sometimes for gain. Economists usually assume the second motivation was primary and call education 'human capital' since schooling involves expending resources at one time in order to realize a higher income at a later date. Three

aspects of 'human capital formation' need to be considered. They are literacy, numeracy, and apprenticeship

Start with literacy. Its spread has been studied by measuring the proportion of people who could sign their names (rather than make a mark) to marriage registers and other official documents. The ability to sign one's name is an imperfect indicator both because it does not indicate great skill and because many people learned to read without learning to write. Nonetheless, signing can be observed for many people over long periods and–historians presume–was correlated with a wider range of literacy skills.

The signature information indicates that literacy increased dramatically during the early modern period especially in the high wage economies of northwestern Europe. In the late middle ages, literacy was mainly confined to the cities. In Venice, for instance, 33% of the men and 13% of the women were literate in 1587 (Grendler 1989, p. 46), and other cities were similar. Only about 5% of the rural population could read. Based on these proportions and the urban-rural breakdown of the population, the literacy rates for 1500 have been guesstimated (Table 5). At that time, literacy was very low in England–about 6%.

Table 5 also reports estimates of the literacy rate in 1800. Most of these figures are based on marriage registers. Literacy was highest in northwestern Europe–the Low countries, the Rhine Valley in Germany, northeastern France, and England where over half of the population could sign their names. These districts were high wage regions or ones adjacent to them and probably influenced by them. Many people from western Germany, for instance, moved to the Netherlands to replace Dutchmen who migrated to the East Indies. There was a great need for immigrants since one fifth of the men born in the Netherlands in the eighteenth century died in east Asia.[6]

People probably learned to read for two reasons–economics and pleasure. Literacy was much more valuable in trade and business than in small scale farming–at least during the middle ages–which is why literacy was higher in medieval cities than in the countryside. This motive persisted through the early modern period. Some of the rise in literacy in northwestern Europe reflected the urbanization of the period. But urbanization was not enough to explain the upsurge in literacy after 1500, for more people were reading in both town and country in the eighteenth century. Protestantism put a premium on reading God's word, and that may have played a role. Catholics in northwestern Europe, however, learned to read and write just like Protestants. The agrarian world was transformed by the legalistically justified reorganization of private estates and by state-sponsored reforms like the enclosure movement, both of which put a premium on being able to navigate through written documents. Economic change raised the value of reading and writing; and, indeed, many eighteenth century books were legal, technical, or otherwise functional. Religion and work were not the only inducements to reading: The early modern period saw the publication of cheap scatological tracts on religion and politics. Irreverence may have been a motive as well as religion (Reis 2005).

Greater numeracy was another aspect of human capital formation. The proportion of

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[6]The population of the Netherlands was about 1.9 million in the mid-eighteenth century. With a birth rate of 30 per thousand, there were 57,000 births of which 28,500 were men. About 8000 men shipped out to the East Indies each year of whom 70% (5600) never returned. 5600/28500 is approximately one fifth. Figures from de Vries and van der Woude (1997, pp. 50, 439, 453).

people with command of arithmetic and geometry is more difficult to gauge than the proportion who were literate since there was no analogue to marriage registers where a broad swath of the population had to sign their names. Thomas (1987, p. 128) has reviewed much impressionistic evidence and concluded that "there can be little doubt that numerical skills were more widely dispersed" in England "in 1700 than they had been two centuries earlier." Landed gentlemen in 1500 could rarely add or subtract, while their successors two centuries later probably could. By the eighteenth century, there was a voluminous trade in arithmetic books, which suggests that many people were learning the skills. Arithmetic, indeed, had become more powerful: arabic numerals had replaced Roman, while logarithms and slide rules sped calculation. Unlike reading where pleasure may have been a motive, very few people learn maths for fun: the incentive was instrumental. Geometry was necessary for navigation and surveying that grew in demand as England's merchant marine expanded and its agriculture was reorganized. The examples in the arithmetic texts were drawn from trade and commerce, which must have been the main application of these skills. It was the growth of the urban, commercial economy that generated the demand for mathematical skills that prompted their acquisition.

Literacy and numeracy were general skills that became more widespread. There was also an increase in specific, craft skills. Agriculture was the largest employer in the middle ages, and it required diverse competences. Most people learned them as children from their parents, and some skills were also acquired by young adults working as farm servants. Servants were hired by the year and received room and board from their employer.

Outside of agriculture, apprenticeship was the established route for acquiring skills, and completion of an apprenticeship was a legal requirement to practice many trades in most parts of Europe. Apprenticeships were contracts in which the master agreed to house and feed the apprentice and to teach him the trade. The apprentice agreed to work for the master, usually without any pay beyond the room and board, for the duration of the contract. In addition, the apprentice gave the master a payment at the beginning of the apprenticeship. Successful completion of the apprenticeship allowed the apprentice to practice the trade and, in England, conferred importance social benefits such as a settlement under the Poor Law. Perhaps two thirds of boys in the seventeenth and eighteenth centuries completed apprenticeships, so the institution was of great importance (Humphries 2007 xx).

The success of apprenticeship depended on two things. One was the quality and effectiveness of guilds. They regulated masters and ensured that apprentices received the training that the masters promised to provide. The second was the prosperity of the parents. They made large payments to the masters at the beginning of the apprenticeship. They had to save it themselves or raise it from relatives. Sometimes, payment by installment was possible, but that was less desirable from the master's point of view. There were no 'student loans' to finance this training, and if the parents lacked the financial resources, the system would collapse. It is worth noting that the capital requirements did not end there. To become a master, a boy had to raise the capital to start a business even after he completed the apprenticeship, and that usually required saving part of his pay as a journeyman.

These financial considerations highlight the importance of the high wage economy, which underpinned all three types of human capital accumulation. Charitable support aside, parents had to pay for schooling and apprenticeships. The Ealing gardener we met earlier was spending 6d per week to educate his two daughters–as much as he spent on beer. Had he been poorer, he might have found school 'too expensive.' Literacy and numeracy were everywhere highest among the wealthy. It was only in England and the Low Countries that a

majority of labourers could sign their names. In the low wage parts of Europe, peasants and labourers were little more literate than they had been in the late middle ages (Reis 2005, pp. 206-7). A similar situation probably applied to numeracy. High wages facilitated all forms of skill acquisition: The ability of parents to come up with the cash to pay the master for taking on their son was eased if they were in receipt of high wages, and the ease with which a journeyman could save the money to start a business was helped if journeymen earned more than it cost to survive. Widespread literacy, numeracy, and craft competence reflected the demand for skills in the advanced economies, and the high wages those economies generated gave workers the money to pay for schooling and apprenticeships.

marriage patterns

At the beginning of this chapter, we discussed Malthus' explanation for Britain's high standard of living, namely, the preventive check. The cultural embodiment of that check is the European marriage pattern identified by Hajnal (1965). He found that early twentieth century censuses showed two patterns of marriage in the world. East and south of a line from St. Petersburg to Trieste, virtually all women married, and many of them married in their teens. West and north of that line, as many as one fifth of women never married, and most of those who did marry waited until their twenties. These tendencies were most pronounced in northwestern Europe. The first marriage pattern corresponds to the positive check where fertility was at its peak and unresponsive to economic conditions. The second, which Hajnal called the European marriage pattern, implies a lower level of fertility and one that does respond to economic conditions through shifts in the proportion of women marrying and the average age of women at first marriage.

What explains the European marriage pattern? De Moor and van Zanden (2005) have traced it back to England and the Low Countries in the late middle ages. While developments in religious doctrine that emphasized the role of personal (rather than family) choice of marriage partner played a background role, the decisive factor was the high wage economy following the Black Death. High wages and the corresponding strong demand for labour meant that young people–and young women in particular–could support themselves apart from their parents and control their lives and marriages. The wage decline of the sixteenth century threatened this independence, but the high wage economy of northwestern Europe guaranteed its existence, and, indeed, marriages in that part of Europe were the most independent from parental influence and exhibited the characteristics of the European pattern most fully. It is, indeed, remarkable that such a personal aspect of life as marriage arrangements can be traced to the high wage economy.

Conclusion

England and the Low Countries stood out in the eighteenth century for their high wage economies. At the exchange rates, wages were higher in northwestern Europe than elsewhere. Since English and Dutch industries were highly competitive internationally, their productivity must also have been high.

English and Dutch wages were also high relative to the cost of living. In most of continental Europe and Asia in the eighteenth century, a labourer's wage was just enough to keep his family at bare bones subsistence. In contrast, labourers in England and the Netherlands could afford a diet with meat, beer, and cheese and still have a little left over to

buy the odd luxury. Craftsmen were even better off. As a result of their high wages, workers in England and the Low Countries ate more and better food than their counterparts elsewhere. As a result, people in northwestern Europe were taller and had more energy to work harder and longer. Their exertions underpinned economic expansion. In addition, these favoured workers had money to buy novel and exotic consumer goods. They were an important part of the 'consumer revolution' that provided a mass market for non-traditional goods that prompted much product innovation in English manufacturing. Finally, the high wage economy meant that workers in northwestern Europe had a surplus from which they could save the resources to provide their children with schooling and apprenticeships. Not only were workers along the North Sea bigger and more energetic, they also had more human capital than their counterparts elsewhere in the world. A better fed, better educated population was a key to the industrial revolution.

Table 1

The Respectable Lifestyle: Basket of Goods

	quantity per person per year	price g. silver per unit	spending share	nutrients/day calories	grams of protein
bread	234 kg	.693	36.0%	1571	64
beans/peas	52 l	.477	5.5	370	28
meat	26 kg	2.213	12.8	178	14
butter	5.2 kg	3.470	4.0	104	0
cheese	5.2 kg	2.843	3.3	54	3
eggs	52 each	.010	1.1	11	1
beer	182 l	.470	20.0	212	2
soap	2.6 kg	2.880	1.7		
linen	5 m	4.369	4.8		
candles	2.6 kg	4.980	2.9		
lamp oil	2.6 l	7.545	4.3		
fuel	5.0 M BTU	4.164	4.6		
total		450.956	100.0%	2500	112

Note:
(1) Where oil and wine were consumed instead of butter and beer, 5.2 litres of olive oil were substituted for the butter and 68.25 litres of wine for the beer. 5.2 litres of olive oil yields 116 calories per day and no protein; 68.25 litres of wine gives 159 calories per day and no protein. In Strasbourg, the average prices 1745-54 were 7.545 grams of silver for olive oil and .965 grams of silver for wine.
(2) M BTU = millions of BTUs
(3) prices are in grams of silver per unit. Prices are averages for Strasbourg in 1745-54. The total shown in the price column is the total cost of the basket at the prices shown.
(4) Nutrients are computed assuming the following composition:

	Calories	Grams of Protein
bread	2450 per kg	100 per kg
beans/peas	2592 per litre	199 grams per litre
meat	2500 per kg	200 per kg
butter	7286 per kg	7 per kg
cheese	3750 per kg	214 per kg
eggs	79 each	6.25 each
beer	426 per litre	3 per litre
wine	850 per litre	0 per litre

Table 2

Subsistence Lifestyle: Baskets of Goods

	Indian rice			Indian millet		
	quantity per person per year	nutrients/day grams of calories	protein	quantity per person Per year	nutrients/day calories	prot
oats						
rice	162 kg	1607	33			
millet				205 kg	1698	62
bread						
beans/peas	20 kg	199	11	10 kg	100	5
meat	3 kg	21	1	3 kg	21	1
butter/ghi	3 kg	72	0	3 kg	72	0
cheese						
eggs						
beer						
sugar	2 kg	21	0	2 kg	21	0
soap						
cotton	3 m			3 m		
candles						
lamp oil						
fuel						
total		1920	45		1912	68

Table 3

Subsistence Incomes: Baskets of Goods

	European oats			Beijing sorghum		
	quantity per person per year	nutrients/day grams of calories	protein	quantiy per person per year	nutrients/day grams of calories	prot
sorghum				156	1453	48
oats	163 kg	1745	75			
rice						
millet						
bread						
beans/peas	5 kg	47	4	39.52	370	28
meat	5 kg	34	3	8	34	3
butter/oil	3 kg	60	0	3	60	0
cheese	3 kg	31	2			
eggs						
beer						
sugar						
soap	1.3 kg					
linen/cotton	3 m			3 m		
candles	1.3 kg					
lamp oil	1.3 l					
fuel	3.0 M BTU			2.0 M BTU		
total		1914	84		1917	79

Table 4

How Food Consumption varied with Income: Somerville's Budgets

	Weekly income			
	66 d	120 d	180 d	318 d
pounds of food and pints of milk consumed per week				
flour	8.54	12.20	17.08	19.53
oatmeal	7.50	13.75	11.25	15.00
potatoes	17.39	34.78	36.52	34.78
milk	7.33	4.00	6.00	6.67
butter	0.00	0.00	0.80	1.28
meat	0.00	0.00	1.09	2.55
beacon	0.29	1.14	0.57	0.43
cheese	0.00	0.00	0.56	0.80
sugar	0.00	0.57	1.26	2.40
tea	0.00	0.00	0.12	0.23
% of income spent on food	85%	76	74	61
calories/day per adult male	1605	2806	3219	3937
grams protein/day per adult male	64	106	119	147
index of food cost/calorie	1.00	.92	1.23	1.41

Notes:
1) The income class of 318 d is also shown consuming 6d per week of beer. I have ignored this.
2) The calculations of calories/day and protein/day per adult male assume that the family consisted of three adult male equivalents, the same assumption used in the subsistence and respectability ratios.
3) The index of food cost per calorie is based on the cost of food divided by the calories it contained.
4) The food quantities were obtained by dividing the expenditure on each item by their prices.

Source: Somerville (1843, pp. 12-3).

Table 5

Adult Literacy, 1500 - 1800

Proportion of the Adult Population
That Could Sign Its Name

	1500	1800
England	.06	.53
Netherlands	.10	.68
Belgium	.10	.49
Germany	.06	.35
France	.07	.37
Austria/Hungary	.06	.21
Poland	.06	.21
Italy	.09	.22
Spain	.09	.20

Sources:

1500--estimated from rural-urban breakdown.

Rural population assumed to be 5% literate. This is suggested by later data from Nalle (1989, p. 71) and Houston (1988, pp. 140-1, 152-3)for Spain, (Wyczanski 1974, p. 713) for Poland, Le Roy Ladurie (1974, pp. 161-4) for Langudoc, Graff (1987, p. 106) for England.
Urban population assumed to be 23% literate generalizing from Grendler's (1989, p. 46) estimate for Venice in 1587 that 33% of the men and 12.2%-13.2% of the women were literate for an overall average of 23%. The proportion was of the same order in Valencia (Nalle 1989, p. 71), among the nobles and bourgeoisie of Poland (Wyczanski 1974, p. 713), and perhaps a bit lower in fifteenth century London (Graff 1987, p. 106). The small urban shares in countries besides Spain and Italy at this time mean that the urban literacy rate had no discernible impact on the national average.

1800--Data are fuller for the seventeenth and eighteenth centuries and include: Nalle (1989), Houston (1988), Graff (1987), Cressy (1980, 1981), Fraga (1990), Grendler (1989), Ruwet and Wellemans (1978), Wyczanski (1974), Francois (1989), Furet and Ozouf (1977), Gelabert (1987), de Vries and van der Woude (1997), Park (1980), Chartier (1987), Cipolla (1969), Kuijpers (1997), Larguie (1987).

Figure 1


Labourers' wages around the world
grams of silver per day
20
15
10
5
0
1375
1475
1575
1675
1775
London
Amsterdam
Vienna
Florence
Delhi
Beijing

Figure 2

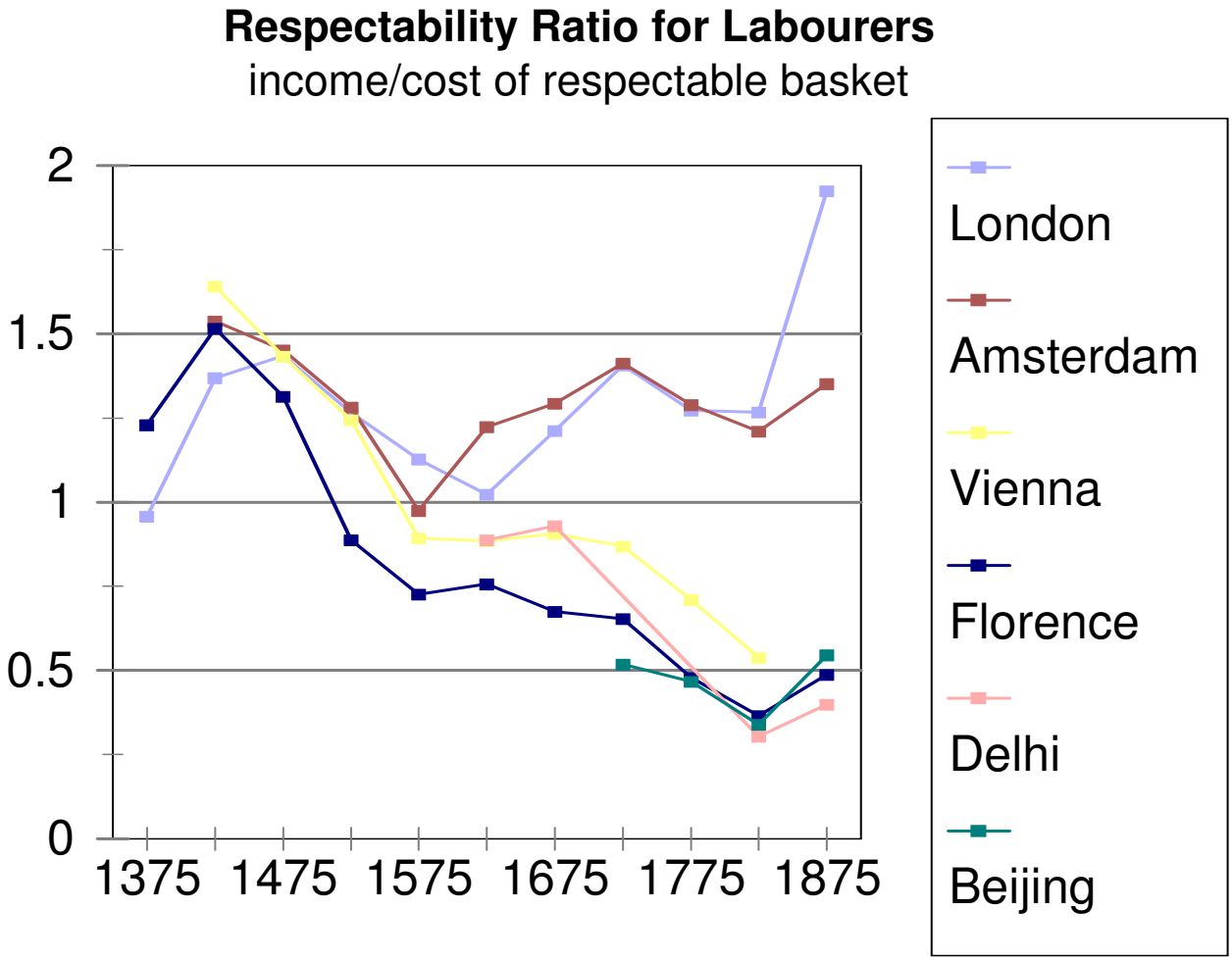

Respectability Ratio for Labourers
income/cost of respectable basket
2
1.5
1
0.5
0
1375
1475
1575
1675
1775
1875
London
Amsterdam
Vienna
Florence
Delhi
Beijing

Figure 3

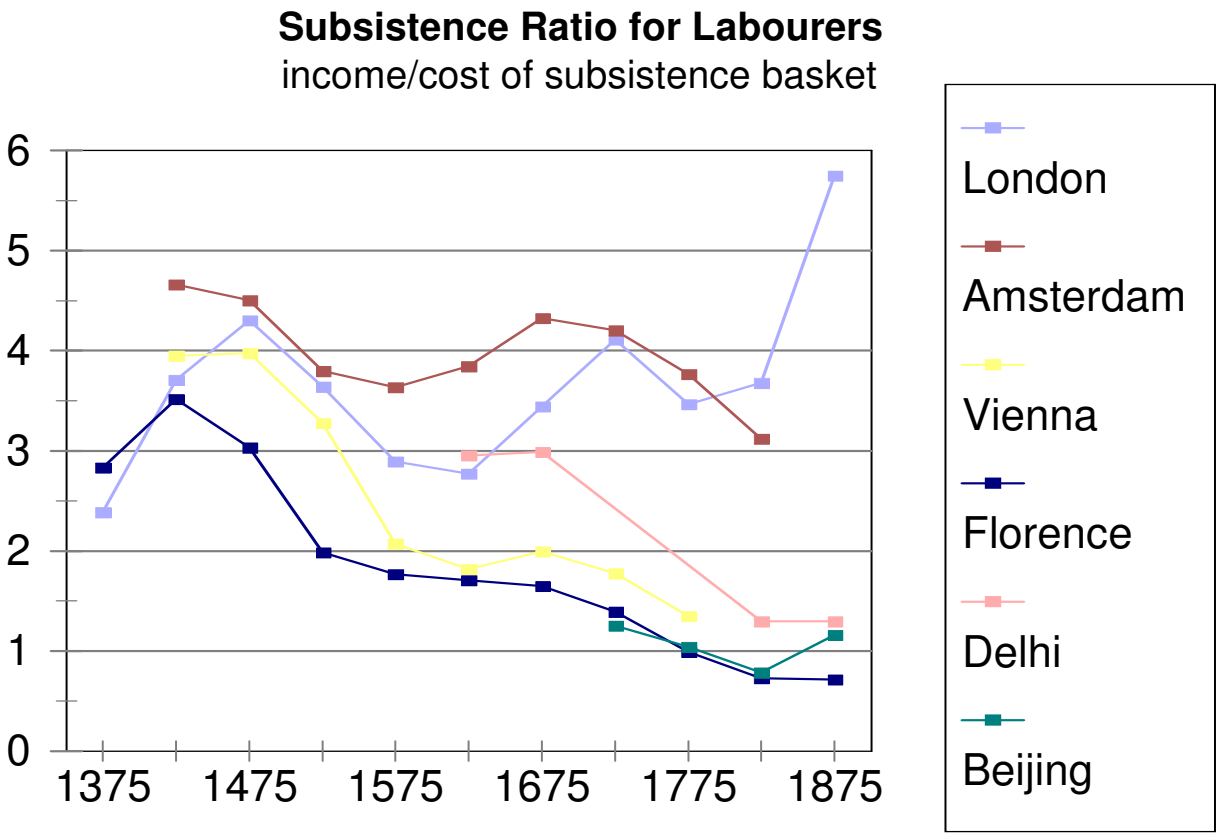

Subsistence Ratio for Labourers
income/cost of subsistence basket
6
5
4
3
2
1
0
1375
1475
1575
1675
1775
1875
London
Amsterdam
Vienna
Florence
Delhi
Beijing

Figure 4

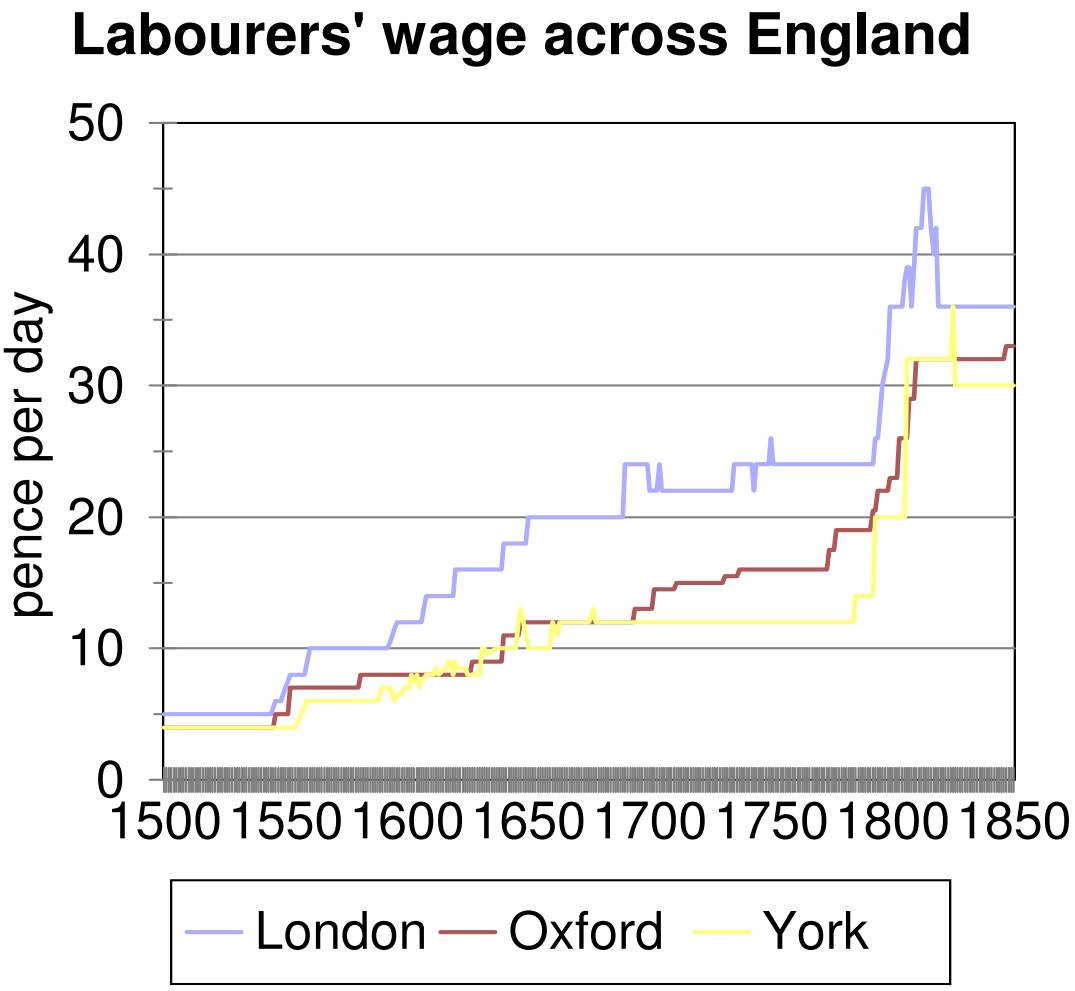
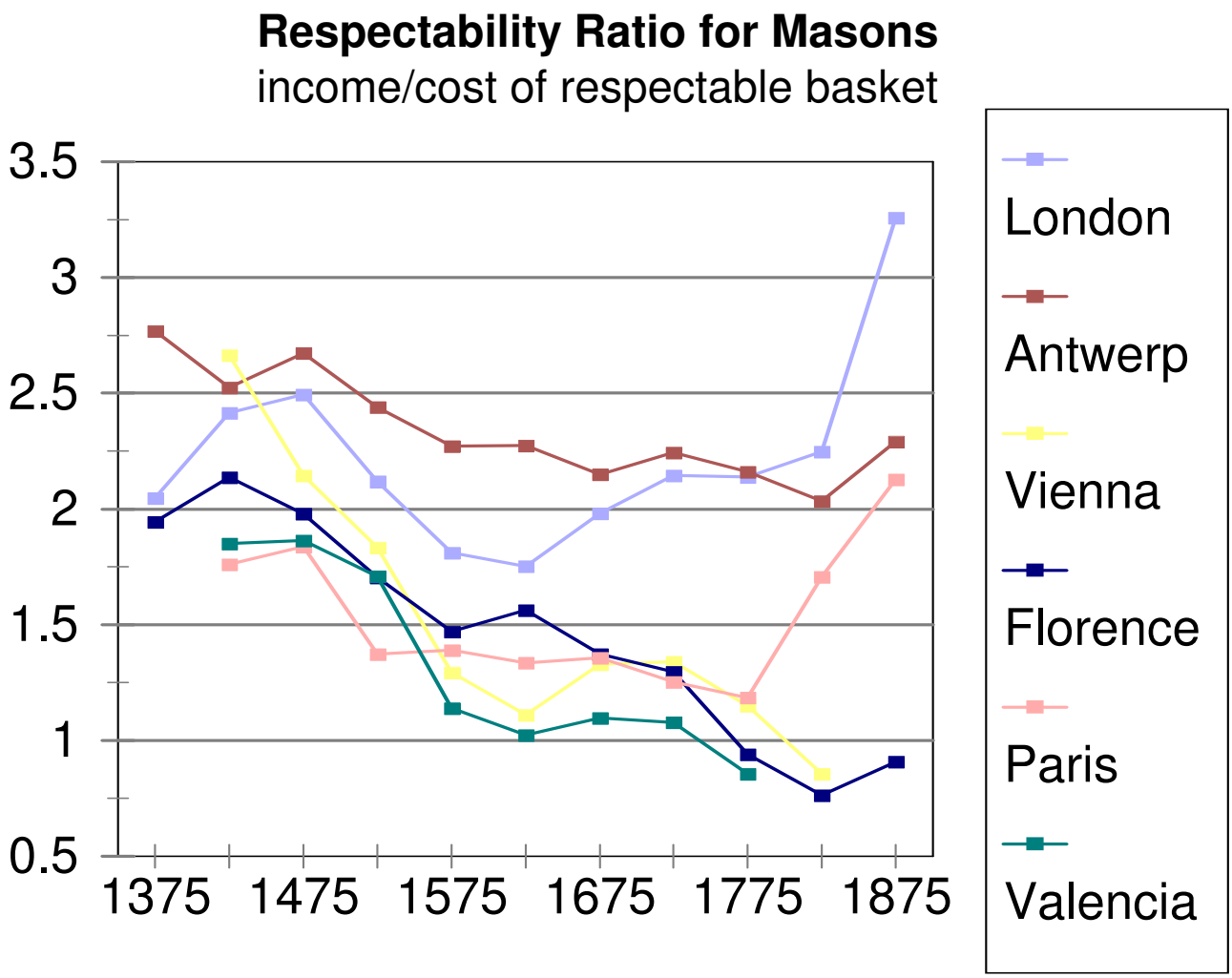

Labourers' wage across England
pence per day
50
40
30
20
10
0
1500
1550
1600
1650
1700
1750
1800
1850
London
Oxford
York

Figure 5


Respectability Ratio for Masons
income/cost of respectable basket
3.5
3
2.5
2
1.5
1
0.5
1375
1475
1575
1675
1775
1875
London
Antwerp
Vienna
Florence
Paris
Valencia