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Farm wages and living standards in the industrial revolution: England, 1670-1869[1]

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Much has been written on agricultural wages in England from 1670 to 1869, but this information has never been formed into one national series of agricultural wages. Wilson Fox provides good evidence based on farm accounts for 1850 and later. But for the years 1770-1849 the only national series available is the one Bowley constructed in 1898 mainly from wage surveys.[2] While Bowley's 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and takes no account of manuscript sources that have become available in the past hundred years.[3] In an unpublished doctoral thesis, Eccleston calculated the day wages of workers on large agricultural estates from five midland counties from 1750 to 1834, and gave an annual day wage series for these counties.[4] In another unpublished thesis, Richardson similarly calculated the average wages in seven English counties from 1790 to 1840, in part from estate sources.[5] But while the volume of *The agrarian history of England and Wales* for 1750 to 1850 offers a number of wage series on individual farms, it gives no overall wage series for that period.[6] For the years before 1750 the information is sparser. From manuscript sources, Bowden calculated 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 in any decade.[7]

Hence, the first task this article undertakes is to produce a nominal national agricultural wage index annually from 1670 to 1850, which incorporates the available published wage information and manuscript

[1] This research was funded by NSF grant no. SES 91-22191. For the midlands in the years 1750-1833 I benefited greatly from the pioneering work of Bernard Eccleston, and used some of his data directly rather than going back to the sources. Peter Lindert generously provided the material on Ardleigh. Without implicating them in any way in the conclusions, I thank the following for advice, help, and responses to queries: Steve Broadberry, Joyce Burnette, Peter Lindert, Andrew Oswald, Michael Turner, and anonymous referees. Robert Eyler and Mona Shraer provided excellent research assistance.

[2] Fox, 'Agricultural wages'. Feinstein uses the Bowley series in his recent work on wages during the industrial revolution, but he notes that 'The most worrying feature of this series is the absence of a reliable benchmark between 1795 and 1824': Feinstein, 'Changes in nominal wages', p. 187.

[3] Bowley, 'Statistics of wages'.

[4] Eccleston, 'Survey of wage rates'.

[5] Richardson, 'Standard of living controversy'.

[6] John, 'Statistical appendix'.

[7] Bowden, 'Statistical appendix', pp. 877-8.

sources, and which can be linked to the Fox series. Manuscript observations contribute about two-thirds of the information at the annual level. A quinquennial index for these years for each of four major areas of the country—the north, midlands, south west and south east—has also been derived since these regions had very different wage trends in this period.

The strategy followed throughout is first to estimate a series on the payment per day of labour to farm workers from wage payments outside hay and harvest (44 out of 52 weeks in the year). 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 inquiry reports which collected wage information by circulars in the winter of 1832-3, wages as reported in the *Gardeners' Chronicle and Agricultural Gazette* in April 1850, and Arthur Young's wage reports for 1767, 1768, and 1770.

Next, by examining what happens to the ratio of hay wages to winter wages and of harvest wages to winter wages, and to the pattern of labour inputs over the year, it is shown that these 'winter' wages are likely to represent both the annual wages of male workers and the average cost of labour to farmers. Having done this, it is possible to consider what the series implies for the living standards of farm labourers and for the movement of agricultural productivity.

I

The article estimates what an adult male agricultural labourer would be paid for a day of labour from 1670 to 1869. This has necessitated the extraction from farm accounts and secondary sources of records of payment per day of work for farm labour, including payments to workers employed by a farmer for the whole year and those to workers employed temporarily. A list of the manuscript sources is given in the appendix. The form of many earlier accounts makes it impractical to try to distinguish between permanent and temporary workers. In earlier years and in the north of England many workers were employed on annual contracts as 'servants in husbandry' and received food, lodging, and clothing in addition to a money wage. Although references to the payments to such workers are frequently found in accounts, these payments have not been used in constructing the estimates because of the impossibility of valuing the in-kind compensation.

Sometimes wages are reported not by days but by weeks. In these cases a week has always been assumed to be six full days. This assumption was made because, for all but one account where the assumed number of days in a 'week' could be calculated from internal evidence, the length of the week was six days all the way from the seventeenth century to the nineteenth. Thus in Somerset in March 1714 farm labourers were recorded as being paid 10d. per day, or 5s. per week, implying that a week was regarded as six days. Similarly on a farm in Bocking, Essex, in March 1773, William Dod was paid £2 13s. 8d. for working seven weeks and four days and a further 28d. for working two more days. At

six days per week his rate per day for the first payment would be the same, at 14d. per day.[8]

There are two big problems with estimating day wages from farm and estate accounts. The first is inferring when the employee referred to is an adult male. Farms employed numbers of women, boys, and girls for various tasks and paid them much less than adult males, but the accounts rarely show the age of workers, and often not even the gender. To make sure that adult male wages only were included, it is possible to rely on the sexual division of labour that was practised in the English countryside from the middle ages onwards. Thus the tasks of threshing, ditching, hedging, mowing, carting, cutting wood and making faggots, which together occupied a large portion 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 safely be presumed to be an adult male agricultural labourer. Some tasks such as reaping and weeding were done by both men and women, at least in earlier years, and these are included only where ancillary evidence shows that the workers were adult males. Again, some tasks such as ploughing and stone picking often involved boys, and again these are included only where other evidence shows the worker to have been an adult male.

Nineteenth-century accounts often had a different form where a group of what were obviously male farm workers would have their wages and days worked detailed week by week, but the amount of the wages shows some of the group to have been youths or elderly workers. Thus the wages listed per day would be, for example, seven workers at 30d., three workers at 28d., and one worker at 18d.[9] In this case the wage has been taken as the average of all wages that fell within two-thirds of the modal wage. The effects of counting or not counting these outlying wages in the mean wage were generally small.

The second problem lies in determining whether, in addition to the wage, the worker received 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 as hard where farmers employed workers both with and without food, since the wage with food would often be no more than half the wage without food. Thus if there are two sets of wages at very different levels it is often apparent that one is for wages with food. In an estate in Cumberland

[8] Somerset RO, Carew, DD/TB BOX 14/12, Essex RO, Tabor family, DDTA/A3. The following other accounts for the years 1800 and earlier, listed in chronological order, showed a week of six days. Staffordshire RO, Levenson-Gower, D593/F/3/25 (1681); West Yorkshire RO: Sheepscar, Ingram/Irwin, TN/EA/12/11 (1691); Somerset RO, Parsonage, DD/X/REE/C/1308 (1692); Somerset RO, Popham, DD/PO/32/3-14 (1706, 1713); Hampshire RO, Russell, 149M89/R5/6103 (1762-3); Nottingham RO, Portland, DD5P/4/1 (1775-6); Essex RO, Tabor family, DDTA/A1 (1788-9); Warwickshire RO, Conway, CR114A, 357 (1791-2); Durham RO, Salvin, D/Sa/E177 (1800). One account showed a week varying from four to six days, with an average of 5.6 days. This was Durham RO, Salvin, D/Sa/E167 (1715-17).

[9] Cumbria RO, Dlons L3/5/55, Oct. 1846.

in 1732, for example, the same person was paid both 9d. per day and 4d. per day for threshing, and the lower rate clearly involved food in addition.[10] 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 in these circumstances. 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, however, workers were often fed at work even in the nineteenth century, and vigilance is required to avoid including such wages in calculations of the mean.

Detecting from the accounts when workers in regular work received beer has proved to be impossible, since beer was a much smaller supplement to wages, and so cannot be identified from internal evidence. Beer was often still provided even in 1832, especially at hay and harvest. But evidence from the 1834 *Report on the Poor Laws* indicates that where beer was provided it was worth about 10 per cent 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 an especially dramatic one.

Table 1. *Amounts of day wage data in the wage dataset*

Work type	*Individual observations*	*Observations averaged by year and place*
All	12,746	3,022
Unspecified farm	7,812	1,730
Hedge	886	405
Farm work on estate	526	517
Thresh and winnow	472	216
Mow	468	347
Labour in garden	334	84
Harvest	232	206
Cart	211	70
Ditch	191	136
Plough	180	70
Dung	177	97
Dig	143	103
Reap	140	108

Note: 'Farm work on estate' refers to workers performing tasks typical of farm workers, such as hedging or carting, on estate grounds.
Source: Agricultural wage dataset

The various sources of wage information used have been combined into an 'agricultural wages' dataset containing 12,746 quotations of day or weekly wages for farm workers for the years 1670-1850, though some are at a much more disaggregated level than others. Hence the quotations of day wages are reduced to 3,022 if averaged by place and year. The breakdown of the most frequent work descriptions is given in table 1.

[10] Cumbria RO, DPenn/204.

Table 2. *Wage rates from the 1834 report*

Season	*No. of observations*	*Wage/day (d., money only)*	*Wage/day (d., valuing beer allowances)*	*Ratio to winter wages (cash + 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

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

To construct the annual index of wages from 1670 to 1850, wages outside hay and harvest are used, and defined 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.[11] Wages varied somewhat even in the period outside harvest, those paid in the winter months being somewhat lower than even non-harvest wages in the summer months. Table 2 shows for the 1832 wages in the *Report on the Poor Laws* the level in winter, summer, hay time, and harvest. Summer wages were on average 11 per cent greater than winter wages, with hay and harvest wages higher still. Thus in calculating average wages outside the harvest and hay periods from the sources, I have increased wages paid from October to March by 4.5 per cent, and reduced wages paid from April to September by 6 per cent. Some workers were also employed on an annual basis and paid a fixed wage throughout the year even in the higher-wage hay and harvest periods. In these cases the winter and summer wages outside harvest were reduced by 7 per cent to make them comparable to those paid to workers who benefited from the higher hay and harvest earnings.

The data were divided into four regions—the north, the midlands, the south east, and the south west—because there are indications that wages moved in different ways in each of these regions in this period. Thus the north went from being the lowest wage to the highest wage region over this period, and the south east from being about 20 per cent above the national average wage level to being 10 per cent below that level. Table 3 shows the number of wage sources by decade for each region, demonstrating that the amount of data is much greater for some regions than for others and that the relative amount of information varies by period.

[11] Where the exact period of the work is not stated, but it is work usually done outside the hay or harvest period, this has been counted as winter work.

Table 3. *Number of wage sources by decade for the wage series, 1670-1850*

Decade	*North*	*Midlands*	*South west*	*South east*	*All*
1670-9	4	6	4	11	25
1680-9	3	5	1	11	20
1690-9	8	9	3	12	32
1700-9	6	12	4	15	37
1710-19	5	6	7	13	32
1720-9	6	11	9	9	36
1730-9	10	9	4	12	36
1740-9	7	11	7	11	36
1750-9	5	14	5	6	31
1760-9	8	21	7	9	45
1770-9	6	16	4	5	31
1780-9	5	12	2	4	23
1790-9	4	15	4	7	30
1800-9	7	23	5	12	47
1810-19	7	24	4	11	46
1820-9	7	19	6	8	40
1830-9	5	20	9	11	45
1840-9	6	13	7	8	34

Notes: The areas are composed as follows: *North*: Cheshire, Cumberland, Durham, Lancashire, Northumberland, Westmorland, 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.

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:

$$\ln(Wage_{it}) = \sum_i \alpha_i PLACE_i + \sum_t \phi_t DYEAR_t + \epsilon_{it}$$

where i indexes the source and t the year. $PLACE_i$ is an indicator variable which is 1 when the observation is from source i, 0 otherwise. The inclusion of the indicator for each wage source, along with the logarithmic form for wages, allows for constant percentage differences in farm wage rates. The estimation procedure calculates the movement of wages by looking just at what happens within each series from each source over time. The movement of wages across years is estimated by including indicator variables for years $DYEAR_t$ which are 1 in year t, 0 otherwise. For the south west, where the data are thin before 1800 and the individual series often do not overlap, this procedure did not work well, and the indicator variables for each source were not used in the years before 1788 (in effect it was necessary to assume that the average wage level at any time was the same across all sources in the south west in these earlier years).[12] 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 tables

[12] In the south west before 1700 the day wage data were supplemented by piece rates on threshing and faggoting to fill in some years where there were no day wage data.

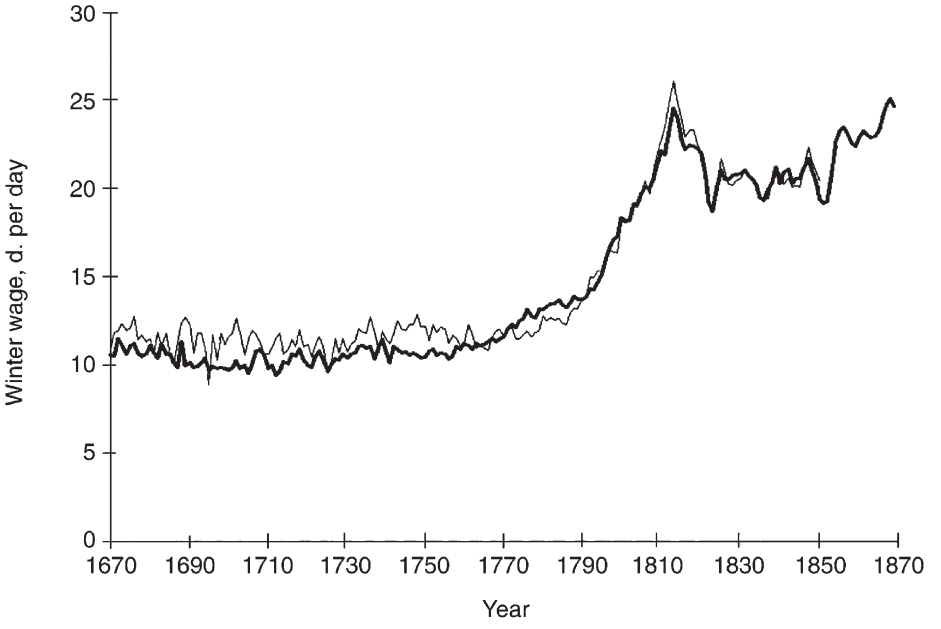

Figure 1. *Average daily wages outside hay and harvest, 1670-1869*
Note: The bold line shows winter wages as a weighted average by agricultural area of four divisions of England. The light line shows a simple average of all the places reporting data for the year in question.
Source: Agricultural wages dataset

on occupations.[13] 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. The corrected index differs little from the uncorrected index in most years. In the years 1670-1760 it is generally below the raw average, because the high-wage south east is over-represented in the data in these years. In 1770-90 the wage index is generally above the raw average. Nominal agricultural wages are essentially flat in the years 1670 to 1730, at an average rate of about 10.3d. 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, 1834-7, and 1848-50, wages are fairly steady between 1820 and 1850. Appendix table A1 shows annual estimated nominal day wages outside hay and harvest from 1670 to 1850.

Figure 2 compares this series with the Bowley index for the years 1770 to 1850. 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

[13] All farm workers between the ages of 15 and 65, including farmers, have been counted in this calculation. The numbers were respectively north, 240,124; midlands, 284,676; south east, 334,163; south west, 278,001.

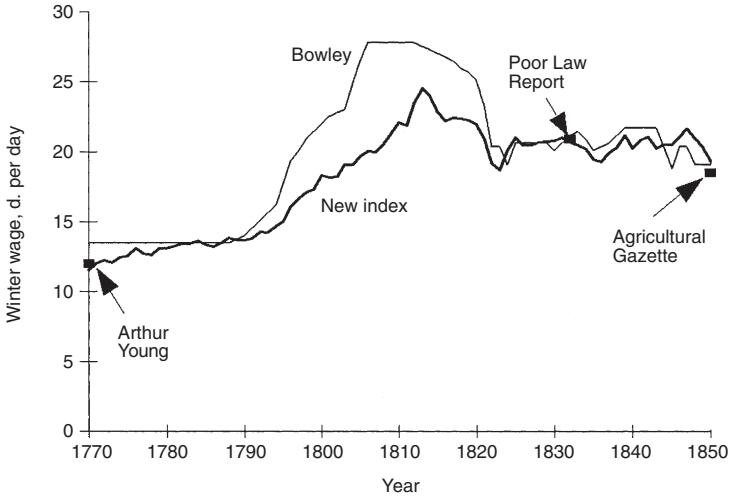

Figure 2. *Winter wages in English agriculture, 1770-1850*
Sources: app. tab. 1; tab. 5; Bowley, 'Statistics of wages'

1795-1820, the Bowley series is very different. Thus at the extreme in 1807 Bowley reports wages at 27.8d. per day, while the new series reports only 19.4d., a 44 per cent difference. Bowley is generally much more optimistic about the level of rural wages for the revolutionary and Napoleonic war periods. Figure 3 shows that the deviation between Bowley and this series in the years 1790-1820 is no accident of sampling in the sources available for use here. The figure shows the Bowley series for England by quinquennia compared with the movement of wages in each of the four regions for which wages were estimated, with 1785-9 in each

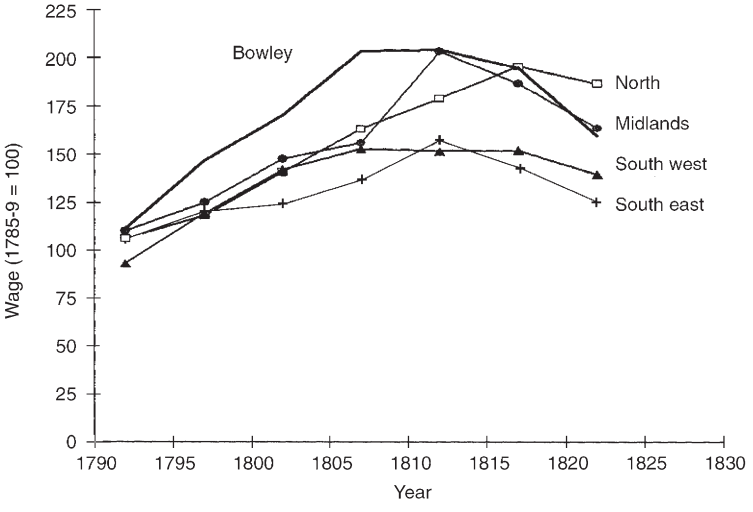

Figure 3. *Winter wages by quinquennia, 1790-1824*
Sources: as fig. 2

case fixed at 100 since the two series are at the same level in this quinquennium. In the periods 1795-9, 1800-4, and 1805-9 wages in all four regions rise by much less than the Bowley series would predict, but are generally similar across the regions. After 1810 the two southern regions show lower wage increases than the northern regions, exactly what everything else we know about the period would suggest should happen. Because all four regions show very similar trends, and individually plausible trends, the chances that this result stemmed from sampling error are very remote. Bowley relied on information for only one or two farms in interpolating between 1796 and 1824 and clearly these were not representative.

Table 4. *Winter wages by region by quinquennia, 1670-1849*

Quinquennium	*North*	*Midlands*	*South east*	*South west*	*All*
1670-4	—	9.8	11.8	12.3	10.5
1675-9	7.2	9.3	11.8	10.5	9.9
1680-4	10.0	8.4	12.0	11.2	10.5
1685-9	—	8.0	13.7	11.3	10.5
1690-4	6.4	8.6	12.4	11.3	9.9
1695-9	6.8	8.9	11.9	10.3	9.7
1700-4	6.4	8.9	12.5	—	9.8
1705-9	7.7	8.9	12.5	11.4	10.3
1710-14	6.7	8.9	12.0	10.7	9.8
1715-19	7.7	9.3	12.1	11.8	10.4
1720-4	6.5	9.2	12.2	12.1	10.2
1725-9	6.5	10.2	12.0	11.4	10.3
1730-4	8.6	10.5	11.8	12.2	10.9
1735-9	9.0	10.6	12.2	11.8	11.0
1740-4	8.2	9.8	12.7	12.1	10.9
1745-9	8.4	10.4	12.7	11.4	10.9
1750-4	9.2	9.8	13.2	10.8	10.9
1755-9	9.4	9.7	13.3	11.0	11.0
1760-4	9.9	10.1	13.3	11.2	11.3
1765-9	9.9	10.4	13.2	11.8	11.4
1770-4	10.7	10.9	14.9	11.9	12.3
1775-9	10.9	12.0	13.5	11.9	12.2
1780-4	11.0	12.9	16.6	11.9	13.3
1785-9	11.5	12.5	15.1	13.6	13.3
1790-4	12.2	15.2	15.9	13.5	14.3
1795-9	13.5	16.5	17.1	16.0	15.9
1800-4	16.1	19.4	19.1	17.8	18.2
1805-9	18.7	20.7	21.3	19.4	20.2
1810-14	20.5	26.4	25.8	19.3	23.2
1815-19	22.4	23.6	22.8	19.3	22.1
1820-4	21.4	20.3	19.0	17.6	19.5
1825-9	21.9	21.8	19.5	17.6	20.1
1830-4	22.4	21.2	19.0	17.3	19.9
1835-9	21.5	20.4	18.4	17.6	19.4
1840-4	21.3	21.3	20.2	17.9	20.2
1845-9	23.5	21.1	20.7	18.3	20.8
1850-4	23.3	20.9	19.0	18.1	20.2
1855-9	26.5	23.1	22.1	20.3	22.9
1860-4	27.1	23.1	21.3	20.9	22.9
1865-9	28.5	24.5	22.8	22.2	24.3

Notes: Nominal wages, d. per day. Some workers would also have received beer allowances.
Sources: Agricultural wages dataset; Fox, 'Agricultural wages'.

Table 4 shows by quinquennia the estimated movement of wages in each of the four regions. The series from each region have been continued for the years 1850-69 by matching them to the nearest corresponding areas reported by Wilson Fox in 1850. There is considerable movement. Wages in the north, which were 20 per cent below the national average in the years 1670-99, were 10 per cent above the national average by 1845. This is in contrast to the situation in the south east, with wages some 20 per cent above the national average at the earlier date, but at the national average by 1845. And in the south west wages fell from a position nearly 20 per cent above the national average in 1670-99 to 10 per cent below the average by 1845.

II

How good an indication is this series, constructed on the basis of an average of 17 randomly located places per year, of the movement of wages outside hay and harvest? The answer, at least for the years after 1767, seems to be that it is likely to be fairly accurate at the national level. I measure how well the new series is likely to represent wage trends by comparing its average level with average wages nationally at three points 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. The national and regional wages for that year, which are derived from the *Report on the Poor Laws*, and which are shown in table 5, are based on 908 day wage observations and are calculated by the same method used for the index. The *Report* suggests an average money wage outside harvest and hay of 20.9d. per day.[14] The wage index estimates national wages in the same year as 20.7d., an error of less than 1 per cent if the *Report* is taken as definitive. For 1767-70 Arthur Young gives 160 day wages, which imply an average money wage of 12.0d., compared with the wage index that shows 11.4d, a difference of less than 6 per cent. For 1850 the *Agricultural Gazette* reports 127 wages for April in 38 of 42 counties in England, which suggest a national average wage of 18.5d., and the index is then at 19.3d., a difference of only 4 per cent. Thus on a national scale we can seemingly expect that the wage index will typically show wages within about 4 per cent of their true national level in the years 1670 to 1850, since the number of farms observed in each 10-year period is about the same throughout.

As expected, the regional wage levels deviate more from their respective benchmarks. But only in one case does the deviation exceed 10 per cent in any of the benchmark years. In 1832 the biggest of the four regional deviations is less than 4 per cent. The estimates here thus also give a rough picture of the movement of wages in the four different regions.

[14] To calculate this wage it is assumed that winter wages covered six of the 10 months outside harvest, and summer wages the other four.

Table 5. *Nominal money wages outside harvest compared with benchmarks*

Source	*Period*	*All*	*North*	*Midlands*	*South east*	*South west*
Arthur Young	1767-70	12.0	11.1	11.1	14.3	11.1
Index	1767-70	11.4	10.1	10.6	12.8	11.8
Report on the Poor Laws	1832	20.9	22.0	22.2	22.0	17.4
Index	1832	20.7	22.2	22.0	21.2	17.3
Agricultural Gazette	1850	18.5	22.0	18.7	17.7	16.4
Index	1850	19.3	22.7	19.9	17.8	17.7

Sources: Young, *Six months' tour*; *idem*, *Farmer's tour*; *idem*, *Six weeks' tour*; House of Commons, *Report on the Poor Laws*; *Gardeners' Chronicle and Agricultural Gazette*, 'The value of agricultural labour', 27 April 1850, pp. 266-7; Agricultural wages dataset

III

The above series shows what happened to wages per day outside the hay and harvest periods. But the interest in wages in this context stems from the information they provide in combination with other input prices on the movement of agricultural productivity, and the information they supply on living standards. If it is reasonable to assume that the typical agricultural worker was employed for roughly the same number of days per year throughout the period 1670 to 1869, then the day wage series will also be an index of average farm labour costs and of the annual earnings of male farm labourers. To see this, note that the total number of days worked will be N, where

$$N = N_{winter} + N_{hay} + N_{harvest}$$

and N_{winter} is the number of days worked outside harvest, N_{hay} the number of days worked in the hay harvest, and $N_{harvest}$ the number of days worked in the grain harvest. The total annual wage income per worker, W, will be

$$\begin{aligned} W &= w_{winter}N_{winter} + w_{hay}N_{hay} + w_{harvest}N_{harvest} \\ &= w_{winter}\left(N_{winter} + \left(\frac{w_{hay}}{w_{winter}}\right)N_{hay} + \left(\frac{w_{harvest}}{w_{winter}}\right)N_{harvest}\right) \end{aligned}$$

As long as the ratio of the hay wage to the winter wage and that of the harvest wage to the winter wage remain constant, and the total number of days worked each year outside hay and harvest does not change, total annual earnings W will move proportionately with the winter wage. Similarly the average cost per day of labour, W/N, will again be proportionate to the winter wage.

Information from the wage accounts suggests that the ratio of harvest and hay wages to wages in the rest of the year changed little from 1670 to 1850. Table 6 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. The ratio does not change much over the course of 180 years, and most of the apparent change may simply be sampling error. The ratios in the farm accounts are also relatively similar to the

Table 6. *Money harvest and hay wages relative to money non-harvest wages*

Source	*Period*	*No. of places*	*Hay wage/'winter' wage*	*No. of places*	*Harvest wage/'winter' wage*
Farm accounts	1670-99	18	1.28	17	1.48
Farm accounts	1700-69	42	1.28	41	1.47
Farm accounts	1770-1850	26	1.21	23	1.56
Arthur Young	1767-70	139	1.39	131	1.56
Report on the Poor Laws	1832	75	1.29	169	1.77
Agricultural Gazette	1850	—	—	110	1.64

Sources: see text

various benchmark cross sections that are available from 1770, 1832, and 1850.

Note also that, since together the hay and harvest period covered only about eight weeks, if workers were employed for most of the remaining 44 weeks of the year, any change in the ratio of hay and harvest wages to winter wages would have very little effect on total earnings. For in that case, taking winter wages from the 1832 *Report*, the 44 weeks of winter employment would provide 78 per cent of annual money earnings, so that any modest change in the ratio of harvest wages to winter wages would have very little effect on annual earnings or on the average labour costs of farmers. A 10 per cent change in the ratio of hay and harvest wages to winter wages will produce a 2.2 per cent change in annual earnings and in average labour costs to farmers. If weeks worked in winter were constant but less than 44, then the annual wage and annual labour cost would be more sensitive to the exact ratio of harvest wages to winter wages. But even if the average worker experienced as many as 10 weeks of idleness in winter from lack of work, winter earnings would still be 73 per cent of annual earnings, so that modest changes in the ratio of harvest and hay wages to winter wages would have little effect.

Thus, as long as the number of days of employment outside harvest is relatively constant from 1670 to 1870, and workers are not idle for more than three months or so in the winter, winter wages will provide a very good index of both annual earnings and average labour costs. Only if the days worked outside harvest changed significantly would an index based on winter wages be misleading. Suppose, for example, that by the nineteenth century the average worker was unemployed for 10 weeks in the winter, while in 1670 work was available year round. In that case, annual earnings in the nineteenth century would fall by 18 per cent if the nominal winter wage stayed constant. In general, for every increase of 10 per cent in the average level of unemployment annual earnings will fall by 9 per cent, assuming that unemployment occurs only in the winter and there is no replacement of wages by poor relief.

My claim is that male agricultural labourers were typically employed for 300 days or so per year throughout the period 1670 to 1869. This is against the general belief among agrarian historians that winter unemployment was a significant problem for English agricultural workers

by the nineteenth century, and perhaps also at an earlier date. Hobsbawm and Rudé, for example, note of the period around 1830 that 'Under-employment was constant, except perhaps at the height of the harvest, and sometimes even then. Yet it is clear that the main burden of unemployment was concentrated in the winter months.'[15] It is not possible here to argue this point to its full extent. But evidence both from the farm accounts and from poor law sources suggests that winter unemployment in English agriculture is likely to have been modest even in the nineteenth century. Consider first the poor law evidence. Ardleigh in Essex was a largely rural parish in the early nineteenth century, with 80 per cent of males aged 15-59 reporting agriculture as their occupation in 1831. It was also located in a region largely devoted to grain production where the seasonality of labour demands was pronounced, and it was a parish of consistently high poor law payments. The average payment per head in 1831 was £1.43, which places Ardleigh in the top 11 per cent of a sample of 926 rural parishes in terms of payments per head.[16] The overseers' books for Ardleigh in 1821 list details of the names of those receiving payments, the amounts paid, and the reason: 'no work', 'ill', 'lame', and even 'lazy'. In addition, manuscript censuses for Ardleigh survive for 1796 and 1821, listing the ages and occupations of everyone in the first case, and of the head of household in the second. From these sources it is possible to estimate the number of males aged 12-64 in Ardleigh in 1821, the fraction of these employed as labourers or artisans, and the share of these workers unemployed in each week of the year 1821. This share is given as an upper and lower bound in figure 4. The lower bound shows the share calculated as the fraction of males explicitly recorded as unemployed for each week, or whom the parish employed. The upper bound shows the share calculated including as unemployed those workers receiving relief where no reason was given, or the reason was only 'in want'. There is significant unemployment in the months between December and July, when on average between 5 and 8 per cent of male workers were unemployed. But this still entails an average annual unemployment rate of between 3.9 and 5.6 per cent of the male labour force.[17] And this 4-6 per cent unemployment did not translate into a 4-6 per cent decline in income since unemployment was concentrated in the months outside the high earnings of the harvest season, and the poor relief payments made up some of the difference. Assuming poor relief replaced even half the lost wage income, the losses in income from unemployment in Ardleigh in 1821 would certainly average less than 3 per cent of potential annual income. And it is necessary to remember

[15] Hobsbawm and Rudé, *Captain Swing*, p. 74. Allen, *Enclosure and the yeoman*, similarly argues that over the course of the eighteenth century 'irregularity, casualness, and the seasonality of employment increased' (p. 288).

[16] Payments per head in Ardleigh were £1.15, which again would place it well within the upper range in terms of poor relief payments.

[17] The reason why little unemployment was recorded in weeks 39-46 immediately after the harvest might be that workers who were unemployed were expected to live on their extra harvest earnings in these weeks, but even if the unemployment rate was the average for the months December-July in all the 46 weeks outside harvest the average annual rate would be between 4.9 and 6.9%.

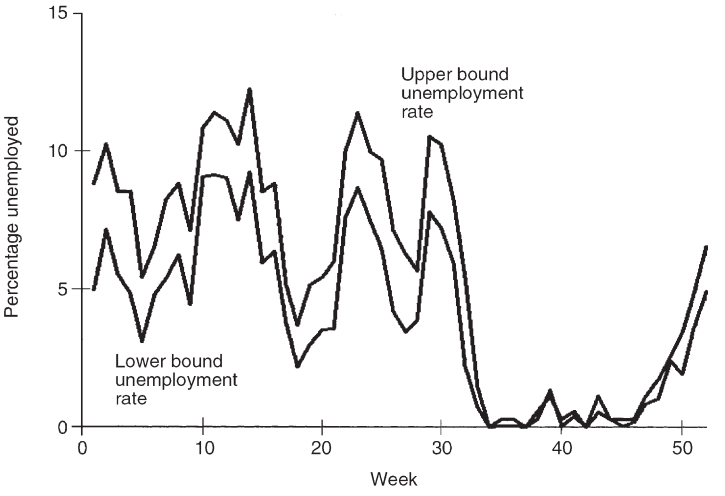

Figure 4. *Male unemployment in Ardleigh, Essex, 1821*
Note: The weeks of the year are numbered from January to December
Sources: Essex RO, Chelmsford: Disbursements to the poor, 1821. D/P263/13/7-8; Census of Sept. 1796. D/P263/1/5; Account of the population of Ardleigh, 28 May 1821. D/P263/28/1

that Ardleigh was a parish with unusually high poor relief payments. Most parishes would have experienced less unemployment than this in the nineteenth century, at least until the end of the old poor law in 1834.

The second source suggesting that close to full employment was the norm over the period 1670 to 1850 is the material included in the farm accounts themselves which contain information on the amount of wage payments to workers in each month of the year. I did not systematically collect this information, but for the accounts from earlier years which tended to be simpler in form I sometimes recorded all the identifiable payments to men in each month of the year. Aggregated, these payment records suggest that the amount of daily or weekly male labour hired by farms actually fluctuated little over the course of the year, at least before 1790. Figure 5 shows the average recorded expenditure per month on labour from 55 farm accounts over 1,277 months for the years 1640 to 1789 measured relative to the average monthly payment over the whole year. August payments were 55 per cent greater than those made in the winter months, but since the harvest wage in table 6 was 48 per cent greater, this implies that total employment in August was only about 5 per cent greater than that in the winter.[18] There is no very obvious winter slack season in labour hiring. Employment in December to February was just as high as in the rest of the year outside harvest. The reason why farms could hire workers at a relatively constant rate was that tasks such as threshing—a major task of hired labour—or hedging and ditching could be done at any time of year. Figure 5 also shows threshing and

[18] Not all payments in August would be at the harvest rate, so the employment differential would be somewhat higher than this.

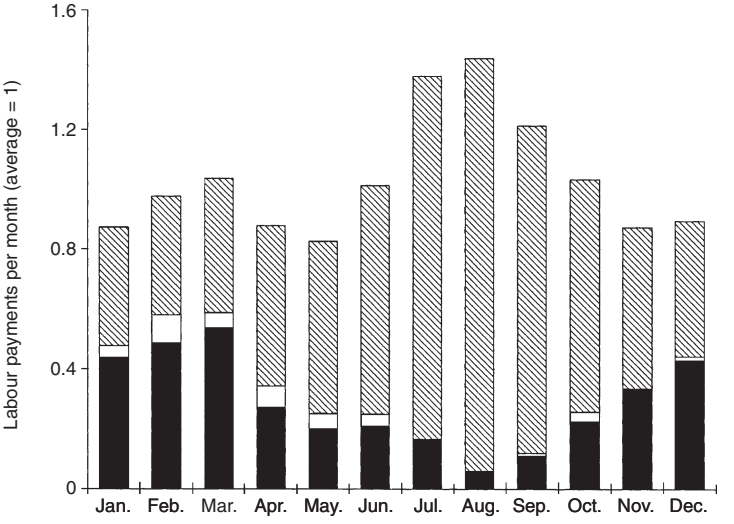

Figure 5. *Labour payments to adult males by month, 1640-1789*
Note: Payments have been adjusted to a standard month length of 31 days. The solid black area in each column represents payments explicitly identified as for threshing. The white areas are payments explicitly for hedging or ditching. The hatched area shows all other payments.
Source: Agricultural wages dataset

hedging payments. These were concentrated in the winter months when other labour tasks were in short supply.

These labour payments do not include payment to the servants in husbandry boarded throughout the year on the farm. Thus if any seasonality were going to appear in labour hiring it would be in these payments to hired out workers. *A fortiori*, at least before 1790, the types of farms represented by these accounts seem to have provided a relatively steady demand for adult male labour over the course of the year. Since these accounts tend to come disproportionately from the home farms of large estates, this may not be the typical pattern of hiring for the farm sector as a whole. But what these accounts do show is that farmers who wanted to could arrange to hire a relatively constant stream of labour over the year. And given that labour was cheapest in the off-season there was every reason for them to smooth out labour demands as much as they could.

Unfortunately, for 1790 and later I did not generally record the amounts of day labour payments across each month of the year. But for two farms in Dorset and Essex in the years 1837-40 I do have the annual record of payments. These show just the same pattern as in the earlier years in labour payments to male workers. Figure 6 shows the pattern on these farms in comparison with the earlier years.

Because the issue of unemployment in agriculture is a large one that cannot be settled here, in the remainder of this article I assume full

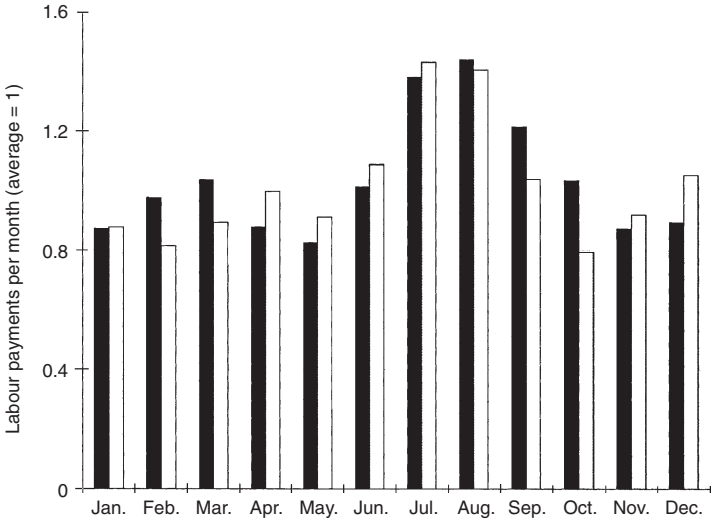

Figure 6. *Labour payments to adult males by month, 1640-1789 and 1837-40*
Note: The solid columns show the pattern on labour payments for the years 1640-1789. The light columns show the pattern for 1837-40.
Source: Agricultural wages dataset

employment throughout.[19] But from the data presented here readers can construct their own real wage series, adjusting for the degree of unemployment they think reasonable in each period.

IV

Having generated a nominal wage series for agricultural labourers that should indicate annual earnings, it is also possible to ask what happened to the real purchasing power of wages in this interval. A rural cost of living index was formed as a geometric index of the prices of each component, with the expenditure shares of farm labourers' families used as weights for each of two sub-periods. 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

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

This implies that if the relative price of an item such as housing increases, consumers adapt by reducing relative purchases of the item to the degree to which the share of expenditures on each item remains constant. The weights used in forming the index are derived from data given by Horrell

[19] Clark and van der Werf, 'Work in progress', discusses other evidence on this issue suggesting little change in labour input.

Table 7. *Percentage of expenditure by category for agricultural labourers*

Category of expenditure	*Horrell*		*Assumed here*	
	1787-1796	*1840-1854*	*1670-1819*	*1820-1869*
Food and beer	77.0	68.6	77.0	69.6
Bread	34.8	8.8	0.0	0.0
Flour	5.3	24.7	0.0	0.0
Wheat	0.0	3.0	38.1	37.4
Barley	1.0	1.4	2.4	1.4
Oats and oatmeal	3.6	2.2	7.1	2.8
Potatoes	2.0	6.0	0.0	6.2
Beer	1.0	0.0	1.0	0.0
Meat and fish	9.2	3.4	9.4	3.5
Bacon	1.3	2.8	1.3	2.9
Milk	4.0	3.2	4.1	3.3
Cheese	3.5	2.6	3.6	2.7
Butter	3.9	3.3	4.0	3.4
Sugar and treacle	3.6	3.1	3.7	3.2
Tea and coffee	2.4	2.6	2.4	2.7
Other food	1.4	1.6	0.0	0.0
Housing	6.0	10.1	6.0	10.1
Fuel	4.0	4.5	4.0	4.5
Light and soap	4.8	3.3	4.8	3.3
Services	0.1	0.7	0.1	0.7
Tobacco	0.0	1.0	0.0	0.0
Other (Clothing)	8.2	11.7	8.2	11.7

Source: Horrell, 'Home demand and British industrialization', pp. 568-9, 577

for the share of expenditures of agricultural workers in 1787-96 and 1840-54 and shown in the first two columns of table 7. Since I do not have prices for some minor items such as tobacco the weights have been modified to those in the last two columns.

In his paper on real wages in the industrial revolution period, Feinstein instead uses a fixed weight index of the form

$$p_t = \sum_i \alpha_i p_{it}$$

for each of three sub-periods. The Feinstein index assumes that if the relative price of an item increases then within each sub-period there is no effect on the relative amount consumed. The Feinstein index will tend to show greater increases in the cost of living than the index preferred here.

The decadal price levels for the major commodity groups used to form the cost of living index, and their sources, are given below, in appendix table A2. For bread and flour, the staple article that formed nearly half of farm labourers' expenditures, the price of wheat is used. Even though wheat was only an input into making flour and bread, bread had very different qualities that are very hard to control for over long time intervals, and the cost of wheat was a very large share of the cost of flour and bread. For fuel I use the price of faggots alone until 1770 since in rural areas these were the main source of fuel until the nineteenth century at

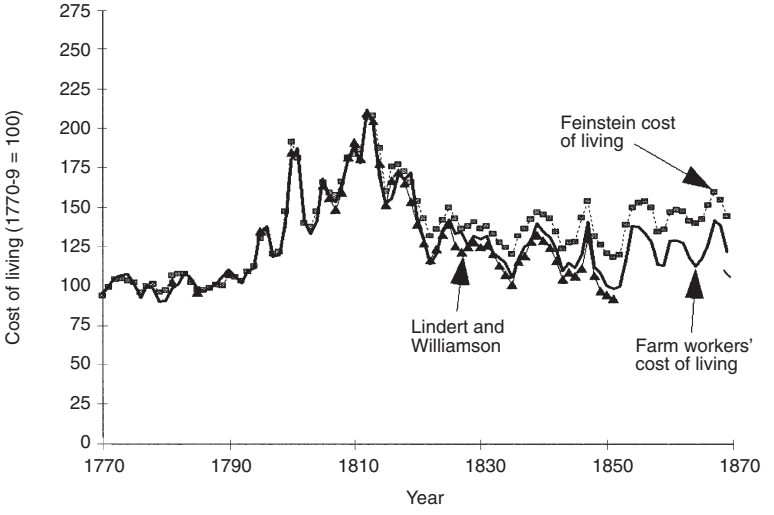

Figure 7. *Cost of living for farm workers, 1770-1869*
Sources: Lindert and Williamson, 'English workers' real wages'; Feinstein, 'Pessimism perpetuated'; app. tab. 1

least. From 1770 to 1830 I use a combination of the prices of faggots and coal, and after 1830 coal alone.[20] For light and soap I use the prices of tallow candles and of tallow, the main input in making soap. Cottage rents are estimated from housing of unchanged quality owned by charities in parishes that had a population density of less than one person per acre in 1801.[21]

Figure 7 shows the resulting index compared with Feinstein's overall cost of living index for all workers for the years 1770-1869 where in both cases the average level of the indices in 1770-9 has been set at 100, and compared with Lindert and Williamson's earlier cost of living index. Appendix table A1 shows the cost of living index for each year. All three indices are very close in the years 1770-1810 but diverge thereafter. By the 1840s the Feinstein cost of living series is about 13 per cent higher, and the Lindert and Williamson series about 6 per cent lower. By the 1860s the Feinstein cost of living is 17 per cent higher than mine.

A number of things explain this deviation from Feinstein. One important matter is the different functional form for the index. An experiment conducted by reproducing roughly the Feinstein series with a constant share of expenditure series suggests that that alone would reduce the cost of living by about 7 per cent in the 1860s (see table

[20] In the years 1770-1830 faggots and coal were each given 50% weight in the fuel series.
[21] The method of estimation here is the same as in G. Clark, 'Shelter from the storm: housing and the industrial revolution' (working paper, Univ. of California, Davis, 2000; http://www.econ.ucdavis.edu/faculty/gclark), with just a restriction to housing in rural parishes.

Table 8. *Explaining the difference between cost of living indices*

	Cost of living, 1860s relative to 1770s
Feinstein index	1.479
Using constant expenditure shares	1.376
Replacing bread with wheat prices	1.347
Using rural weights	1.314
Using Clark rent series	1.295
Using fuel series with faggots	1.273
Clark series	1.262

Source: Feinstein, 'Pessimism perpetuated', pp. 652-3

8).[22] This raises the question as to which assumption is better. Horrell's budget studies seem to suggest that constant expenditure shares approximate more closely to consumer behaviour than fixed quantity weights. Thus the share of household budgets spent on tea, coffee, and sugar stayed approximately constant from the 1790s to the 1860s despite tea and sugar prices falling to about half their level relative to other goods. The share spent on clothing rose despite clothing costs falling relative to other costs. And the share of budgets expended on rent rose by only about 30 per cent despite a rise of more than 60 per cent in housing costs relative to other costs.

A second reason for the more rapid rise of the Feinstein series is the use of bread prices from London until 1820. London bread prices increased by 17 per cent more than wheat prices between 1770-9 and 1860-9. This might argue for using these bread prices, except that London bread prices were fixed by an assize until 1815. Sidney and Beatrice Webb's discussion of how assize prices were fixed in this period suggests strongly that they are not reliable.[23] Thus the ratio of the price of 4 lbs. of bread in London in pence to the price of a bushel of wheat in England in shillings falls from an average of 1.36 in 1670-1769 to 1.14 in 1770-99, but then bounces back up to 1.32 in the years 1820-69 when the assize was abolished. Again, table 8 shows the additional effect of replacing these bread prices by wheat prices. Next, the weights are somewhat different for the rural households. In particular, housing, the most rapidly increasing cost, has a lower weight. Furthermore, the rent series used here, although rising during the years 1770 to 1869 by just the same amount as Feinstein's, has a very different timing for the increase, placing most of it in the earlier period when the expenditure weight on housing was smaller. Finally, the fuel series used here, which looks at the price of faggots as well as that of coal in the years 1770-1830, shows more of a decline in prices. Together these effects are

[22] This is not an exact calculation since I do not have the exact sub-series Feinstein used within the food category.

[23] Webb and Webb, 'Assize of Bread'.

Table 9. *Farm labourers' real wages by decade, 1670-1869* (1770-9 = 100)

Decade	*North*	*Midlands*	*South east*	*South west*	*All*	*Feinstein all workers*
1670-9	82	115	100	122	106	
1680-9	117	98	113	120	112	
1690-9	69	89	92	113	90	
1700-9	86	109	107	120	108	
1710-19	81	105	98	116	102	
1720-9	76	109	99	123	104	
1730-9	113	121	109	137	120	
1740-9	106	120	109	135	118	
1750-9	106	107	97	110	105	
1760-9	106	105	98	109	104	
1770-9	100	100	100	100	100	100
1780-9	103	116	106	99	107	106
1790-9	101	114	102	93	103	113
1800-9	102	109	87	97	98	112
1810-19	113	127	91	91	104	108
1820-9	153	146	103	112	125	118
1830-9	166	154	109	118	132	124
1840-9	173	161	111	125	138	130
1850-9	197	164	115	136	147	140
1860-9	204	165	115	143	150	147

Sources: tab. 4; app. tab. A1; Feinstein, 'Pessimism perpetuated', app. tab. 1

sufficient to account for most of the difference between the cost of living series. Since most of the modifications suggested above would apply to an urban cost of living series also, the above discussion suggests that Feinstein is too pessimistic about living standards for workers in the years from 1815 onwards.

Table 9 and figure 8 show the resulting estimate of real farm wages

Figure 8. *Agricultural real wages, 1670-1869*
Note: The figure also shows Feinstein's index of real wages of all workers, assuming full employment
Sources: Feinstein, 'Pessimism perpetuated'; app. tab. 1

by decade for England as a whole and for each of the four regions, where the average of 1770-79 is set at 100. Real wages overall show little sign of any trend between 1670 and 1819. Indeed, from 1770 to 1819 real wages are essentially flat. For its first 50 years the industrial revolution does nothing to improve the living standards of farm workers. But after 1820 a modest but sustained upward trend in real wages appears so that by the 1850s real wages of male agricultural workers are nearly 50 per cent higher than in the 1770s. This overall real wage trend is a little more robust than that found by Feinstein for all workers, the difference stemming principally from the differences in estimated living costs. Also Feinstein finds modest gains in real wages already in the first two decades of the nineteenth century, gains which are absent here for agricultural workers.[24]

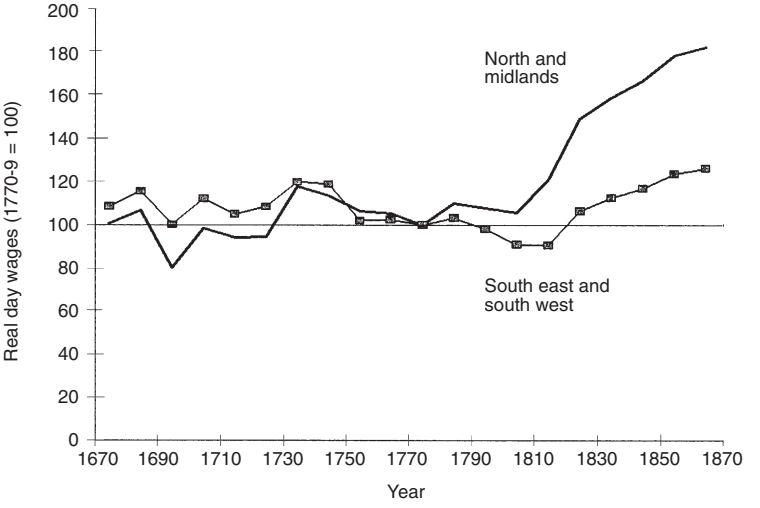

Figure 9. *Agricultural real wages by region, 1670-1869*
Note: The nominal wage in each of the two areas was calculated as a weighted average of the nominal wage in each region within the area, using weights derived from the 1851 occupational census.
Source: tab. 9

Real wage trends were very different in the north than in the south of the country. Figure 9 shows estimated real wages relative to 1770-9 for the south east and south west combined, and for the north and midlands combined. In the south real wages do not rise above the average level of 1670-1769 until the 1840s. Even by the 1860s real wages are only about 15 per cent above their level of the century before 1770. Further, there is a clear decline in real wages over the years 1750-1819 compared with the earlier years. In the north and midlands in contrast, after a period of flat real wages from 1670 to 1809, a sustained increase begins in the

[24] If readers prefer the Feinstein approach to the cost of living they can substitute his real wage index for 1770-1869 and calculate a revised real wage series that will increase to a lesser extent in the decades after 1820.

1810s, and by the 1860s real wages are 85 per cent above their level of the years before 1770.

V

In industrializing economies, the poorest workers are those in agriculture. Since urban areas are providing an increasing proportion of employment there is migration from the country to the city. To induce this rural to urban migration, urban living standards have to rise relative to those in rural areas. In England there was certainly a widening of the gap between nominal agricultural wages and nominal urban wages in the years 1770 to 1869. From the 1770s to the 1860s the day wage of agricultural workers in England increased by 90 per cent, while Feinstein's general wage series for Great Britain shows increases of 118 per cent. Given the migration flows, in an industrializing economy the movement of farm workers' real wages will set a lower bound on the movement of real wages as a whole. If their real wages rise then we can be sure that real wages in the cities are rising by as much or more. Otherwise the increased migration flow to the cities would not be occurring. What makes the wages of male farm workers attractive also as a standard for real wages is that their jobs and living conditions changed little in the years 1670 to 1869. The same tasks were being performed at the same times of year from 1670 until at least the 1850s. Workers were living in the same village settings. Real wage measures for urban workers show just what private goods the wage can purchase, but give no measure of the costs of urban disamenities such as higher infant mortality, pollution, congestion, and unemployment risks. Nor do they measure the costs of changed work conditions as in the move from domestic industry to the factory.

In table 9 we see that from the 1820s onwards real male farm wages in all regions of England rise steadily from their levels of the 1770s. The national rise is greater than Feinstein recently calculated for workers as a whole for all of the decades from the 1820s. The reason, as we saw above, is that while nominal male farm wages increase more slowly than Feinstein (and earlier Williamson) found for workers as a whole, the cost of living series used here shows a consistently lower cost of living in all these decades. Thus Feinstein's recent pessimism with regard to living standards is probably too great. If farm day labourers were improving their living standards in these years, even in the south of England, it is hard to conceive that living standards were not also improving in urban areas.

VI

From the farmer's perspective the real wage that matters is the cost of agricultural labour relative to the price of the output he sells. This will differ from the real wages given above because the bundle of goods produced by English agriculture was different from the bundle of goods

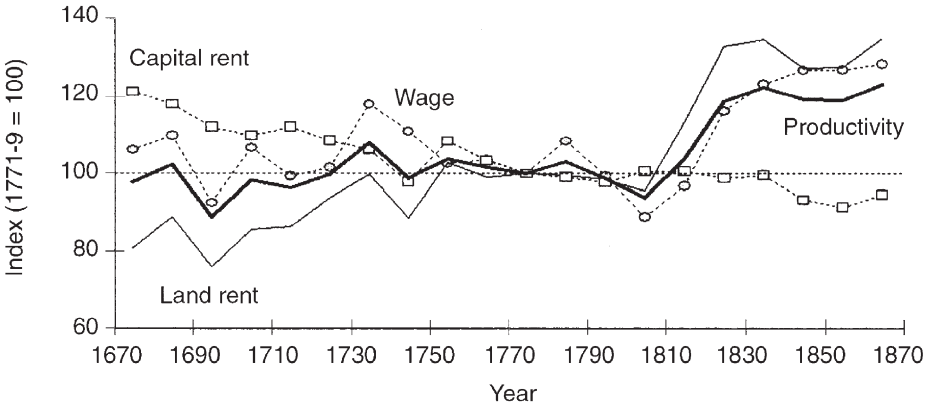

Figure 10. *Indices of wages etc. measured in product prices, 1670-1869*
Sources: Capital rentals: Clark, 'Land hunger'. Land rents: *idem*, 'Renting the revolution'; *idem*, 'Land rental values'. Agricultural output prices: *idem*, 'Land rental values'

consumed by the workers. Figure 10 shows the day wage of agricultural workers from 1670 to 1869 measured in terms of the price of farm output. Farm wages on this measure rise even less during the industrial revolution than does the general purchasing power of wages. By the 1860s they are only about 28 per cent higher than in the 1770s.

The overall productivity of agriculture—the average output per unit of inputs—can be measured as a weighted average of the cost of the inputs—wages, land, and capital—relative to the price of output.[25] Thus, suppose that overall productivity doubles. Then the average payment to inputs measured in the price of the products would also have to double. Since wages increased so little and constituted about two-fifths of production costs in the nineteenth century, for there to be significant productivity advance other input costs measured in product prices would have to have risen by large amounts. Real rentals on land did rise more than for labour, as figure 10 shows, but the rental cost of capital goods actually fell slightly, if it is assumed that farmer's capital had the same price as output. The net effect is a very modest gain in overall productivity, which appears only in the years after 1820.

Thus the wage series developed here, if it can be taken as measuring the labour cost to farmers, implies, in combination with our knowledge of the rental value of land and the return on capital, that the concept that an agricultural revolution occurred at any time in the years 1670 to 1869 is mistaken, and that such advance in productivity as did occur was concentrated in the early nineteenth century.

University of California at Davis

[25] This method is explained in Clark, 'Too much revolution'.

APPENDIX: Details of wages and the cost of living

Manuscript sources on day wages

Beveridge Collection, Robbins Library, London School of Economics. Brooke, Isle of Wight (Box I11). Delisle Accounts (Box W2). Eton (Box 119). Pelham Papers (Box H12). Stowe Papers (Box H2). St Bartholomew's Hospital, Sandwich (Box E9). Winchester College (Box W4).
Bedford Record Office. Chester, BC 482, CH 938. Orlebar, OR 1372-4.
Berkshire Record Office. Craven, D/E C A3. Throckmorton, D/E We A3, A5, A13.
Buckinghamshire Record Office. Chester, D/C/2/45, D/C/2/52. Drake, D/DR/2/48, D/DR/2/51, D/DR/2/89, D/DR/2/164, D/DR/2/166, D/DR/2/168. Hampden, D/MH/30/5, D/MH/30/13, D/MH/30/15, D/MH/30/19, D/MH/30/21, D/MH/33/1-28.
Cambridge Record Office. Cotton, 588/A2, A4.
Chester Record Office. Tollemarche, DTW/2343/A/3/1. Chester Treasurer's Accounts, TAB/7.
Cumbria Record Office (Carlisle). Curwen, D/LONS, D/LONS/W3/14, D/LONS/L3/5/48-56, 90. Fleming, D/S/FLEMING/21. Pennington, D/PENN/202-4.
Cumbria Record Office (Kendal). Browne, WD/TE/Box11/3.
Devon Record Office. Courtenay, 1508 M/V10, 1508 M/V31, 1508 M/V37. Crosse 1160M/Accounts A9(2) (Brampton). Drake 346 M/E2-11.
Dorset Record Office. Bastard, 5339. Bragge, D 83/22. Damer, D188. Digby, KG 1229-40. Larder, PE/WCH/MI/1. Syndercombe, PE/SYM 2/5-6, KW 11A.
Durham Record Office. Salvin, D/Sa/E167-177, D/Sa/E763-5.
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The appendix tables begin overleaf

Appendix table A1. *Winter farm wages and living costs by year, 1670-1869* (d./day)

Year	*Observations*	*Wage*	*Cost of living*	*Year*	*Observations*	*Wage*	*Cost of living*
1670	11	10.5	80	1720	12	9.9	76
1671	10	10.5	77	1721	8	9.8	73
1672	9	11.5	76	1722	13	10.5	75
1673	10	11.1	89	1723	11	10.8	73
1674	13	10.6	94	1724	13	10.3	76
1675	11	11.1	80	1725	11	9.6	83
1676	11	11.2	77	1726	11	10.0	79
1677	10	10.7	82	1727	16	10.3	90
1678	9	10.5	83	1728	12	10.3	92
1679	11	10.6	78	1729	14	10.6	77
1680	9	11.1	81	1730	11	10.4	72
1681	11	10.6	80	1731	13	10.6	67
1682	10	10.4	78	1732	11	10.7	66
1683	6	11.2	76	1733	12	11.0	70
1684	8	10.6	83	1734	16	11.1	75
1685	5	10.6	75	1735	15	10.9	77
1686	6	10.1	77	1736	15	11.0	74
1687	4	9.8	68	1737	10	10.3	72
1688	4	11.3	66	1738	8	11.0	70
1689	5	10.0	73	1739	15	11.4	80
1690	9	10.1	70	1740	16	10.7	89
1691	12	9.8	77	1741	12	10.1	78
1692	12	9.9	86	1742	16	11.0	69
1693	7	10.1	95	1743	15	10.8	63
1694	13	10.4	80	1744	19	10.7	65
1695	10	9.7	95	1745	19	10.7	72
1696	13	9.9	95	1746	22	10.5	72
1697	11	9.8	101	1747	23	10.6	71
1698	13	9.8	100	1748	16	10.5	75
1699	13	9.8	91	1749	15	10.4	73
1700	13	9.7	77	1750	20	10.4	73
1701	13	9.8	72	1751	18	10.8	79
1702	14	10.2	69	1752	19	10.8	81
1703	17	9.8	75	1753	18	10.5	77
1704	14	9.9	71	1754	17	10.6	78
1705	16	9.5	67	1755	17	10.6	86
1706	19	10.1	67	1756	15	10.3	100
1707	18	10.7	73	1757	16	10.5	93
1708	15	10.9	89	1758	19	11.0	78
1709	13	10.5	100	1759	16	10.9	75
1710	15	9.8	87	1760	19	11.2	71
1711	15	9.9	89	1761	20	11.1	73
1712	14	9.4	79	1762	18	10.9	76
1713	11	9.6	86	1763	21	11.2	82
1714	16	10.1	76	1764	20	11.1	91
1715	16	10.1	79	1765	19	11.1	94
1716	11	10.6	78	1766	19	11.3	104
1717	11	10.5	76	1767	22	11.4	100
1718	12	10.8	72	1768	21	11.3	91
1719	12	10.3	77	1769	21	11.5	89

Appendix table A1. *Continued*

Year	*Observations*	*Wage*	*Cost of living*	*Year*	*Observations*	*Wage*	*Cost of living*
1770	16	11.5	96	1820	24	22.0	144
1771	18	12.0	101	1821	26	21.0	129
1772	16	12.3	105	1822	28	19.2	114
1773	15	12.1	107	1823	27	18.7	120
1774	11	12.5	107	1824	23	20.1	135
1775	14	12.6	102	1825	27	21.0	142
1776	14	13.1	93	1826	25	20.5	134
1777	14	12.7	100	1827	23	20.5	134
1778	13	12.6	99	1828	24	20.7	126
1779	13	13.1	90	1829	24	20.7	132
1780	15	13.1	91	1830	23	20.8	130
1781	11	13.3	99	1831	26	21.0	132
1782	12	13.4	102	1832	25	20.7	121
1783	12	13.4	109	1833	26	20.5	118
1784	10	13.6	105	1834	29	20.2	115
1785	11	13.4	98	1835	25	19.5	106
1786	11	13.2	97	1836	23	19.3	117
1787	12	13.5	99	1837	29	19.9	125
1788	13	13.9	101	1838	31	20.3	128
1789	13	13.7	106	1839	28	21.2	140
1790	16	13.7	110	1840	27	20.2	135
1791	15	13.8	106	1841	24	20.9	131
1792	13	14.3	102	1842	21	21.1	124
1793	14	14.2	109	1843	22	20.3	110
1794	13	14.6	111	1844	21	20.5	115
1795	18	15.0	134	1845	17	20.5	112
1796	17	16.1	138	1846	16	21.1	120
1797	16	16.6	119	1847	17	21.7	141
1798	19	17.1	120	1848	15	21.0	112
1799	19	17.3	139	1849	12	20.4	108
1800	21	18.3	180	1850	15	19.3	101
1801	19	18.2	187	1851	—	19.1	99
1802	20	18.2	142	1852	—	19.2	100
1803	20	19.1	134	1853	—	20.9	117
1804	22	19.1	141	1854	—	22.6	138
1805	22	19.7	168	1855	—	23.2	138
1806	24	20.0	158	1856	—	23.4	133
1807	23	20.0	154	1857	—	23.1	128
1808	24	20.6	165	1858	—	22.5	114
1809	27	21.3	180	1859	—	22.4	113
1810	28	22.1	188	1860	—	22.9	129
1811	26	21.8	179	1861	—	23.2	129
1812	26	23.5	212	1862	—	23.0	128
1813	23	24.5	203	1863	—	22.8	118
1814	23	24.0	170	1864	—	22.9	113
1815	26	22.8	153	1865	—	23.3	117
1816	28	22.2	156	1866	—	24.1	126
1817	28	22.4	171	1867	—	24.8	142
1818	26	22.4	168	1868	—	25.1	138
1819	23	22.2	172	1869	—	24.6	122

Sources: The manuscript sources listed above, as well as Bacon, *Report*; Brassley, *Accounts*; Eccleston, 'Survey'; Fox, 'Agricultural wages'; Gilboy, 'Labour'; John, 'Statistical appendix', pp. 1089-98; Richardson, 'Agricultural labourer's standard of living'; *idem*, 'Standard of living'; Thorold Rogers, *History*, pp. 646-703.

Appendix table A2. *The rural cost of living, 1670-1869*

Decade	*Grain*	*Beer*	*Meat*	*Bacon*	*Dairy*	*Sugar*	*Tea*	*Fuel*	*Candles and soap*	*Rent*	*Clothing*	*All*
1670-9	75		74	90	79	115		115	84		94	82
1680-9	66		72	91	76	108		114	76	102	97	76
1690-9	87		76	108	82	133		109	86	102	94	90
1700-9	68	75	72	87	72	114		110	78	102	106	77
1710-19	73	77	74	88	71	105		100	89	102	109	80
1720-9	75	79	73	86	75	96		97	83	80	109	80
1730-9	65	83	69	90	73	87		97	74	80	104	73
1740-9	64	83	74	90	74	104		97	92	63	104	73
1750-9	79	83	75	90	83	106		98	87	63	103	82
1760-9	84	83	84	91	83	90	100	95	100	96	103	87
1770-9	100	100	100	100	100	100	100	100	100	100	100	100
1780-9	99	119	102	98	100	104	85	100	106	111	101	100
1790-9	124	130	127	101	120	152	61	122	115	112	98	118
1800-9	181	160	189	130	163	103	86	155	150	167	103	160
1810-19	194	165	198	141	188	127	89	154	165	212	105	174
1820-9	130	149	162	125	161	80	70	128	101	213	90	130
1830-9	123	125	136	104	154	74	56	103	102	215	74	123
1840-9	121	114	137	105	153	79	46	92	110	196	69	120
1850-9	117	139	149	110	142	63	50	88	122	198	63	118
1860-9	114	138	171	123	159	59	58	89	113	247	81	126

Notes: The index for each commodity and overall is set to 100 for 1770-9. The commodities and the weights used for each category of good where more than one was used were: *Grain, flour and bread*: before 1820, wheat (0.80), barley (0.05), oats (0.15), after 1820, wheat (0.90), barley (0.033), oats (0.067). *Meat*—beef (0.5), mutton (0.5). *Dairy*: before 1820, cheese, (0.31), butter, (0.34), milk (0.35), after 1820, cheese, (0.29), butter, (0.35), milk (0.36). *Fuel*: faggots, 1670-1830 (0.5), coal, 1770-1869 (0.5). *Light and soap*: tallow candles, 1670-1830 (0.5), tallow, 1670-1869 (0.5). *Cottage rents*: charity owned housing outside towns and cities, 1680-1869. *Clothing*: before 1770, wool cloth, 1670-1769 (0.5), linen cloth, 1670-1769 (0.2), stockings, 1710-69 (0.1), shoes, 1670-1769 (0.2); after 1770, from Feinstein.

Sources: Bowden, 'Statistical appendix', pp. 828-31, 843-6. Beveridge, *Prices and wages*, pp. 85-90, 143-8, 193-6, 236-40, 292-5, 313, 434-7, 457-8. G. Clark, 'Shelter from the storm: housing and the industrial revolution' (Working paper, Univ. of California, Davis, 2000; http://www.econ.ucdavis.edu/faculty/g.clark). John, 'Statistical appendix'. Feinstein, 'Pessimism perpetuated', p. 640. Sauerbeck, 'Prices of commodities'. House of Commons, *Report on Wholesale and Retail Prices*.

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