

FARM WAGES AND LIVING STANDARDS IN THE INDUSTRIAL REVOLUTION: ENGLAND, 1670-1850

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Using manuscript and secondary sources, this paper calculates a consistent series of day wages for male farm workers in England from 1670 to 1850. The new series differs considerably for the years 1790-1820 from the still widely used Bowley series. Wages are also estimated for four regions by quinquennia. The new series suggests that real agricultural wages showed little long term movement in the 180 years from 1670 to 1850. Real wages in 1840-49 were only 20% above their level circa 1700. As expected real wage trends differ sharply between the north and south. Real wages declined 10% in the South West, but rose by 75% in the north. The flatness of the real wage series implies Feinstein is too optimistic about real wages in general in the years 1790-1820. It also is inconsistent with the claim of rapid productivity advance in agriculture anytime in the years 1670-1850.

INTRODUCTION

Much has been written on agricultural wages in England from 1670 to 1850, but this information has never been formed into one national series of agricultural wages. For the years after 1770 Bowley calculated a wage index, mainly from secondary sources and wage surveys for England and Wales that is still frequently quoted.¹ Bowley's index reports annual estimates of wages from 1770 to 1914.² But while his index is well founded in the years after 1824, for the earlier period it relies on considerable interpolation, and takes no account of manuscript sources that became available in the past 100 years. Elizabeth Gilboy derived from county bills estimates of the wages of road workers in rural areas from 1700 to 1796, and these we can expect

¹ See, for example, Feinstein (1995).

to approximate to agricultural wages.³ Bernard Eccleston in an unpublished Ph.D. thesis calculated the day wages of workers on large agricultural estates from five midland counties from 1750 to 1834, and gives an annual day wage series for these counties.⁴ Thomas Richardson in another unpublished thesis similarly calculated the average wages in seven English counties from 1790 to 1840 in part from estate sources.⁵ But while the Agrarian History of England and Wales volume for 1750 to 1850 offers a number of wage series on individual farms, it gives no overall wage series for the years 1750 to 1850.⁶

In the years before 1750 the information is much sparser. Peter Bowden calculated from manuscript sources average winter day wages for some decades in six counties for the years 1640-1749. But he had no observations for the north of the country before 1690, and none for the west of the country in any decade.⁷

The first task this paper thus undertakes is to produce a nominal national agricultural wage index annually from 1670 to 1850 which incorporates the available published wage information and manuscript sources. Manuscript observations contribute about two thirds of the information at the annual level. I have also derived by quinquennia an index for each of four major areas of the country for these years– the North, Midlands, South West and South East – since these regions had very different wage trends in this period. I then consider what these indices imply about the standard of living of agricultural workers.

The strategy followed throughout is to estimate a wage series from weekly wage payments outside hay and harvest (44 out of 52 weeks in the year). I show that these “winter”

² Bowley (1898), Bowley (1937)

³ Gilboy (1934).

⁴ Eccleston (1976).

⁵ Richardson (1977).

⁶ John (1989).

⁷ Bowden (1985), p. 877-8.

wages are likely to represent annual wages by examining what happens to the ratio of hay wages to winter wages and harvest wages to winter wages. I also check that the series is at approximately the right level by comparing it with three “benchmark” cross sections of agricultural wages. These are the 1834 Poor Law enquiry reports that collected wage information by circulars in the winter of 1832-3, wages as reported in the Gardener’s Chronicle and Agricultural Gazette in April 1850, and Arthur Young’s wage reports for 1767, 1768 and 1770.

Estimating Wages from Farm Accounts

There are three big problems with estimating wages from farm and estate accounts. The first is knowing when the employee referred to is an adult male. Farms employed varying numbers of women, boys, and girls for various tasks and paid them much less than adult males. The accounts rarely show the age of workers, and often not even the gender. To make sure that adult male wages only were included we can rely on the sexual division of labor which was practiced in the English countryside from the middle ages on. Thus the tasks of threshing, ditching, hedging, mowing, carting, cutting wood and making faggots, which together occupied a large chunk of the agricultural year, seem to have been almost exclusively the jobs of adult male workers. Farm tasks such as these can safely be included in the wage index. And once a worker is identified as performing such tasks he can be safely presumed to be an adult male agricultural laborer. Some tasks such as reaping and weeding were done by both men and women, at least in earlier years, and these are only included where ancillary evidence shows the workers were adult males. Again some tasks such as plowing often involved boys, and again are included only where other evidence shows the worker was an adult male.

The second problem is knowing whether the worker received in addition to the wage some of his pay as food, beer, cottage accommodation, an allotment, or the right to buy grain at low prices. Such allowances are generally not recorded in these accounts. Detecting cases in regular work where the worker was fed on the job is not so hard where farmers employed workers both with and without food, since the wage with food would often be only a half or less than the wage without food. Thus if we see two sets of wages at very different levels it is often apparent that one is for wages with food.⁸ Detecting wages that included food at hay or harvest time is very difficult since these wages could vary a great deal from regular wages, and food is a smaller share of wages then. Fortunately in southern England at least provision of food to workers was relatively rare by the late seventeenth century, and may have been unusual long before that. In the north of England workers were often fed at work even in the nineteenth century, and vigilance is required to avoid including such wages.

Detecting when workers in regular work received beer proves to be impossible from the accounts, since beer was a much smaller supplement to wages, and so cannot be detected from internal evidence. Beer was often still provided even in 1832, especially at hay and harvest. But the evidence from the 1834 Poor Law report is that where beer was provided it was worth about 10% of wages in winter and summer, and less than this in harvest. Thus changes in the degree of beer provision will have some effect on wages, but not too dramatic an effect.

The third problem is that wages varied over the course of the year, being lowest in the midwinter, and highest at the grain harvest. Table 1 shows for the 1832 wages in the Poor Law report the level of wages in winter, summer, hay time, and harvest. Money wages at harvest were nearly twice the level of wages in winter.

⁸ See, for example, Harland (1856), which records wages on the Shuttleworth estate in Lancashire. Workers on the home farm were generally fed, but workers at outlying tithe barns

Table 1: Wage Rates from the 1834 Report

Season	Number of Observations	Wage per Day (in d., money only)	Wage per Day (in d., valuing beer allowances)	Ratio to Winter Wages (cash and value of beer)	Ratio to Winter Wages (cash only)
Winter	898	19.96	20.42	-	-
Summer	897	22.15	22.70	1.12	1.11
Hay	76	26.01	28.24	1.42	1.28
Harvest	172	35.98	38.56	1.92	1.73

Source: United Kingdom. House of Commons (1834).

Notes: Wages including beer were converted into equivalent money wages using the average difference between wages with and without beer at specific parishes in each season. This was for winter, 1.94 d. per day (95 cases), for summer 2.13 d. (104 cases), for hay and harvest 2.67 d. (6 cases). In the 15 cases where quantities were stated average consumption of beer or cider in winter was 3.5 pints per day.

fed themselves, and the difference between day wages with or without food is reasonably clear.

To deal with this last problem I first note that the ratio of harvest and hay wages to winter and summer wages changed little over time. Table 2 shows the ratio of money wage payments at harvest and hay to non-harvest wages from the farm accounts used in the wage index from 1670 on. As can be seen the ratio does not change much over the course of 180 years, and most of the apparent change may just be sampling error. The ratios in the farm accounts are also relatively similar to the various benchmark cross sections that we have from 1770, 1832, and 1850. This implies that as long as I have a geographically representative sample of places I can use the winter and summer day wages as a good index of annual earnings at least back as far as 1670, assuming full employment of workers.

If we take harvest wages at being at the level suggested in Table 1 for 1832, for example, then the earnings of the a worker who worked 52 weeks in the year in 1832 would be £30.4. Earnings outside harvest and hay would thus be 77% of total earnings. Hence the modest changes in the ratio of hay and harvest wages to winter wages observed in Table 2 would change total annual earnings for a fully employed worker by only 1 or 2%. For example, the 1834 report suggests harvest wages were 1.92 times winter wages (counting beer and food allowances). Suppose before 1770 they were only 1.68imes winter wages as table 2 would imply. In that case annual earnings would be 1.9% less than would be suggested by an index based only on winter wages. Thus a wage series based on non-harvest wages will in general present a pretty good picture of wage trends.

The various sources of wage information used have been combined into an “Agricultural Wages” data set that records the following information where available:

Table 2: Money Harvest and Hay Wages Relative to Money Non-Harvest Wages

Source	Period	Places	Hay Wage / “Winter” Wage	Places	Harvest Wage / “Winter” Wage
Farm Accounts	1670-1699	18	1.28	17	1.48
Farm Accounts	1700-1769	42	1.28	41	1.47
Farm Accounts	1770-1850	26	1.21	23	1.56
Arthur Young	1767-1770	139	1.39	131	1.56
Poor Law Report	1832	75	1.29	169	1.77
Agricultural Gazette	1850	-	-	110	1.64

Sources: See text.

Place: The place the observation is drawn from.

Year: The calendar year the observation comes from.

Month: Where available, the month in which the wage payment was made.

Season: Where available, a code was given for the season in which the work was done.

HAR = Grain harvest, HAY = Hay harvest

WIN = Winter (October-March)

SMR = Summer outside harvest (April-September)

YR = Average pay over the year

Worktype: Description of the work done, such as THRESH, REAP, HEDGE. Where it was unspecified farm work this was "FARM." Where workers were employed in rural estate operations this was "ESTATE."

Weeks: Number of weeks of work.

Days: Number of days of work.

Totpay (s., d.): Pay in shillings and pence.

d./day: Pay in pence per day. Weeks are assumed to be 6 days.

Food?: Y if food provided to the worker. N if food definitely not provided.

Val Food: The value of the food provided where known.

d./day (no food): Pay in pence per day without food.

Piecework unit: Unit piecework measured in.

Units: Number of units paid for.

Piece Rate: Piece rate in pence per unit.

Notes: Comments on any of the above.

In all, the data set contains 12,232 quotations of day wages for farm workers for all the years 1670-1851, though some are at a much more disaggregated level than others. Hence these quotes are reduced to 2,890 if averaged by place and year. The data set also contains piece rates for tasks such as threshing and making faggots which can also be used to estimate the trend in day wages. The ones used are for threshing wheat, barley or oats, and for making faggots. This supplies another 667 observations on places by year. The breakdown of the most frequent work types is given in table 3.

Nominal Wages, 1670-1850

To construct the annual index of agricultural wages from 1670 to 1850 I use wages outside hay and harvest, defining this as wages for all farm work carried out between October and May, and for regular farm operations such as ditching, threshing, and hedging carried out in the summer months.⁹ For brevity I will refer to these as “winter” wages, though they will include many wages paid in the non-harvest weeks of the summer months. Table 1 shows that these summer wages outside the hay and the harvest period were only 11% higher than winter wages in 1832. Thus the inclusion of variable amounts of these “summer” wages will not have much effect on the overall level of winter wages estimated here. I also use the piece rates for threshing wheat, barley and oats, and the piece rates for making faggots.

Table 4 shows the number of places for which I have at least some data for each decade in the years 1670 to 1850. I calculate for each of the 179 places supplying wage data the average winter wage for farm work in each year for which there is data. This generates 2,761 individual observations on average wages by year, as well as 515 observations on threshing piece rates, as

⁹ Where the exact period of the work is not stated but it is work ordinarily done outside the hay or harvest period I count this as winter work.

Table 3: Amounts of Data in the Wage Data Set

Work type	Individual observations	Observations averaged by year and place
<u>DAY WAGES</u>		
All	12,232	2,890
“Farm”	7,341	1,645
Hedge	882	391
“Estate” (Eccleston)	513	513
Thresh and winnow	475	218
Mow ..	453	330
Labor in Garden	334	184
Cart	222	79
“harvest”	217	194
Ditch	186	132
Plow	182	71
“Dung”	175	95
“Labor”	153	136
Dig	143	103
Reap	125	100
<u>PIECE RATES</u>		
Threshing wheat, barley or oats	2,911	515
Making faggots	232	142

Source: Agricultural Wage Data Set.

Table 4: The Number of Wage Sources by Decade for the Wage Series, 1670-1850

Decade	North	Midlands	South West	South East	All
1670-9	2	5	3	11	21
1680-9	3	5	2	11	21
1690-9	7	8	5	11	31
1700-9	6	12	4	12	34
1710-9	4	6	7	11	28
1720-9	5	11	8	7	31
1730-9	8	10	4	10	32
1740-9	6	12	7	12	37
1750-9	4	16	6	5	31
1760-9	5	21	7	8	41
1770-9	6	16	4	4	30
1780-9	4	12	2	3	21
1790-9	3	15	4	7	29
1800-9	5	24	3	12	44
1810-9	5	25	3	11	44
1820-9	5	20	5	8	38
1830-9	4	21	7	11	43
1840-9	5	8	6	8	27

Notes: The areas are composed as follows:

North - Cheshire, Cumberland, Durham, Lancashire, Northumberland, Westmoreland,

Yorkshire. Midlands - Bedford, Berkshire, Buckingham, Derby, Huntingdon, Leicester, Lincoln,

Northampton, Nottingham, Oxford, Rutland, Stafford, Warwick. South West - Cornwall, Devon,

Dorset, Gloucester, Hereford, Monmouth, Shropshire, Somerset, Wiltshire, Worcester. South

East - Cambridge, Essex, Hampshire, Hertford, Kent, Middlesex, Norfolk, Suffolk, Surrey,

Sussex.

well as 142 observations on rates paid for making faggots.¹⁰ The data has been divided up into these four regions because of indications that wages moved in different ways in each of these regions in this period. Thus the north went from the lowest wage to the highest wage region over this period. And the South East went from being about 20% above the national average wage level to being 10% below the national average. As can be seen there is much more data for some regions than for others, and the relative amount of information varies by period.

Thus to construct the overall average wage which is not influenced by the varying amount of data from each region the following expression was fitted to the data from each of the four regions:

$$\ln(Wage_t) = \sum_k \alpha_k IND_k + \sum_t \beta_t DUM_t + \phi_1 DUMTH + \phi_2 DUMFAG + \varepsilon$$

where k indexes the source, and IND_k is an indicator variable which is 1 when the observation is from source k, 0 otherwise and t indexes the year; DUM_t is 1 in year t, 0 otherwise. $DUMTH$ is an indicator variable for cases where the wage is a threshing payment, $DUMFAG$ is an indicator variable for cases where the payment is for making faggots. The inclusion of the indicator for each wage source allows for variations from farm to farm in rates paid – the estimation procedure calculates the movement of wages by looking at what happens within each series from each source over time. The inclusion of the indicator variables for threshing payments and faggoting payments allows us to include these also in calculating the trend in wages. For the South West where the data is thin and the individual series often do not overlap this procedure

¹⁰ The largest secondary source of observations is Eccleston whose thesis supplies 15% of the annual average observations. Most of these estate workers did the same type of work as pure farm workers – hedging, ditching, carting, and mowing.

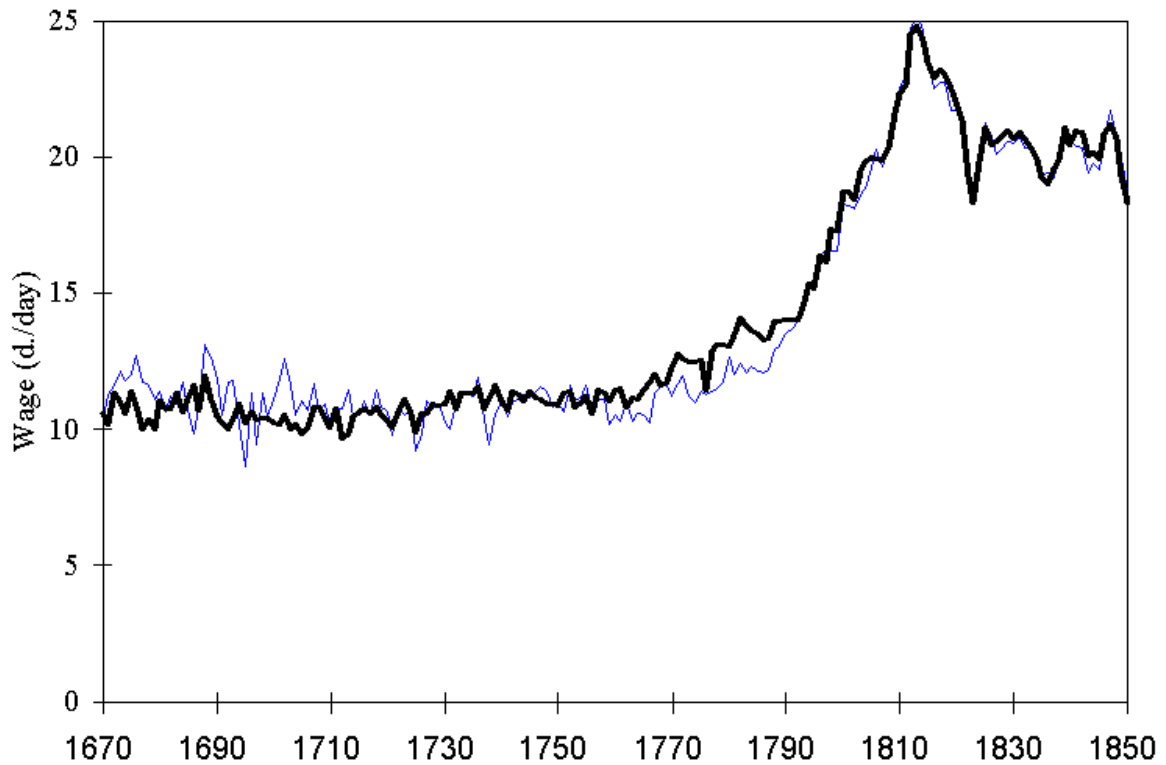
did not work well, and the indicator variables for each source were not used (in effect I had to assume that the average wage level at any time was the same across sources in the South West).

The national wage is calculated as the weighted average of the estimated wage in each region, weighting by the numbers of male agricultural workers in each region recorded in the 1851 census.¹¹ Figure 1 shows as the faint line the raw average winter day wage in each year. The bold line is the wage index calculated from the above regression for each region, and averaged across each region. As can be seen the corrected index differs little from the uncorrected index in most years. In the years 1670-1720 it is generally below the raw average, while in 1760-1790 it is generally above the raw average. Nominal agricultural wages are essentially flat in the years 1670 to 1730, at an average rate of about 10.3 d. per day in the winter. Thereafter there is a rise to a peak in 1813, followed by a decline to the 1820s. With the exception of notable downturns in 1822-4, and 1834-37, and 1848-50 wages are fairly steady between 1820 and 1850. Appendix 1 shows annual estimated nominal day wages from 1670 to 1850.

Figure 2 compares this series with the Bowley index. The Bowley index was constructed using a few cross sections of wages – 1770, 1796, 1824, 1832, 1837, 1850 - interpolated using records for a small number of farms. For the years after 1820 the two series move closely together. But for some of the earlier dates, and in particular 1795-1820 the Bowley series is very different. Thus in 1807 Bowley reports wages at 27.8 d. per day, while the new series

¹¹I counted all farm workers between the ages of 15 and 65, including farmers, in this calculation. The numbers were respectively North, 240,124, Midlands, 284,676, South East, 334,163, South West, 278,001.

Figure 1: Winter Wages in Agriculture, 1670-1850



Note: The bold line shows winter wages as a weighted average by agriculture area of four divisions of England. The light line shows a simple average of all the places reporting data for that year.

Source: Agricultural Wage Data Set.

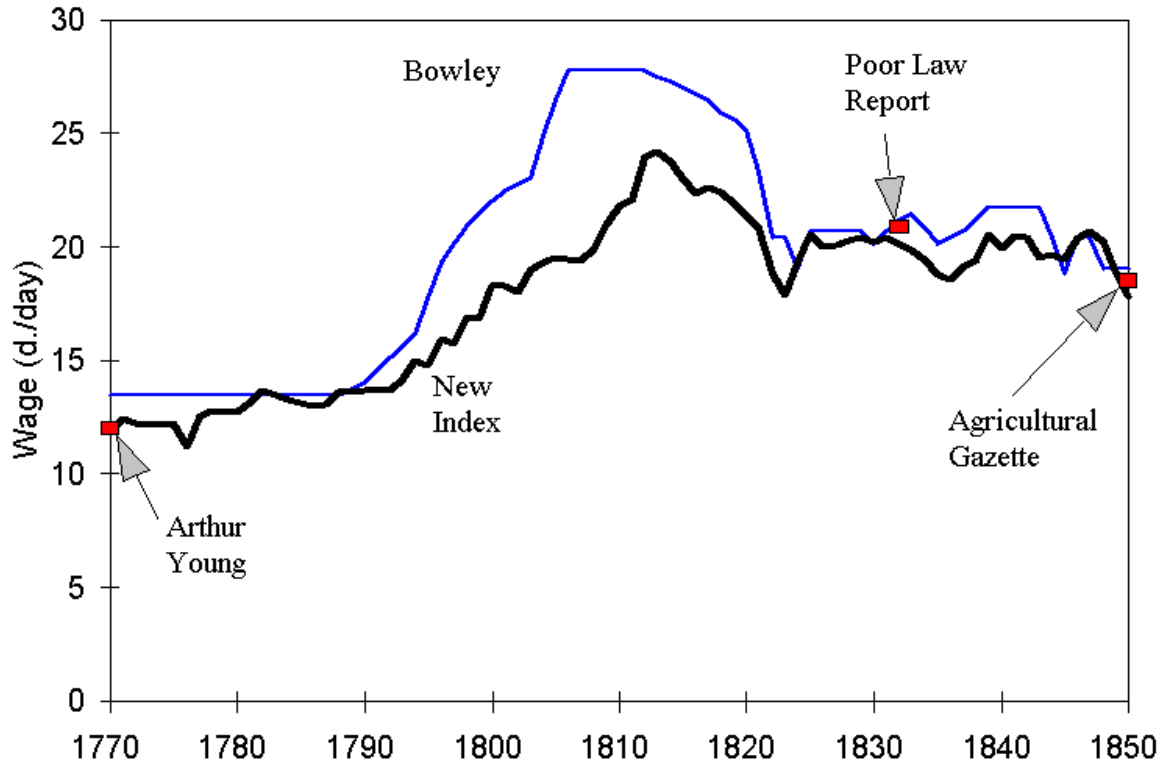
reports only 19.4 d., a 44% difference. Bowley is generally much more optimistic about the level of rural wages for the Revolutionary and Napoleonic war period.¹²

Feinstein uses the Bowley series for agricultural wages in his recent article on real wages in Britain in the Industrial Revolution period, and agricultural workers were almost a third of the labor force in the early Industrial Revolution. These wage estimates suggest that Feinstein will have overestimated real wages in the years 1800-1820 when the Bowley series overstates nominal agricultural wages very substantially.

Table 5 shows by quinquennia the estimated movement of wages in each of the four regions. As can be seen both the North and the Midlands move from having wages 20% below the national average in the years 1670-1699 to having wages nearly 5% above the national average in the 1840s. The South East in contrast moves from being about 20% above the national average to being at the national average by 1845. And the South West moves from being nearly 20% above the national average to being nearly 10% below by the 1840s.

¹² This seems to be because Bowley's interpolation was based on a small group of farms in the south east. We shall see below that wages peaked much more in the years 1800-1820 in the South East and the Midlands than in the North and South West.

FIGURE 2: WINTER WAGES IN ENGLISH AGRICULTURE, 1770-1850



Note: The ■ indicate the comparable level of wages in the benchmark years, 1768-70, 1832 and 1850.

Sources: Figure 1, table 5, and Bowley (1898).

Table 5: Winter Wages by Region by Quinquennia, 1670-1849

Quinquennia	North	Midlands	South East	South West	All
1670-74	8.6	9.2	12.0	11.9	10.5
1675-79	8.0	9.2	12.1	10.0	10.3
1680-84	10.0	8.2	12.1	11.8	10.6
1685-89	-	7.9	13.5	11.9	11.0
1690-94	6.7	8.4	12.4	12.1	10.1
1695-99	6.9	9.0	11.8	-	10.1
1700-04	6.5	8.9	12.4	-	10.0
1705-09	7.6	9.0	12.1	11.1	10.1
1710-14	6.5	9.2	11.9	11.2	9.9
1715-19	7.9	9.6	11.9	11.9	10.4
1720-24	6.4	9.5	12.2	12.0	10.3
1725-29	6.6	10.2	12.1	11.6	10.3
1730-34	8.8	10.3	11.9	12.0	10.9
1735-39	9.1	10.4	12.3	11.7	11.0
1740-44	8.4	9.8	12.6	11.8	10.8
1745-49	8.9	10.1	12.3	11.4	10.8
1750-54	9.4	9.7	12.5	11.0	10.8
1755-59	9.6	9.7	13.0	10.6	10.8
1760-64	9.2	10.0	13.2	10.7	10.9
1765-69	10.1	10.4	12.8	11.8	11.4
1770-74	10.6	10.9	14.7	12.0	12.2
1775-79	10.9	11.8	13.9	12.0	12.3
1780-84	11.0	13.4	15.9	12.0	13.3
1785-89	11.5	13.1	15.3	12.9	13.3
1790-94	12.4	14.5	16.2	12.0	14.0
1795-99	13.9	16.4	18.1	15.3	16.1
1800-04	16.8	19.3	19.8	17.9	18.6
1805-09	17.5	20.6	21.7	18.9	19.8
1810-14	20.0	26.0	25.8	19.8	23.2
1815-19	22.1	23.7	22.8	21.1	22.5
1820-24	21.5	20.7	19.6	17.0	19.6
1825-29	21.6	22.0	20.1	17.5	20.3
1830-34	21.9	21.3	19.9	17.2	20.0
1835-39	20.6	20.8	19.1	16.8	19.3
1840-44	20.9	21.8	20.4	17.0	20.0
1845-49	21.0	21.0	20.1	17.4	19.9

Notes: Nominal wages in pence (d.) per day. Some workers would also have received beer allowances.

Source: Agricultural wages data set.

The New Series Compared to Benchmark Estimates of Wages

How good an indication is this series, constructed on the basis of an average of 19 randomly located places per year, of the movement of wages? The answer, at least for the years after 1768, seems to be that it is likely to be pretty accurate at the national level. I measure how well the new series is likely to represent wage trends by comparing its average level to average wages nationally in three years where we have extensive data from across the country: 1767-70, 1832 and 1850. The 1832 benchmark is the best of all, since it comes from a large sample of parishes. Calculating wages the same way as is used in the index, I get the national and regional wages in 1832 from the Poor Law reports as shown in Table 5, based on 908 day wage observations. The Poor Law reports suggest an average money wage outside harvest and hay of 20.9 d. per day.¹³ The wage index estimates national wages in the same year as 20.2 d., an error of less than 4% if we take the poor law reports as definitive. For 1767-70 Arthur Young gives 160 day wages, which imply an average money wage of 12.0 d., versus the wage index which shows 11.6 d, for a difference of again less than 4%. For 1850 the Agricultural Gazette reports 127 wages for April of 1850 in 38 of 42 counties in England, which suggest a national average wage of 18.5 d., versus my index which is then at 17.8 d., again a difference of only 4%. Thus on a national scale we can seemingly expect that the wage index will show wages within about 4% of their true national level in the years 1670 to 1850, since the number of farms observed in each ten year period is about the same throughout.

As expected the regional wage levels deviate more from their respective benchmarks. But only in two cases does the deviation exceed 10% in any of the benchmark years. The regional indices can thus

¹³ To calculate this wage I assume winter wages covered six of the ten months outside harvest, and summer wages the other four.

Table 6: The Nominal Money Wages outside Harvest Compared to Benchmarks

Source	Period	All	North	Midlands	South East	South West
Arthur Young Index	1767-70	12.0	11.1	11.1	14.3	11.1
	1767-70	11.6	10.0	10.6	13.1	12.1
Poor Law Report Index	1832	20.9	22.0	22.2	22.0	17.4
	1832	20.2	21.7	21.6	20.4	17.1
Agricultural Gazette Index	1850	18.5	22.0	18.7	17.7	16.4
	1850	17.8	20.3	16.2	17.9	17.2

Sources: Young (1771a, 1771b, 1771c), United Kingdom, House of Commons (1834),

Gardeners' Chronicle and Agricultural Gazette (1850), Agricultural Wages Data Set.

give us at least a rough picture of the movement of rents in the four different regions.

As noted above the accounts in the data set suggest that money wages on average across the whole year would be 106% of winter wages if the worker was employed for all 52 weeks. Thus the implied average money earning of a full time worker can be easily calculated from the annual winter wage index. To get full earnings we would also have to add an allowance for beer allowed the worker by the employer. In 1834 beer allowances per day averaged over the whole year represented about 4% of winter wages per day. Assuming beer allowances were constant over the years 1670-1850 at the levels shown in Table 1 for 1832 the total annual earnings of full time workers, valuing beer allowances also, would be about 10% above winter wages.

The Purchasing Power of Farm Wages

Having now generated a nominal wage series for agricultural laborers, we can also ask what happened to the real purchasing power of wages in this interval. To measure this I use the weights for expenditures by rural families given in the last column of table 10. These weights, with the exception of that for housing, are derived from data given by Sara Horrell for the expenditures of agricultural workers in 1787-96, 1830-39 and 1840-54 and shown in the first two columns.¹⁴ Since I have better data on housing costs than these surveys will reveal, I estimated housing expenditures directly. In 1832 the average male agricultural worker would earn in a full year an annual income of £29.1, including the implied value of beer allowances at work. The other members of the family together are assumed to earn 25% of the adult male's wage.¹⁵ Thus the average family would have an income of £36.4 per year. Average cottage rents on a set of 1,206 cottages owned by charities in England in the years 1830 to 1837, adjusted to control for oversampling in more densely populated parishes were £3.25.¹⁶ This implies that in the early 1830s cottage rents were 8.9% of family incomes for agricultural workers, close to the 8.8% that Horrell found for 1830-54.

The quinquennia price levels for the major commodity groups used to form the cost of living index are shown in table 11. For bread, the staple article which formed nearly half of farm laborers expenditures, I use the prices of wheat, barley and oats. Even though these were only the inputs into making bread, I use these because bread had very different qualities which are very hard to control for over long time intervals, and because the cost of the inputs was a very large share of the cost of outputs for bread.

¹⁴ Horrell (1996), pp. 568-70.

¹⁵ Based on Clark (1991), p. 254.

¹⁶ The source of this housing rental information is discussed in Clark (1998).

Table 7: The Percentage of Expenditure by Category for Agricultural Laborers

Category of Expenditure	1787-96 (Horrell)	1830-54 (Horrell)	Assumed here
<u>Food and Beer</u>	77.1	66.3	71.7
Grain, potato	48.3	40.4	44.4
Beer	1.1	1.4	1.3
Meat	10.1	8.2	9.2
Dairy	10.1	9.6	9.8
Sugar and Treacle	3.5	2.1	2.8
Tea and Coffee	2.4	2.2	2.3
Other	1.5	1.2	0
<u>Housing</u>	5.9	8.8	7.4
<u>Fuel</u>	3.6	4.6	4.1
<u>Light and Soap</u>	5.0	4.0	4.5
<u>Other (Clothing)</u>	8.4	15.8	12.1

Sources: Horrell (1996).

Table 8: Index of Farm Laborers' Living Costs, 1670-1850

Quin.	Grain	Beer	Meat	Dairy	Sugar	Tea	Fuel	Candles and soap	Rent	Clothing	Cost of Living
1670-74	73		74	73			94	83	90	94	79.9
1675-79	77		74	68	122		94	87	90	100	82.1
1680-84	73		73	64	122		93	76	90	97	78.6
1685-89	66		73	68	107		93	75	90	94	74.9
1690-94	73		73	74	122		92	83	90	94	79.6
1695-99	91		80	79	159		92	89	90	108	92.8
1700-04	68	77	74	69	120		88	81	76	106	76.5
1705-09	68	77	69	63	122		88	74	76	107	74.9
1710-14	88	79	75	72	116		84	88	76	109	87.0
1715-19	71	80	73	61	110		84	90	76	108	77.3
1720-24	72	80	72	64	102		84	82	79	109	77.5
1725-29	87	82	73	68	102		84	82	79	109	85.7
1730-34	64	85	71	67	93		87	76	79	104	72.8
1735-39	72	85	66	64	92		87	68	79	104	76.1
1740-44	75	85	76	73	100		88	92	100	104	82.4
1745-49	63	85	72	64	114		88	89	100	106	74.6
1750-54	70	86	71	89	114		88	84	100	103	80.6
1755-59	86	85	78	85	112		88	89	100	104	89.7
1760-64	69	85	76	81	100	100	87	100	111	103	80.9
1765-69	94	85	91	86	92	100	87	101	111	99	94.7
1770-74	100	100	100	100	100	100	100	100	100	100	100.0
1775-79	89	106	99	102	106	100	105	98	100	100	95.3
1780-84	96	118	96	94	120	100	90	103	99	100	97.6
1785-89	95	127	107	102	104	75	88	106	99	93	96.9
1790-94	108	132	111	115	141	69	94	100	106	99	106.6
1795-99	132	135	142	135	168	73	102	110	106	105	124.3
1800-04	172	156	191	157	111	90	114	141	98	112	148.4
1805-09	172	174	186	180	99	111	124	146	137	120	156.4
1810-14	204	173	216	201	137	109	126	166	193	122	180.7
1815-19	167	166	177	175	120	99	114	141	164	127	155.7
1820-24	120	152	156	145	85	86	110	98	164	122	124.9
1825-29	136	155	166	160	78	78	107	89	176	119	133.4
1830-34	123	133	140	148	63	73	83	98	185	124	123.5
1835-39	124	126	131	155	88	59	90		182		124.8*
1840-44	122	107	132	155	93	62	82				127.5*
1845-49	122	127	140	156	68	48	72				131.3*
1850-54	109	134	137	143	58	50	74				

Notes: The index for each commodity and overall is set to 100 for 1770-4. Feinstein's overall cost of living index was used for the years 1835-49. The commodities and the weights used for each category of good where more than one was used were: Grain - wheat, 1670-1850 (.5),

barley, 1670-1850 (.3), oats, 1670-1850 (.2); Meat - beef, 1670-1850 (.5), mutton, 1670-1850 (.5); Dairy - Cheese, 1670-1850 (.5), butter, 1670-1850 (.5); Fuel - faggots, 1670-1830 (.5), coal 1770-1850 (.5); Light and Soap - Tallow candles 1670-1830 (.5), Tallow 1670-1830 (.5); Cottage Rents - Charity owned cottages outside major cities, 1670-1837; Clothing - wool cloth, 1670-1829 (.5), linen cloth 1670-1829 (.2), stockings 1710-1830 (.1), shoes 1670-1830 (.2); Sources: Thorold Rogers (1888), pp. 209-218, 255-277, 282-96, 474-94. Bowden (1985), pp. 828-31, 843-6. Beveridge (1939), pp. 85-90, 143-8, 193-6, 236-240, 292-5, 313, 434-7, 457-8. John (1989). Feinstein (1998), p. 640.

For fuel I use the price of faggots only until 1770 since in rural areas these were the main source of fuel until the nineteenth century at least. From 1770-1830 I use a combination of the prices of faggots and coal, and after 1830 coal alone.¹⁷ For light and soap I use the prices of tallow candles and of tallow, the main input in making soap, from 1670 to 1830. Cottage rents are estimated from the rents and prices of cottage properties in rural areas (defined as parishes with a population density of less than 1 person per acre in 1841) bought or owned by charities. The details of this estimation are given in the appendix.

The cost of living index is formed as a geometric index of the prices of each component, with the expenditure shares used as weights. Thus it assumes constant shares of expenditure on each item as relative prices change. That is, if p_{it} is the price index for each commodity i in year t , and α_i is the expenditure share of commodity i , then the overall price level in each year, p_t is calculated as,

$$p_t = \prod_i p_{it}^{\alpha_i}$$

The last column of table 9 shows the resulting decadal estimate of the cost of living with 1770-9 set to 100. Real wages overall show little sign of any trend between 1670 and 1820. After 1820 there is a sustained increase in real wages to a level about 20% above the earlier decades. But real wages trends in the South East and South West differ from the North and the Midlands. In the southern regions there is no increase on real wages in 1840-9 compared to 1670-1730. Indeed in the South West wages are estimated to have declined by about 10% from 1670-1730 to 1840-9. In the North and Midlands real wages rose substantially. Northern real wages rose by 75%, and those in the Midlands by 47%.

¹⁷ Since fuel was another input in making bread arguably the weight of fuel in the budget should

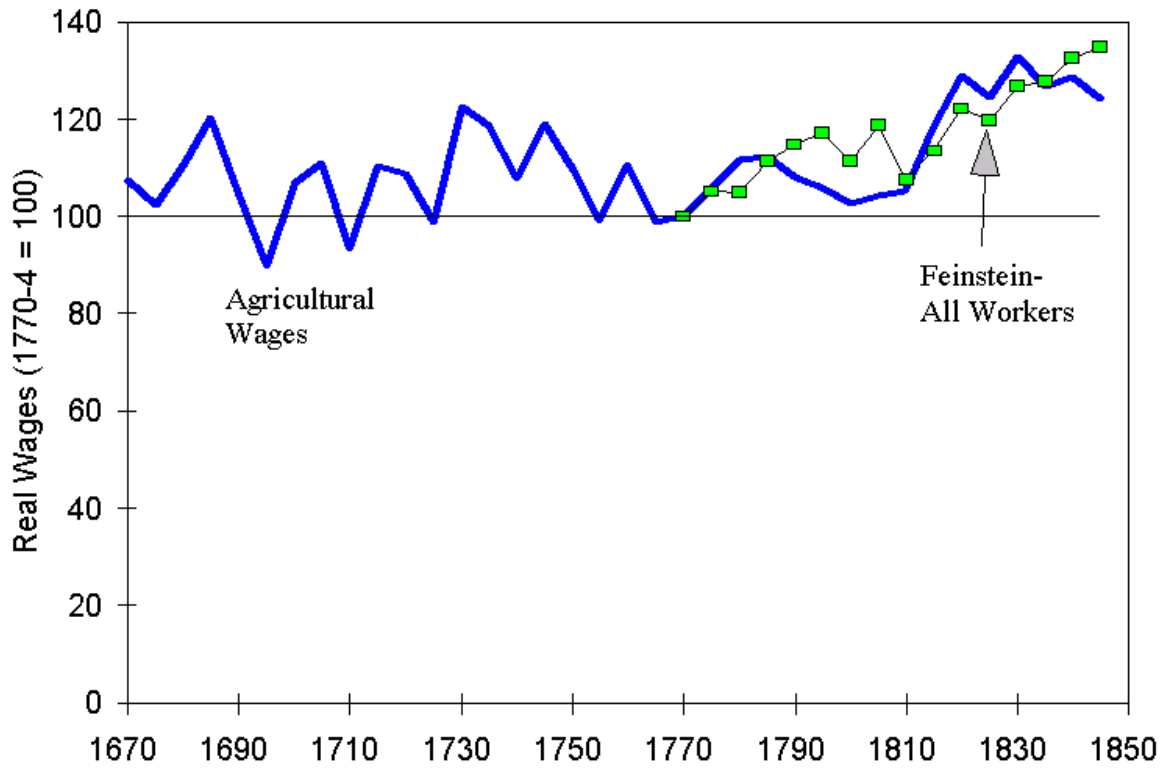
Table 9: Farm Laborers' Real Wages by Quinquennia, 1670-1849

Quinquennia	Cost of Living (1770-4 = 100)	England (1770-4 = 100)	North (1770-4 = 100)	Midlands (1770-4 = 100)	South East (1770-4 = 100)	South West (1770-4 = 100)
1670-4	79.9	107.4	101.3	105.8	102.3	124.5
1675-9	82.1	102.5	91.7	102.8	100.5	101.5
1680-4	78.6	110.7	120.3	95.8	105.0	124.7
1685-9	74.9	120.2		97.2	122.9	132.1
1690-4	79.6	104.5	79.3	97.3	106.3	126.8
1695-9	92.8	89.7	70.1	88.9	86.9	
1700-4	76.5	106.9	80.3	107.1	110.7	
1705-9	74.9	111.0	95.8	110.0	110.5	123.2
1710-4	87.0	93.4	69.8	97.4	93.4	107.0
1715-9	77.3	110.4	96.0	113.9	104.9	128.4
1720-4	77.5	108.7	78.1	113.0	107.4	129.1
1725-9	85.7	98.9	72.0	109.7	96.2	112.4
1730-4	72.8	122.6	113.9	130.2	111.8	136.9
1735-9	76.1	118.6	112.1	124.9	110.6	128.3
1740-4	82.4	107.7	96.0	108.7	104.5	119.5
1745-9	74.6	119.0	112.8	124.3	112.2	127.8
1750-4	80.6	109.7	109.3	110.7	106.2	113.4
1755-9	89.7	99.2	100.3	98.9	98.8	98.2
1760-4	80.9	110.8	107.5	113.7	110.9	109.9
1765-9	94.7	98.8	100.5	100.6	92.1	104.1
1770-4	100.0	100.0	100.0	100.0	100.0	100.0
1775-9	95.3	105.8	107.8	113.3	99.5	104.9
1780-4	97.6	111.5	105.8	125.8	111.1	102.5
1785-9	96.9	112.4	111.6	124.6	107.7	110.7
1790-4	106.6	108.1	109.8	125.1	104.0	93.5
1795-9	124.3	106.0	105.7	121.2	99.6	102.8
1800-4	148.4	102.7	106.5	119.6	91.1	100.3
1805-9	156.4	104.1	105.4	120.7	94.8	100.6
1810-4	180.7	105.2	104.2	132.3	97.4	91.3
1815-9	155.7	118.4	133.8	140.1	99.7	112.9
1820-4	124.9	129.1	162.1	152.5	107.0	113.4
1825-9	133.4	124.7	152.8	151.5	102.9	109.2
1830-4	123.5	133.0	167.0	158.4	109.9	116.2
1835-9	124.8*	126.8	155.4	153.0	104.7	112.0
1840-4	127.5*	128.8	154.2	157.1	109.2	111.0
1845-9	131.3*	124.3	150.6	147.0	104.5	110.5

Source: Tables 5 and 8.

be increased.

Figure 3: Real Agricultural Wages, 1670-1849



Notes: The figure also shows Feinstein's index of real wages of all workers adjusting for unemployment.

Sources: Table 9. Feinstein (1998).

The real wages given in table 9 are for a day's work by male agricultural workers. The movement of real family incomes will not be the same as real day wages if the number of work days per year per worker changes because of involuntary unemployment, or if the incomes earned by women and children change because of shifts in the nature of labor demand. Clark and van der Werf (1998) considers the issue of the length of the work year for male workers in greater depth.

Conclusion

The real wage of male farm workers, measured as the purchasing power of the day wage, increased little if at all in the Industrial Revolution. Indeed workers in the southern regions may have seen declines in their real wages. These findings are in line with Feinstein's recent pessimism about real wages in general in the Industrial Revolution. Indeed the agricultural wage series developed here suggests that the Bowley series of agricultural wages used by Feinstein may greatly overstate farm wages in the years 1790-1820. Feinstein's pessimistic estimates are still too optimistic in the Revolutionary and Napoleonic War years!

The flatness of the farm real wage series in the years 1670-1850 also casts doubt on the claim that an agricultural revolution, defined as a period of rapid productivity advance, occurred in England anytime in these years. For significant gains in agricultural productivity would have to appear as gains in real earnings for at least one of the factors contributing to production, and other evidence suggests modest increases in real earnings for land and capital owners in the years 1670 to 1850.¹⁸

¹⁸ See Clark (1998b), Clark (1998c).

Appendix 1: “Winter” Farm Wages by year, 1670-1851 (d./day)

Year	Obs.	Wage	Year	Obs.	Wage	Year	Obs.	Wage
1670	14	10.31	1720	12	10.04	1770	16	11.92
1671	12	9.90	1721	10	9.81	1771	19	12.41
1672	13	11.06	1722	16	10.36	1772	14	12.26
1673	14	10.68	1723	14	10.81	1773	15	12.16
1674	15	10.32	1724	14	10.32	1774	12	12.18
1675	13	11.12	1725	13	9.65	1775	16	12.24
1676	14	10.59	1726	12	10.36	1776	16	11.18
1677	9	9.75	1727	15	10.33	1777	16	12.54
1678	11	10.09	1728	13	10.69	1778	14	12.75
1679	13	9.73	1729	14	10.60	1779	14	12.74
1680	13	10.73	1730	16	10.65	1780	16	12.71
1681	15	10.50	1731	15	11.12	1781	10	13.16
1682	14	10.45	1732	16	10.53	1782	12	13.71
1683	8	10.99	1733	18	11.05	1783	11	13.46
1684	12	10.37	1734	20	11.04	1784	10	13.28
1685	8	10.77	1735	20	11.07	1785	11	13.16
1686	10	11.29	1736	19	11.29	1786	11	12.97
1687	7	10.43	1737	16	10.50	1787	12	13.04
1688	7	11.60	1738	12	10.80	1788	13	13.59
1689	7	10.77	1739	20	11.32	1789	13	13.61
1690	16	10.19	1740	24	10.74	1790	17	13.69
1691	19	10	1741	17	10.44	1791	16	13.67
1692	17	9.76	1742	22	11.12	1792	15	13.70
1693	10	10.11	1743	19	11.01	1793	15	14.15
1694	16	10.63	1744	25	10.76	1794	14	14.99
1695	12	10	1745	25	11.11	1795	19	14.80
1696	18	10.36	1746	26	10.86	1796	19	15.97
1697	11	10.07	1747	28	10.83	1797	18	15.74
1698	15	10.14	1748	23	10.65	1798	20	16.90
1699	14	10.17	1749	19	10.66	1799	21	16.87
1700	14	9.97	1750	23	10.56	1800	23	18.27
1701	14	9.94	1751	20	11.01	1801	22	18.29
1702	18	10.22	1752	23	11.08	1802	22	18.01
1703	19	9.77	1753	24	10.55	1803	23	18.99
1704	14	9.95	1754	22	10.68	1804	24	19.31
1705	18	9.59	1755	20	10.92	1805	24	19.50
1706	20	9.80	1756	20	10.31	1806	28	19.45
1707	21	10.55	1757	20	11.16	1807	26	19.37
1708	17	10.55	1758	23	11.04	1808	26	19.84
1709	19	10.16	1759	17	10.78	1809	29	21.06
1710	18	9.83	1760	20	11.15	1810	32	21.79
1711	19	10.48	1761	21	11.21	1811	31	22.09
1712	16	9.40	1762	20	10.55	1812	31	23.94
1713	14	9.60	1763	22	10.89	1813	27	24.24
1714	20	10.21	1764	20	10.82	1814	27	23.74
1715	20	10.40	1765	17	11.14	1815	30	22.93
1716	14	10.51	1766	17	11.42	1816	33	22.38
1717	14	10.30	1767	25	11.71	1817	33	22.63
1718	13	10.54	1768	22	11.32	1818	30	22.44
1719	11	10.23	1769	22	11.46	1819	26	21.93

Year	Obs.	Wage	Year	Obs.	Wage	Year	Obs.	Wage
1820	26	21.36						
1821	28	20.81						
1822	31	18.85						
1823	29	17.90						
1824	26	19.32						
1825	30	20.55						
1826	28	19.99						
1827	24	20.07						
1828	25	20.28						
1829	26	20.44						
1830	25	20.20						
1831	27	20.41						
1832	27	20.17						
1833	29	19.84						
1834	31	19.44						
1835	24	18.75						
1836	24	18.57						
1837	29	19.12						
1838	30	19.39						
1839	27	20.56						
1840	26	19.97						
1841	22	20.46						
1842	19	20.43						
1843	19	19.56						
1844	17	19.68						
1845	13	19.44						
1846	11	20.34						
1847	13	20.68						
1848	11	20.19						
1849	8	18.80						
1850	11	17.83						
1851	10	17.80						

Appendix 2: Estimated Cottage Rents, 1670-1837

Feinstein had trouble estimating housing rents in the years 1770-1841, and used very indirect evidence from local rates and the property tax. Here cottage rental values were estimated from cottage properties owned or purchased by charities which lay outside major cities such as London, Bristol, Manchester, Birmingham and Leeds. The Charity Commission of 1818-1837 gave details on the current and previous rental values of hundreds of cottages owned by charities or purchased by them. The table below shows the number of properties observed in each period. Sometimes the observations are for collections of cottages, so the second column shows the total number of properties covered. The table below shows the calculated average rental value of the properties observed. The location of the properties by parish or township was generally given, and sometimes additional details such as the area of the garden, the size (large or small). Rents, as expected, were higher the more densely populated the parish. Since the properties were more concentrated in densely populated parishes than the agricultural population as a whole would be, the rental series was adjusted to always reflect rents in rural parishes of the appropriate average density. The expression fitted to the data was:

$$\ln(\text{RENT}) = \sum_t \alpha_t \text{DUM}_t + \beta_1 \text{FBIG} + \beta_2 \text{FSMALL} + \beta_3 \text{FSHOP} + \beta_4 \text{AREA} + \beta_5 \text{DNAREA} \\ + \beta_6 \text{DSHORT} + \beta_7 \text{DNTERM} + \sum_k \gamma_k \text{DEN}_k + \varepsilon$$

where RENT is the rent per cottage, and DUM an indicator variable which is successively one for each of the periods 1670-99, 1700-19,...1835-39, 0 otherwise. The other variables all control for the characteristics of the properties. FBIG is the fraction of the cottages which were described as large (0.4% on average), FSMALL the fraction described as small (9% on average),

FSHOP the number of shops attached per cottage (1% on average), AREA the average garden area per cottage where an area was given (1,570 square yards), DNAREA an indicator variable where a garden area was not given (81% of properties), DSHORT an indicator which equals one if the lease of the property was for a year or less (58% of properties), and DNTERM an indicator which equals one if no lease term was given (34% of cases). Average rents were estimated re-weighting to give cottages in the less dense parishes a weight proportionate to the estimated population in these parishes. Since a few parishes had many observations in one period, the expression was fitted with weights of the inverse of the number of observations per parish per period.

Cottage Rents, 1670-1837

Period	Observations	Number of Cottages	Average Rent per year (£, uncorrected)	Estimated Rent per Year (£)
1670-99	9	20	2.26	1.59
1700-19	21	29	2.07	1.35
1720-39	18	30	1.73	1.40
1740-59	9	19	1.94	1.77
1760-69	12	23	3.55	1.96
1770-79	11	12	1.97	1.77
1780-89	19	25	2.28	1.75
1790-99	18	26	2.13	1.88
1800-04	16	24	3.22	1.74
1805-09	28	43	3.56	2.43
1810-14	35	49	6.84	3.41
1815-19	92	155	3.01	2.91
1820-24	306	484	3.34	2.90
1825-29	317	611	3.77	3.12
1830-34	304	499	3.84	3.28
1835-39	331	654	4.02	3.23

Manuscript Sources on Wages

Day Wages

Beveridge Collection, Robbins Library, London School of Economics. Brooke, Isle of Wight (Box I11). Delisle Accounts (Box W2). Eton (Box I19). Pelham Papers (Box H12). Stowe Papers (Box H2). St Bartholomew's Hospital, Sandwich (Box E9). Winchester College (Box, --).

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Hertford Record Office. Broadfield Hall, 70474A. Labor Accounts, D/ER96. Hatfield, 26294. Rolt, D/EAS/21710. Sebright, 18104. Wilshere, 61589.

Huntingdon Record Office. Bernard, ddM5/4/1. Brampton, ddM5/5, ddMM/44D/7. Houghton, ddM/44D.

Kent Record Office. Best, U480/E1-2. Croft, U709/A1. Darell, U386/A1. Gambia, U194/A8. Rockingham, U471/A18. Sackville, U269/A69/2, U269/A70/2, U269/A89. Tylden, U593/A7.

Lancashire Record Office. Clifton, DDCI 399. Farington, DDF 31. Hesketh, DDHe/62/14-15, DDHe/62/25-29. Molyneaux, DDM/1/141.

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