The Influence of London on Labor Markets in Southern England, 1830-1914

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Historians have long acknowledged that London, because of its enormous size and rapidly growing demand for labor, acted as a powerful magnet for migrants from throughout southern England. However, while there is a large literature documenting the flow of migrants to London, there have been surprisingly few attempts to determine the consequences of this migration for southern labor markets. This article attempts to redress the imbalance in the literature by examining the influence of London on agricultural labor markets during the nineteenth century. In particular, the article examines the effect of distance from London on wage rates in southern England at various points in time, and the effect of labor market conditions in London on short-run changes in agricultural wage rates. I find that there was a significant London wage effect throughout the nineteenth century and that annual changes in agricultural wage rates were largely driven by London wage and employment rates. The results of the article show that London and the rural South and East of England formed a well-functioning regional labor market throughout the nineteenth century.

The analysis of agricultural wage data in the article complements the previous analyses of migration trends by historians. While most historians who have examined the relationship between rural and urban labor markets have relied almost exclusively on migration data, the results presented here show that this relationship can also be analyzed using wage data[1]. In fact, the use of wage data is in many ways more attractive than the use of migration data. Migration data for England are not available before 1851, and even then they are available only at the county level of aggregation. Moreover, because only decadal migration rates can be constructed using census data, it is not possible to examine short-run responses by rural labor markets to economic conditions in London. In contrast, cross sections of agricultural wage data exist for various years throughout the nineteenth century, and large cross sections of wage data at the parish/district level of aggregation are available for 1832, 1894-98, and 1903. Moreover, annual wage series for agricultural laborers and London building laborers can be constructed for the second half of the century and used to determine the effects of labor market conditions in London on annual changes in agricultural wages. Thus, one can get a much better idea of the influence of London on rural labor markets using wage rates than migration rates.

Historians have also shown that distance had a significant deterrent effect on migration in Victorian Britain—the greater the distance between origin and destination, the smaller the migration flow, other things being equal. Unfortunately, it is difficult to determine whether the deterrent effect of distance declined over time using migration data. This is an important issue, since many historians have argued that improvements in transportation and communications in the mid-nineteenth century must have sharply reduced the costs of migration and therefore reduced the deterrent effect of distance. I show in my article that this hypothesis can be tested by examining the trend in the effect of distance from London on wage rates. The magnitude of the wage gradient around London is a measure of the deterrent effect of distance on migration. By estimating the London wage effect at several points in time during the century, it is possible to get some idea of the effect of transportation improvements on the deterrent effect of distance.

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[1] Major studies of rural-urban migration in Victorian Britain include Ravenstein 1885, H. L. Smith 1892, Redford 1926, Shannon 1934-35, Cairncross 1949, Saville 1957, Friedlander and Roshier 1966, and Baines 1985. Hunt (1973) briefly examines the influence of London, Birmingham, and other large cities on agricultural wage rates in his detailed analysis of regional wage variations.

Migrations Patterns and the Development of Wage Gradients around London

In his seminal 1885 paper, Ernest Ravenstein found that most migration in Victorian Britain covered short distances and that cities "recruit their population in the main from the county in which they are situated" and from adjacent counties.. However, London's demand for labor was so great that it could not be supplied by the surrounding counties, and as a result it attracted large numbers of migrants from all over southern England (1885: 205-6). Historians of migration have also noted the exceptional drawing power of London. For example, Arthur Redford (1926: 183) wrote that London "absorbed the bulk of the migrants from the south and east" of England, and C. T. Smith (1951: 210) found that in the 1850s, among English cities, "London alone drew in large quantities upon areas that were up to and even over a hundred miles distant."

E. H. Hunt (1973: 281-82) concluded that "a large part of the southern labour force appears to have operated in a particularly restricted market. They moved overwhelmingly, in one direction—towards London." This has recently been confirmed in Boyer 1997; I estimated migration flows from rural southern counties to six major destination areas from 1861 to 1900 and found that/counties in the South and East sent from two-thirds to 80% or snore of their migrants to Greater London and that counties in the Southwest, much of which was more than 100 miles from London, also sent a majority of their migrants to the metropolis.

What explains the "overwhelming" importance of London as a destination for southern migrants in the nineteenth century? For most of the century, London wage rates were significantly higher than wages in any other city in the South or Midlands, and London was the closest large city for most potential migrants from the South and East. In addition, London's "better communications often made it more accessible" to migrants than other urban centers that were physically closer, and rural migrants typically preferred the "ample non-industrial employment" offered by its service trades to factory employment in northern cities (Hunt 1973: 282-83; 1981:157)[2].

Economic models of migration assume that an individual's decision to migrate is determined by a comparison of economic conditions at home and in possible destinations. An individual will choose to migrate if he or she believes that the benefits from moving, typically proxied by the difference in wages between origin and destination areas, exceed the (monetary and psychic) costs of the move, which often are proxied by the distance between origin and destination. Distance is also a proxy for information on urban labor markets: As distance increases, information concerning job opportunities declines. An increase in the wage rate of unskilled laborers in London would increase the benefits of migration for potential migrants and, other things being equal, would cause migration to London to increase. Similarly, an increase in the availability of information would reduce the cost of migration and, for any given wage gap, would cause migration to increase[3].

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[2] Employment in transport, distribution, and miscellaneous services varied significantly across urban areas: It was high in London and the Home Counties and relatively low in the industrial North and Midlands and in the coalfields (Lee 1984: 148-51).

[3] For any given wage gap and distance from London, the benefits of migration are higher, and the costs of migration lower, for young adults than for older workers. The younger one migrates, the longer he or she will be able to benefit from the higher wages in the destination, and thus the greater the return for migration. Moreover, the costs of acquiring different skills and the psychic costs of migration increase with age; in Williamson's (1990: 39) words, older workers have "bigger accumulated rural commitments." It is therefore not surprising that migrants in Victorian Britain tended to be young adults aged 15-34 (Baines 1985:104; Williamson 1990: 42).

The deterrent effect of distance on migration created wage gradients around large cities. The existence of wage gradients around London was first noted by the agricultural reformer Arthur Young on his 1770 tour through southern England. Young found that average weekly wage rates on farms located within 20 miles of London were 40% larger than wage rates on farms located 20 to 60 miles from London and 70% larger than wage rates on farms located 60 to 110 miles from the metropolis. He argued that the differences in wages were not caused by differences in the cost of living and concluded that "the influence of the capital, in raising the price of labour, is prodigious" (Young 1772: 33S-36)[4]. More than a century later, the effect of distance from London on agricultural wage rates was mentioned in the Board of Trade's first report on the wages and earnings of agricultural laborers (1900). The report noted that while the earmngs of agricultural laborers in southern arable counties were relatively low, earnings in Middlesex, Kent, and Surrey were among the highest in England, "the higher payments in these counties being clearly due, in a large measure, to the proximity of the Metropolis" (ibid.: 35).

To see why wage gradients develop, suppose that initially wage rates for unskilled workers in London and for agricultural laborers throughout southern England are the same. An increase in the London wage would create a rural/urban wage gap that in the short run. would be the same size throughout southern England. This wage gap generates migration to London. Because of the deterrent effect of distance, the closer a village is to London, the lower the cost of migration faced by its inhabitants, and therefore the greater its out-migration rate for a given wage gap. The migration of laborers to London reduces the supply of agricultural labor, thereby driving up wage rates. Villages located farther from London would have fewer outmigrants and therefore would experience a smaller increase in wage rates, other things being equal. Eventually a new equilibrium wage distribution would be reached in which the agricultural wage rate would vary inversely with distance from London.

It might be argued that such a scenario is unrealistic because it does not allow for short-distance, migration between rural areas. Ravenstein (1885: 198-99) maintained that; a significant amount of rural-rural migration occurred as part of the larger rural-urban migration process: "The inhabitants of the country immediately surrounding a town of rapid, growth, flock into it; the gaps thus left in the rural population are filled up by migrants from more remote districts." However, so long as there is some fixed cost to migration, in equilibrium agricultural, wages will still vary inversely with distance from London,

The slope of .the wage, gradient is a measure of the deterrent effect of distance on migration. If improvements in transportation or information flows in the nineteenth century significantly reduced the deterrent effect of distance, then the rate of out-migration from more distant rural areas should have increased, driving up agricultural wages and reducing the effect of distance from London on wage rates.

Many contemporaries and historians have argued that the development of the railway network in the mid-nineteenth century significantly reduced the deterrent effect of distance and led to a large increase in labor mobility.

For example, R. B. Baxter (1866: 567) wrote that before the construction of the railway network "the farm labourer was unable to migrate; from that time he became a migratory animal," and Arthur Redford (1926: 187) concluded that "the popularization of the railway . . . must surely have tapped a vast stagnant reservoir of labour in the English countryside and transformed the character of English migration." E. L. Jones (1964) argued that the 1850s witnessed not only a reduction in farm labor supply caused by increased migration but also an increase in the demand for farm labor caused by improved cultivation. As a result, "a crucial change from

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[4] Adam Smith, writing a few years later, also noted the effect of distance from London on wage rates: "Eighteen pence a day may be reckoned the common price of labour in London and its neighbourhood. At a few miles distant it falls to fourteen and fifteen pence" (1976 [1776]: 84). For a discussion of the London wage effect in the late eighteenth century, see Gilboy 1934: chap. 2.

conditions of glut to a partial, but structural, shortage of [agricultural] labour took place during the 1850's" (328, 322). On the other hand, Hunt (1973: 269-70) maintained that "England was small and well served by coach and wagon before railway building commenced. . . . Given Britain's size, the existence of other forms of transport, and specific evidence of a great deal of mobility which was not dependent on the railways, it seems unlikely that the direct effect of railways on migration was substantial. The advantages the railway offered . . . amounted to no more than one factor among many to be taken into account" when contemplating migration.

The preceding discussion suggests that one way to determine the effect of railway development on labor mobility in southern England is to examine changes over time in the effect of distance from London on wage rates. The next section provides estimates of the magnitude of the London wage effect during the second half of the nineteenth century.

The Effect of Distance from London on Agricultural Wage Rates

While several historians have noted that agricultural wages were significantly higher in the Home Counties than elsewhere in southern England in the nineteenth century, no one has attempted to measure the geographic extent of the London wage effect. Hunt (1973) briefly discussed the effect of distance from London on wages in the Home Counties in 1850 and 1903. He found that while London was the "highest wage centre" in Britain, "from London towards the rural parts of the Home Counties wages fell steeply; 25 miles from Westminster there were wages well below the national average, fifty miles away were some of the lowest-wage districts in Britain" (9-10).

This was true not only for agricultural laborers but also for skilled workers in the building trades; in Halstead, Essex, in 1906 bricklayers were paid "as little as bricklayers almost anywhere else in Britain" (ibid.: 11). Hunt did not, however, discuss the effect of London on wages outside of the Home Counties; nor did he attempt to determine whether the London wage effect declined between 1850 and 1914.

It is possible to estimate the magnitude and the geographic extent of the London wage effect using the large cross sections of agricultural wage data for southern England for 1832 and 1903. The 1832 data include estimates of agricultural laborers' weekly wages in summer and winter for over 500 southern parishes, obtained from a questionnaire distributed among rural parishes in the summer of 1832 by the Royal Poor Law Commission; these estimates were printed as appendix B of the 1834 Poor Law Report. The data have been widely used by economic historians and probably are the most reliable source of information on agricultural wages that is available for the first half of the nineteenth century. The data for 1903 include estimates of agricultural laborers' weekly cash wages in June and January for about 250 rural districts in southern England, compiled by the Labour Department of the Board of Trade from returns furnished by the chairmen of rural district councils. The data are contained in appendix 3 of the Board of Trade's *Second Report. . . on the Wages, Earnings, and Conditions of Employment of Agricultural Labourers in the United Kingdom* (1905)[5], The 1832 and 1903 data sets are comparable; both report weekly cash wage rates for "ordinary" agricultural laborers. There were no significant changes in the relationship between weekly cash wages and other sources of income, such as harvest earnings or allowances in kind, during this period (Bowley 1899: 556).

[5]Large cross sections of agricultural wage data at the rural district level also exist for1894-98, compiled by the Labour Department of the Board of Trade and contained in appendix 2 of the Board of Trade's *Report . . . on the Wages and Earnings of Agricultural Labourers* (1900). The 1903 and 1894-98 data sets were the results of "exhaustive enquiries" undertaken by A, Wilson Fox for the Board of Trade. The 1903 wage data were extensively used by E. H. Hunt (1973) in his important study of regional wage variations in Britain.

Table 1 presents some simple regressions to determine the effect of distance from London (in miles) on agricultural wage rates in 1832 and 1903. For both years the dependent variable used is the weekly cash wage paid in summer (or the log of the summer wage). While it would be possible to construct estimates of average weekly earnings for each district in 1903, using, county-level estimates of extra cash wages, harvest earnings, and the value of allowances in kind in 1902 printed in the Board of Trade's second report on agricultural wages (1905: 28—29), it is not possible to calculate similar estimates for 1832., In any case, the ratio of average weekly earnings to weekly wages in 1902 was nearly identical in the Home Counties of Kent, Surrey, and Essex arid in the distant southwestern counties of Somerset, Devon, and Cornwall, which suggests that the regression results would not be significantly different if earnings data were used instead of wage data (ibid.).

Table 1 Estimates of the London wage effect, 1832 and 1903

A. Dependent variable: Log (summer wage)

	1832			1903		
Constant	2.89 (64.68)	2.92 (48.67)	2.94 (66.15)	2.97 (62.96)	3.14 (62.57)	3.08 (70.52)
Log (Dislondon)	-0.130 (11.47)	-0.132 (11.31)	-0.130 (11.80)	-0.083 (7.18)	-0.095 (8.89)	-0.098 (9.48)
Cropmix		-0.0004 (0.76)			-0.005 (6.77)	
Grain			-0.072 (5.22)			-0.106 (8.27)
R^2	0.215	0.216	0.257	0.179	0.312	0.363
N	483	483	483	239	239	239

B. Dependent variable: Summer Wage

Constant	9.39 (40.06)	10.00 (30.43)	9.75 (42.58)	13.43 (58.14)	14.69 (49.30)	13.71 (69.71)
Lon25	3.30 (10.38)	3.64 (10.67)	3.53 (11.59)	2.77 (7.10)	3.12 (8.51)	3.11 (8.77)
Lon25-50	1.75 (6.61)	2.08 (7.15)	2.04 (7.97)	0.69 (2.31)	1.17 (4.05)	1.17 (4.21)
Lon50-75	1.68 (6.01)	2.05 (6.59)	2.14 (7.83)	0.27 (0.90)	0.78 (2.65)	0.74 (2.65)
Lon75-100	0.78 (2.49)	1.15 (3.37)	1.24 (4.05)	0.11 (0.31)	0.56 (1.70)	0.48 (1.50)
Cropmix		-0.017 (2.65)			-0.065 (6.10)	
Grain			-1.10 (7.08)			-1.40 (7.37)
R^2	0.209	0.221	0.284	0.207	0.316	0.357

N	483	483	483	239	239	239

Note: *t*-statistics in parentheses

The counties included in the analysis all lie south of a line drawn between the Severn and the Wash (see shaded area of Figure 1). I chose not to include districts located in the South Midlands even though they were closer to London than were several southwestern districts, because many of them were located close to Birmingham and were within its sphere of influence[6].

The effect of distance from London on wage rates was estimated in two ways: first, by regressing the log of the summer wage on the log of distance from London; and, second, by regressing the summer wage rate on a series of dummy variables measuring distance from London in 25-mile intervals. The regressions were run with and without a measure of crop mix included as a right-hand-side variable. Agricultural output varied significantly across southern England, as can be seen in Figure 1. The counties located to the northeast of London specialized in grain production, while the counties located to the south of London and in the Southwest specialized in pasture farming. Because short-term fluctuations in farm output prices influenced the demand for farm labor and, thus, wage rates, it is necessary to control for differences in crop mix in order to get a more precise measure of the London wage effect. Two crop-mix variables were used: a continuous variable, "cropmix," equal to the share of agricultural land devoted to grain crops in the county in which the district is located; and a dummy variable, "grain," equal to one for districts located in counties specializing in grain production[7].

The results obtained from regressing the log of the summer wage on the log of distance from London are presented in panel A of Table 1. Distance from London has a significant negative effect on wages in each specification of the model for both years. The coefficients on the distance variable are elasticities; in 1832, a 10% increase in distance from London caused agricultural wages to decline by 1.3%. For each specification, the coefficient on logged distance is larger in absolute value in 1832 than in 1903, indicating that the London wage effect declined in the second half of the nineteenth century. The negative coefficients on the crop-mix variables indicate that when distance from London is held constant, wages were lower in areas specializing in grain production than in pasture-farming areas. The effect of crop mix on wages was larger in 1903 than in 1832 as a result of the decline in the demand for labor in grain-producing areas caused by the agricultural depression of the late nineteenth century.
Panel B presents the results obtained when distance from London is measured using a series of dummy variables. Once again, the results indicate that the London wage effect declined between 1832 and 1903. I will focus my discussion on the results in columns 3 and 6. In 1832, weekly agricultural wages were 3.5s. higher in parishes within 25 miles of London than in southern parishes more than 100 miles from London; in 1903, weekly wages in districts within 25 miles of London were 3.1s. higher than those in districts more than 100 miles from London. The average weekly wage in summer for agricultural laborers in southern England was 11.0s. in 1832 and 14.0s in 1903.

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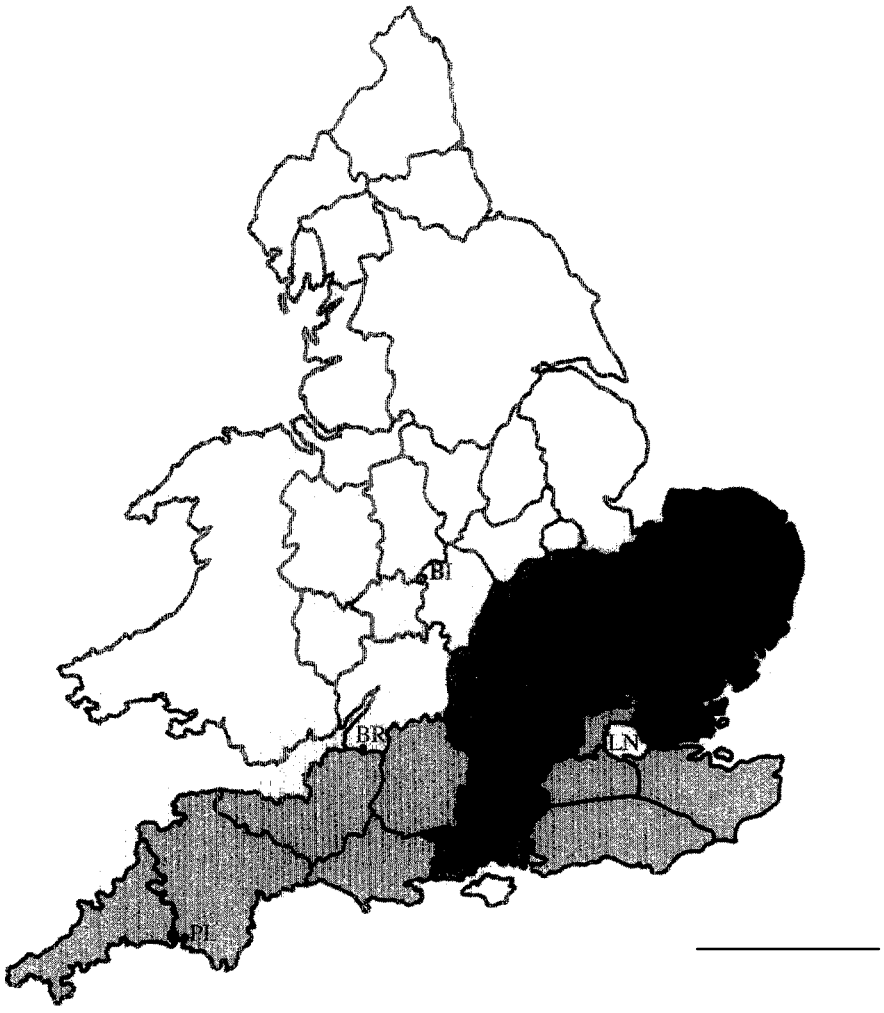
[6] For a discussion of the effect of Birmingham on agricultural wages in nearby districts, see Hunt 1973: 29-30. Earlier regressions that included South Midlands districts, suggested that the Birmingham wage effect did not extend beyond 25 miles outside the city in either 1832 or 1903. None of the parishes/districts included in the regressions in Table 1 was located within 30 miles of Birmingham.

[7] For the 1832 regressions, I used county-level crop-mix estimates for 1836 obtained from Kain 1986. For the 1903 regressions, I used county-level data for 1904 obtained from Great Britain, Board of Agriculture, *Agricultural Returns for Great Britain ... for 1904.*



Key

L: London

lBI: Birmingham lBR: Bdsrol

JPL: Plymouth

PO: P01tsmouth

SH: Southamp:on

<20% of farm land in grain

20-30% of farm land in grain

>30% of farm land in grain

0 20 40 60 miles

Figure 1 County-level data on crop mix, 1904. Key: LN =London, BI =Birmingham, BR = Bristol, PL ::::: Plymouth, PO :::: Portsmouth, SO = Southampton.

London's sphere of influence extended farther in 1832 than in 1903. Weekly wages in 1832 were 2.0-2.Is. higher in parishes 25-75 miles from London, and 1.2s. higher in parishes 75-100 miles from London, than in parishes more than 100 miles from London[8]. In 1903 weekly wages were 1.2s. higher in districts 25-50 miles from London, and 0.7s. higher in districts 50-75 miles from London, than those in districts more than 100 miles from the metropolis. Agricultural wages in districts 75-100 miles from London were not significantly different than wages in districts more than 100 miles from London.

The regressions in Table 1 assume that London was the only southern city with a sphere of influence. It is possible, however, that agricultural wages were .affected by close proximity to other large or rapidly growing southern cities. In 1831 the only large southern city besides London was Bristol, which had; a population of 104,000. In 1901 there were six southern cities with populations greater than 100,000, and three—Bristol, Portsmouth, and Plymouth/Devortport—with populations greater than 175,000[9]. To test for the effect of proximity to other southern cities on wage rates, I reestimated the above model with the addition of variables measuring distance from Bristol for 1832, and distance from Bristol, Portsmouth, and Plymouth for 1903[10]. The results suggest that in 1832 proximity to Bristol had no effect on agricultural wages. In 1903 weekly agricultural wages in districts within 20 miles of Bristol or Plymouth were slightly less than 2s. above wages elsewhere in southern England, while wages in districts within 20 miles• of Portsmouth were not significantly different than wages elsewhere. Neither Bristol nor Plymouth had a sphere of influence that extended beyond 20 miles.

The regression results in Table 1 indicate that the effect of distance from London on wage rates declined between 1832 and 1903. It is not possible to determine more precisely the timing of the decline using large cross sections of agricultural wage data, because none exist for the period 1840-90. However, it is possible to estimate the trend in the London wage effect from 1864 to 1904 by using, annual wage data for agricultural laborers on 56 southern farms, contained; in. appendix 5 of the Board of Trade's second report on agricultural wages (1905). The data set reports weekly cash wages paid to "ordinary labourers" in June and December for each year. I used the June wage, so the results are comparable with those reported in Table 1.

Table 2 presents for each year from 1864 to 1904 the results obtained from regressing the log of the wage on the log of distance from London and on a dummy variable equal to one for farms located in counties specializing in grain production[11]. The coefficient on logged distance from London is negative and significantly different from zero at the 5% level for each year. The coefficient on the crop-mix dummy is negative for every year except 1372-74, the *years* of peak trade union activity in agriculture[12]; it is significantly different from zero in 1865 and in every year from 1879 to 3904.

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[8] The coefficients for the dummy variables "Lon2S-50" and "Lon50-75" are very similar in each specification of the 1832 regression. A test of the restriction that the two coefficients were equal could not be rejected at the 5% level for any specification,
suggesting that the magnitude of the London wage effect was the same for parishes located 25-50 and 50-75 miles from London.

[9] The populations of these cities in 1901 were as follows: Bristol, 339,000; Portsmouth, 189,000; Plyinauth/Dpvonporf, 178,000. The next largest city was Brighton, with a population of 123,000, For comparison the population of London in 1901 was 4,5 million {Mitchell and Deane 1962: 25-27,22).

[10] The regression results are not reported here. I will provide them on request.

[11] The dummy variable takes the value of one for farms located in counties where 25% or more of farmland was devoted to grain crops in 1904. While the share of land devoted to grain declined throughout England during the late nineteenth century, the relative ranking of counties in terms of specialization in grain crops did riot change over time. It therefore seems reasonable to include a dummy variable denoting specialization in grain in 1904 in each annual regression.

[12] In 1874 agricultural union density exceeded 15% in nine southern counties: Kent, Berkshire, Oxford, Northampton, Buckingham Cambridge, Huntingdon, Norfolk, and Suffolk. Each of these counties devoted a relatively large share of farmland to grain crops. In the pasture farming Southwest, union density in 1874 was below 5% in every county

The values of the coefficients on distance from London and on the crop-mix dummy for each year are presented in Figure 2. The sign of the coefficients for both variables is reversed for ease of exposition. The coefficient on the crop-mix dummy is relatively small from 1864 until 1878, then increases sharply to a peak in 1894-96. That is, if distance from London is held constant, wage rates were significantly higher in pasture-farming areas than in grain-producing areas during the 1880s arid 1890s. The dramatic increase in the effect of crop mix on wage rates was a result of the agricultural depression' from the mid-1870s to the mid-189Qs, which was especially severe in grain-producing areas and caused nominal wages in the grain-producing eastern counties *to* fall by 16% from 1873-78 to 1895-96[13].

The coefficient on logged distance from London measures the elasticity of the agricultural wage with respect to distance. The coefficient fluctuated within a relatively narrow band from 1864 to 1889, began to decline in the 1890s, and continued to fall until 1904. For example, in 1870 a 10% increase in distance from London caused agricultural wages to decline by 1.3%, whereas in 1900:a;10%' increase in distance caused wages to fall by 0.69%.

To test whether this decline was statistically significant, I regressed the time series of estimated coefficients for the London wage effect on a con stant and a time trend. The results are presented in column 1 of Table 3; the coefficient on the time trend is negative and significantly different from zero. I then reestimated the model with an additional trend variable, constructed by multiplying the time trend by a dummy variable equal to zero for 1864-89 and equal to one for 1890-1904[14], in order to test whether the decline in the London wage effect accelerated after 1890. The coefficient for "time90" in column 2 is negative and significantly different from zero, while the coefficient on the time trend is no longer significant. This suggests that the effect of distance from London on wage rates remained roughly constant from 1864 to 1889 and then began to decline in the 1890s.

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except Dorset, which had a density of 14.4%. Boyer and Hatton (1994). show that union density had a strong positive effect on agricultural wages in the mid-1870s.

[13] By comparison, agricultural wages in the pasture-farming Southwest increased by 11% 'during the same period. See Boyer 1995:12-14.

[14] The variable "rinie90" is therefore equal :to zero for each year from 1864 to 1889 and equal to: the value of the time trend for each year from 1890 to 1904.

Table 2 Estimation of the London wage effect, 1864-1904

	Log (Dislondon)		Grain		
Year	Coef.	*t* Statistic	Coe(	*t* Statistic	*RZ*
1864	-0.098	(3.43)	-0.056	(1.63)	0.183
1865	-0.126	(4.16)	-0.074	(2.04)	0.247
1866	-0.130	(4.09)	-0.062	(1.66)	0.245
1867	-0.119	(3.72)	-0.032	(0.84)	0.230
1868	-0.122	(3.72)	-0.014	(0.36)	0.252
1869	-0.142	(4.73)	-0.045	(1.27)	0.320
1870	-0.130	(4.41)	-0.057	(1.63)	0.277
1871	-0.117	(3.92)	-0.023	(0.65)	0.259
1872	-0.102	(3.24)	0.011	(0.30)	0.239
1873	-0.102	(3.34)	0.008	(0.22)	0.244
1874	-0.104	(3.42)	0.004	(0.12)	0.247
1875	-0.110	(3.49)	-0.005	(0.14)	0.239
1876	-0.115	(3.48)	-0.028	(0.72)	0.210
1877	-0.112	(3.15)	-0.049	(1.15)	0.164
1878	-0.118	(3.60)	-0.036	(0.93)	0.215
1879	-0.123	(4.02)	-0.073	(2.01)	0.234
1880	-0.124	(3.98)	-0.088	(2.38)	0.230
1881	-0.126	(4.17)	-0.099	(2.74)	0.250
1882	-0.112	(3.88)	-0.087	(2.55)	0.224
1883	-0.116	(4.02)	-0.085	(2.49)	0.235
1884	-0.110	(3.79)	-0.080	(2.32)	0.214
1885	-0.117	(4.36)	-0.117	(3.66)	0.287
1886	-0.125	(4.26)	-0.133	(3.83)	0.287
1887	-0.121	(4.13)	-0.127	(3.67)	0.246
1888	-0.110	(3.60)	-0.135	(3.73)	0.247
1889	-0.109	(3.75)	-0.148	(4.32)	0.288
1890	-0.094	(3.25)	-0.155	(4.51)	0.285
1891	-0.093	(3.31)	-0.112	(3.37)	0.214
1892	-0.088	(3.30)	-0.114	(3.60)	0.227
1893	-0.103	(3.92)	-0.149	(4.78)	0.323
1894	-0.105	(3.66)	-0.167	(4.91)	0.325
1895	-0.104	(3.61)	-0.179	(5.23)	0.347
1896	-0.098	(3.33)	-0.172	(4.94)	0.321
1897	-0.092	(3.11)	-0.156	(4.42)	0.277
1898	-0.077	(2.81)	-0.119	(3.68)	0.214
1899	-0.079	(2.93)	-0.114	(3.57)	0.211
1900	-0.069	(2.51)	-0.105	(3.23)	0.175
1901	-0.070	(2.51)	-0.110	(3.32)	0.181
1902	-0.072	(2.50)	-0.113	(3.30)	0.179
1903	-0.066	(2.31)	-0.111	(3.30)	0.175
1904	-0.068	(2.35)	-0.116	(3.39)	0.183

Note: Dependent variable: log (summer wage). Number of observations equals 56 for each year.

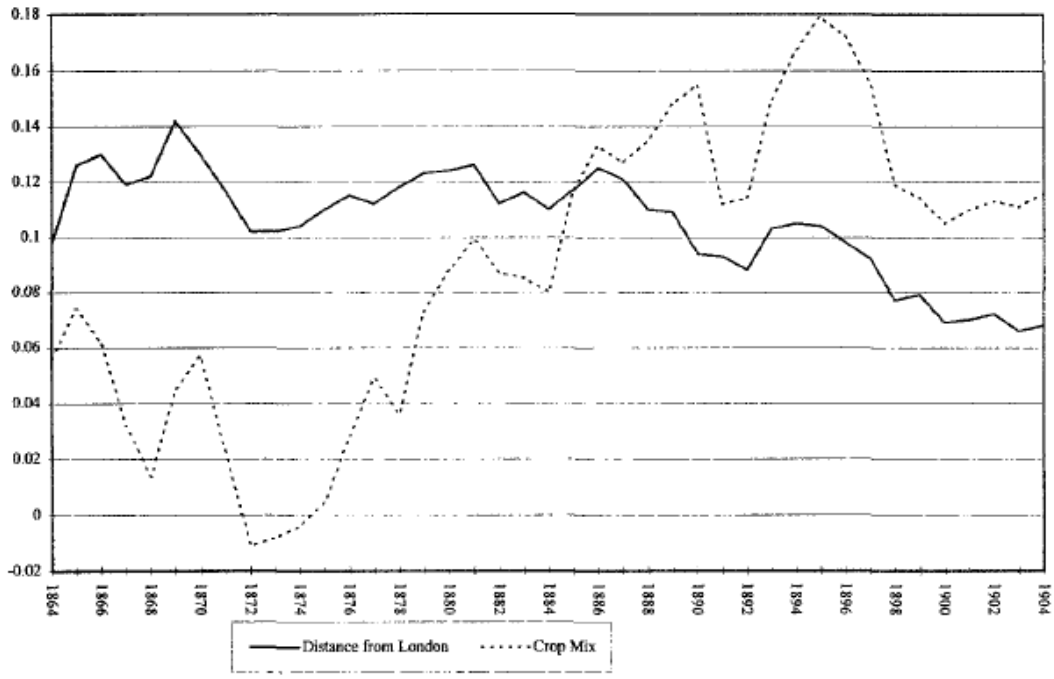

Figure 2 Estimated effects of crop mix and distance from London on agricultural wages, 1864–1904

Table 3 Analysis of trend in London wage effect, 1864–1904

Dependent variable: Estimated coefficient on log (distance from London)		
Constant	0.1315	0.1213
	(33.31)	(29.36)
Time	−0.0012	−0.0003
	(7.61)	(1.07)
Time90		−0.0008
		(4.16)
R^2	0.598	0.723
N	41	41

Note: t statistics are in parentheses.

The estimated London wage effect for 1902-4 given in Table 2 is somewhat smaller than that for 1903 given in Table 1. The fact that the estimate in Table 1 was obtained from an analysis of 239 rural districts—as opposed to 56 farms—suggests that it is a better measure of the effect of distance from London on wages. Indeed, the estimates of the London wage effect in Table 2 are strongly affected by one observation, a very-high-wage farm in the southwestern county of Devon[15]. If this farm is removed from the analysis, the estimated coefficient on logged distance from London increases for each year, but the trend in the London wage effect remains about the same[16]. This suggests that although the estimated magnitude of the London wage effect given in Table 2 is somewhat low for any particular year, the trend shown in Figure 2 is probably reasonably accurate.

A comparison of the estimated London wage effect for 1832 with either the estimates in Table 2 or the revised estimates suggests that the effect of distance from London on wage rates declined little, if at all, between 1832 and the late 1880s and that most of the decline between 1832 and 1903 occurred after 1890. Improvements in the transportation network and in information flows between the 1830s and the 1880s apparently had little effect on the wage structure in the rural South of England. This result supports Hunt's (1973: 270) conclusion that the "direct effect" of railroad development on migration was small. It goes against the view held by Baxter (1866), Redford (1926), and others that the development of the railway network in the mid-nineteenth century led to a significant reduction in the deterrent effect of distance and thus caused a large increase in labor mobility. It also calls into question Jones's (1964) contention that the labor surplus in agriculture largely disappeared in the 1850s. A disappearing labor surplus should have raised agricultural wages throughout southern England in the 1850s and 1860s and reduced the slope of the wage gradient.

What caused the decline in the London wage effect in the 1890s? It probably was not a result of improvements in transportation that reduced the cost of migration to London. The railway network was largely completed by 1870, and although construction activity continued thereafter at a slower rate, "no important new long line was constructed" between 1870 and 1900 (Deane and Cole 1967: 232-33). Moreover, the fact that the decline occurs even when crop mix is controlled for suggests that it was not caused by the late-nineteenth-century depression in arable agriculture.

The most likely cause of the decline in the effect of distance from London on wages in the 1890s was the growth in importance of other southern cities, whose demands for labor led to a change in the migration pattern of rural southerners. While Greater London remained the dominant destination for southern migrants throughout the nineteenth century, in the 1890s migration to other southern cities increased sharply. From 1841 to 1890 net migration to London averaged 251,200 per decade, and net migration to 66 other southern cities for which data are available averaged 24,400 per decade (Cairncross 1949: 83)[17]. In the 1890s, net migration to London remained high at 226,500, while net migration to other southern cities increased to 182,800[18]. Some of these cities, such as Watford, Uxbridge, and Staines, largely were dormitory towns for London. The growth of such cities, located close to the boundaries of Greater London, would not have caused a decline in the London wage effect. On the other hand, by creating

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[15] The weekly summer wage for the farming question was 204s. higher in each year than the wage reported for any of the other six Devon farms in the sample. In particular, in 1903 the summer wage for this farm was 18s. The average wage for the other six farms was 14.1s.; the average summer wage in 1903 for the 15 Devon rural districts included in the analysis in Table 1 was 13.6s.

[16] The estimated coefficient on logged distance from London in 1902-4 equals -0.085 when the Devon farm is dropped from the data set.

[17] Greater London, as defined by Welton (1911) and Cairncross (1949: 68), extended "from Barnet and Edmonton in the north to Croydon in the south, and from Romford and Dartford in the east to Chertsey in the west."

[18] Aggregate migration data for southern "industrial," "old," "residential," and "military" towns for each decade 1841-51 to 1901-11 are reported in Cairncross 1949: 83.

alternative, and closer, destinations for migrants from Hampshire and the Southwest, the rapid growth of such cities as Plymouth, Portsmouth, and Southampton might have reduced the influence of London on labor markets and, in particular, the effect of distance from London on wage rates. During the 1890s, the cities of Bristol, Southampton, Portsmouth, Plymouth, Weymouth, Bournemouth, Poole, Worthing, Brighton, and Swindon experienced a net in-migration of 85,000, compared to a net in-migration of 32,300 in the 1880s[19].

An examination of trends in wage rates for unskilled building laborers offers further evidence of the growing attractiveness of southern cities to potential migrants. From 1886 to 1901, nominal weekly wages for building laborers increased by 11.1% in London; over the same period, wages of building laborers increased by 25% in Southampton, by 31% in Portsmouth, by 23.3% in Plymouth, and by 41.2% in Bristol[20]. In 1901 real weekly wages in Bristol and Portsmouth were about equal to real wages in London; in Brighton and Bournemouth real wages in 1901 were within 7% of real wages in London, and in Plymouth and Southampton real wages were about 15% less than those in London[21]. While real wages in most southern cities were slightly lower than wages in London, the quality of life was probably lower in London than in most other southern cities. In 1901 16% of the population of London lived in overcrowded tenements, compared to 3.6% in Bristol, 1.2% in Portsmouth, 19.5% in Plymouth, and 2.1% in Southampton[22]. Differences across cities in infant mortality rates were smaller; for 1896-1905 the infant mortality rate in London was 150 per 1,000 births, compared to 138 in Bristol, 153 in Portsmouth, 154 in Plymouth, and 143 in Southampton[23].

Hunt (1973: 282-83; 1981: 157) maintains that London's attractiveness as a destination was due in part to its employment opportunities in transport, distribution, and other service occupations, and also to its "accessibility— road and rail links focused on the capital." Many southern cities, such as Bristol, Bournemouth, and Brighton, also provided, ample employment opportunities in service occupations, and. few contained much factory employment. Moreover, the railway construction that took place after 1870 "was almost all branch, link, or local" (Clapham 1932: 182). This branching of the railway network increased the accessibility of southern cities.

In stun, by the 1890s the benefits obtained from migrating to London were not much greater than those obtained from migrating to other southern cities. Given .that the cost of migrating to Bristol, Plymouth, Bournemouth, or Portsmouth was lower than the cost of migrating to London for many migrants from Hampshire and the Southwest, it is not surprising that migration to southern cities increased sharply.

I noted earlier that although agricultural wages were relatively high in the vicinity of Bristol and Plymouth, these cities' spheres of influence extended only 20 miles. However, the rapid increase in wage rates in Bristol, Plymouth, Portsmouth, and other southern cities in the 1880s and 1890s affected rural labor markets throughout much of the Southwest. From 1882-84 to 1902-4,' nominal wages in agriculture increased by 19% in the Southwest, compared, to 7% in the South and East and 10% in England and Wales as a whole[24]. By 1903: agricultural wages

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[19] Net migration estimates for individual southern cities for the 1880s and 1890s are reported in Welton 1911:178-85.

[20] Wage data for 1886 are from *Report on the Wages of the Manual Labour Classes* (Parliamentary Papers, 1893-94, vol. 83, part II: 176, 184-85). Wage data for 1901 are from Board of Trade, *Rates of Wages and Hours of Labour in Various Industries* (1908b).

[21] Real wage estimates were constructed using town-level cost-of-living data for 1905 reported in Board of Trade, *Enquiry into Working Class Rents, Housing, and Retail Prices* (1908a: xlvi).

[22] The census defined a tenement as overcrowded if it contained more than two persons per room. Data on overcrowding were obtained from Board of Trade 1908a: xlvii-xlviii.

[23] Data on infant mortality rates are from Board of Trade 1908a: 14,117, 371, 377, 418.

[24] From 1882-84 to 1902-4, agricultural wages increased more rapidly in the Southwest than in any other region of England and Wales. Wage data are from Boyer 1995: Table 4.

in the Southwest had caught up to$ and in some cases surpassed, wages in other southern districts outside the Home Counties.

The evidence presented here suggests that there was a significant London wage effect throughout the nineteenth century but that after 1890 its magnitude declined. In 1.903 agricultural laborers in districts within 25 miles of London, were still paid a substantial, wage premium, but the size of the wage premium declined sharply as distance increased, so that weekly wages on farms located 50 to 75 miles from London were only 0.7s. (5%) higher than wages on farms located more than 100 miles from the metropolis. The decline in the London wage effect that began in the 1890s was largely a result of the rapid growth of other southern cities, which offered attractive and nearby alternatives for potential migrants from rural districts located west or southwest of London.

The Effect of Economic Conditions in London on Changes in Agricultural Wage Rates

The cross-sectional evidence presented above indicates that distance from London had a significant effect on the level of agricultural wage rates in rural southern districts. In this section I use time-series evidence to examine the effect of labor market conditions in London on annual changes in agricultural wage rates. London's importance as a destination for southern migrants suggests that the extent of rural out-migration should have been determined in part by labor market conditions in the metropolis. E. J. T. Collins (1987: 42-43) contends that "the rate of rural migration . . . ebbed and flowed with the expansion and contraction of employment in the nonagricultural sector. The rate of outflow increased during the upturns and in a major recession slowed down . . . [and] may even have become negative due to large numbers of migrants returning home." High London wages and employment rates would therefore be expected to draw migrants out of agricultural districts, reducing the supply of labor and, subject to variations in demand conditions, causing the agricultural wage to increase.

Movements in the agricultural wage were determined by the interaction of the forces of labor supply and demand. In the short run, changes in the demand for agricultural labor were driven by changes in farm output prices. During the agricultural depression from the mid-1870s to the mid-1890's, the prices of both grain and animal products fell, but the decline in grain prices was much larger. The ratio of grain prices to the prices of animal products, set equal to 100 in 1872-74, declined to 69 in 1893-95, then increased slightly to 74 in 1902-4[25].

Any attempt to explain short-term movements in agricultural wages must take into account the fact that, because of differences in crop mix, changes in the demand for agricultural labor varied across counties. Southern
England can be divided into three agricultural regions: the East, which specialized in grain production; the Southwest, which specialized in animal production; and the Southeast[26]. The agricultural depression was more severe in the grain-producing eastern counties than in the Southeast and more severe in the Southeast than in the pasture-farming Southwest. This in turn suggests that the decline in the demand for farm labor was largest in the East and smallest in the Southwest[27].

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[25] Price data for grain and animal products are from Mitchell and Deane 1962:474-75.

[26] The East consists of Essex, Suffolk, Norfolk, Cambridge, and Huntingdon. The Southeast consists of Bedford, Berkshire, Buckingham, Hertford, Kent, Northampton, Oxford, Southampton, Surrey, and Sussex. The Southwest consists of Wiltshire, Dorset, Somerset, Devon, and Cornwall. In 1875, 49.1% of farmland in the East was devoted to grain crops, compared to 37.4% of farmland in the Southeast and 25.5% of farmland in the Southwest. Crop-mix data are from Great Britain, Board of Agriculture 1876: 22-26.

[27] The severity of the depression in the grain-producing East relative to other regions can be estimated by looking at changes in the value of land assessments. From 1879- 80 to 1894-95, the gross annual ratable value of "lands"

For each southern agricultural region, I constructed series of weekly agricultural earnings from 1864 to 1904 using annual farm-level data on weekly cash wages, adjusted to reflect total weekly earnings[28]. I also constructed a wage series for London unskilled laborers for the same period, using data for bricklayers' laborers obtained from a Board of Trade report titled *Rates of Wages and Hours of Labour in Various Industries* (1908b)[29]. Figure 3 presents estimates of nominal weekly earnings of agricultural laborers in each region from 1864 to 1904. The eastern and southeastern series move closely together from 1864 to 1878; from 1878 until the mid-1890's earnings decline in both regions, but the decline is much more severe in the East. The sharp decline in eastern laborers' earnings was caused by a decline in the demand for farm labor resulting from the fall in the price of grain[30]. The trend in earnings for the pasture-farming Southwest is significantly different than those for the other two regions.
Earnings increased steadily throughout the period; there is no decline during the so-called agricultural depression. At the beginning of the period agricultural laborers' earnings in the Southwest were lower than those in the other two regions; by the late 1890s earnings were higher in the Southwest than in the other regions.

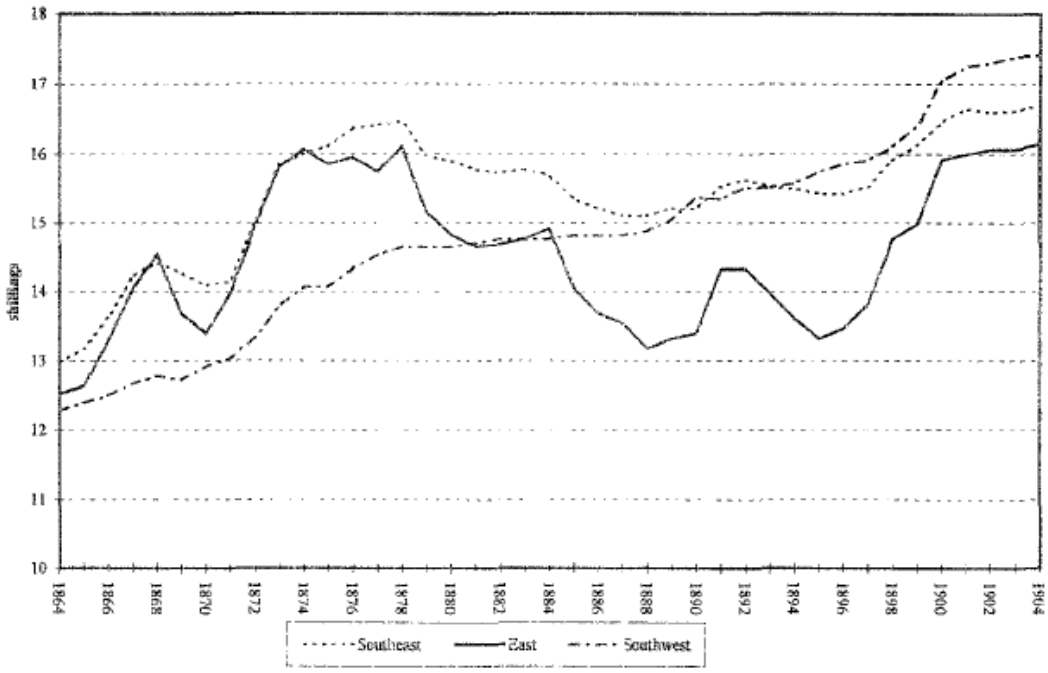

Figure 3 Nominal weekly earnings of agricultural laborers, 1864–1904

declined on average by 36% in the East, as compared to 27% in the Southeast and 20% in the Southwest. Data on the value of land assessments are from Great Britain, Royal Commission on Agriculture 1897b: 10.

[28] The wage data are from appendix 5 of the Board of Trade's second report on agricultural wages (1905). The report also contains estimates of average weekly cash wages and average weekly earnings in 1902 for agricultural laborers in every English county (ibid.: 27-30). I used these data to calculate the ratio of average weekly earnings to weekly cash wages in 1902. Evidence presented by Wilson Fox (1903: 289) and Bowley (1899: 556) suggests that the ratio of earnings to wages remained roughly constant from 1860 to 1902. I constructed a time series of average weekly earnings by multiplying the weekly cash wage series by the earnings/wage ratio in 1902.

[29] According to Hunt (1986: 962), "wages of. . , building workers can be regarded as a reasonably reliable guide to town wages."

[30] According to Wilson Fox (1903: 280-81), farmers' profits in the eastern counties "mainly dependled] on the prices of grain . . . [and] wages were roughly adjusted according as the price of corn rose or fell."

Figure 4 Rural/urban earnings ratios, 1864–1904

Figure 4 presents estimates of the ratio of real weekly earnings of agricultural laborers in each region to those of bricklayers' laborers in London for each year from 1864 to 1904[31]. For both the East and Southeast, the real earnings ratio reached its highest point at 0.77 in 1873-74, the years of peak trade union activity in agriculture. For the East, the ratio's lowest point occurred at 0.60 in 1894-96, at the end of the great depression in agriculture, while for the Southeast the lowest point occurred at 0.67 in 1898-99. Both regions' earnings ratios increased after the late 1890s, so that in 1903-4 the ratio was about equal to its level in 1866-71. For the Southwest, the earnings ratio reached its peak at 0.74 in 1903-4; its lowest point occurred at 0.62 in 1867-68.

The potential short-run gains from migration varied from year to year with fluctuations in the rural/urban earnings ratio and the London unemployment rate. To determine the effect of labor market conditions in London on changes in agricultural wages, I estimate a simple time-series model in which the agricultural wage is determined by the supply and demand for farm labor, taking London wages and employment conditions as predetermined[32]. The dependent variable in the model is the annual change in the agricultural wage, W_a.

The estimating equation is as follows:

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[31] Rural and urban cost-of-living series are from Boyer et al, 1994: 11-12. From 1864 to 1904, rural living costs declined by 8.2%, while urban living costs declined by 1.1%. In 1905, -the cost of living in London was 22.2% higher than the cost of living in the rural South. In calculating the urban/rural wage ratios I therefore deflated each wage series by the relevant cost-of-living series and deflated the London wage in each, year by 22.2%.

[32] The approach .used here is similar to.that pioneered by Todaro (1969) and by Harris and Todaro (1970). Versions of the model have been estimated for the aggregate agricultural labor .market for England arid Wales (Boyer and Hatton 1994), for the United States (Hatton and Williamson 1992), and for several countries (Hatton and Williamson 1991).

$$\Delta \log W_{a,t} = \beta_0+\beta_1\Delta \log P_{a,t}+\beta_2\Delta \log P_{a,t-1}+\beta_3 \log(W_a/W_a)_{t-1}+\beta_4 \log(1-U)_{t-1}+\beta_5 UD_1+\beta_6 t$$

where W_u is the London wage rate, *1-U* is the London employment rate (one minus the unemployment rate), *Pa* is the price of farm output, *t* is a time trend, and *UD* is a dummy variable equal to one for 1872-76, the years of peak trade union activity in agriculture.

Changes in the agricultural wage are determined on the demand side by changes in farm output prices and on the supply side by the urban/rural earnings ratio and the London employment rate. An increase in farm output prices would increase the demand for labor and therefore drive up agricultural wage rates. A high urban/rural wage ratio or a high London employment rate would: stimulate migration from rural areas, which would reduce the supply of labor and raise the agricultural wage. The coefficient on the union dummy measures the effect of trade unions on agricultural wages, and the coefficient on the time trend tests whether there was a trend in technical progress or capital accumulation in agriculture in the late nineteenth century.

The results obtained from estimating the model for each agricultural region are presented in Table 4. On the demand side, both current and lagged changes in farm output prices had a significant positive effect on agricultural wages- in the Southeast and East, although the magnitude of the effect was much larger in the East. On the other hand, in the Southwest changes in .farm output prices had only a weak positive effect on wages. These results suggest that prices were an important determinant of labor demand only in largely arable areas.

The positive coefficients on both. the lagged urban/rural wage ratio and the London, employment rate for each region indicate that labor market conditions in London had a strong influence on short-run changes in wage rates in agriculture. That is, the higher the wage ratio and the London employment rate, the more rural workers who migrated to the metropolis, thereby reducing rural labor supply and raising the agricultural wage. As expected, the influence of London was stronger in the East and Southeast than in the distant Southwest. The fact that the coefficient on the London employment rate is larger than that on the urban/rural wage ratio in the East and Southeast suggests that job availability was particularly important to potential migrants.

The negative coefficient on the time trend for both the East and Southeast suggests that the rates of technical progress or capital accumulation in agriculture were decelerating in these regions during the late nineteenth century. This result is consistent with the conclusion reached in the Royal Commission on Agriculture's *Final Report on the Agricultural Depression* (1897a: 30): that "in the eastern, and some of the southern, counties of England . . . the position of tenant farmers must, with few exceptions, be described as a critical one. Notwithstanding material reductions of rent, numbers in these counties have had to give up their farms . . . while most of those who remain have sustained heavy losses of capital, and are financially in a precarious position[33]."

[33] From 1873 to 1911, the real value of gross farm output declined by 11% in the eastern counties and by 15% in the southern counties, while remaining constant for England as a whole (calculated from. Table 11.6 in Thompson 1991: 233).

Table 4 The determinants of changes in the agricultural wage, 1864–1904

	Southeast	East	Southwest
Constant	−0.093	−0.100	−0.110
	(2.76)	(2.25)	(3.15)
Change in price (t)	0.141	0.323	0.033
	(3.21)	(4.41)	(1.15)
Change in price ($t-1$)	0.087	0.238	0.054
	(1.86)	(3.22)	(1.72)
Urban/rural wage ($t-1$)	0.193	0.218	0.163
	(3.33)	(3.22)	(3.38)
London employment rate ($t-1$)	0.325	0.688	0.173
	(2.60)	(3.21)	(1.86)
Union dummy 1872–76	0.014	0.006	0.004
	(2.20)	(0.49)	(0.87)
Time	−0.001	−0.002	0.0001
	(3.16)	(2.89)	(0.83)
R^2	0.740	0.773	0.535

Note: t statistics are in parentheses.

The evidence presented here shows that labor market conditions in London had a strong influence on short-run changes in agricultural wage rates in southern England. London's influence was especially strong in the nearby eastern and southeastern counties, which sent most of their migrants to the metropolis, but it was also evident in the Southwest, much of which lies more than 100 miles from London. The results offer further evidence of the importance of London as a magnet for migrants from throughout southern England.

Conclusion

This article has addressed two issues concerning the influence of London on labor markets in rural southern England: the effect of distance from London on agricultural wage rates and the effect of labor market conditions in London on short-run changes in agricultural wage rates. The regression results presented in the second section show that there was a significant London wage effect throughout the nineteenth century but that its magnitude declined from 1832 to 1903. While it is difficult to determine precisely the timing of the decline, regressions run using annual wage data for laborers on 56 southern farms suggest that the London wage effect remained roughly constant from 1832 until the late 1880s and then began to decline in the 1890s. The timing of the decline does not support the hypothesis that the construction of the railway network in the mid-nineteenth century led to a sharp .reduction in the deterrent effect of distance on migration. I contend that the decline was largely a result of the rapid growth in the 1890s of other southern cities, whose demands for labor led to a change in the migration pattern of rural southerners.

To determine the effect of economic conditions in London on short-run changes in rural labor markets, in the third section I estimated a time series model to explain annual changes in the agricultural wage for each of three southern agricultural regions for the period from 1864 to

1904. The results indicate that London wage and. employment rates were important determinants of short-ran changes in agricultural wages throughout southern England, although the influence of London was stronger in the East and Southeast than in the more distant Southwest. This finding supports Collins's (1987: 42) contention that the "most crucial factor" affecting the supply of agricultural labor was the trade cycle and confirms the "overwhelming importance" of London as a destination for migrants from southern England.

Notes

George R. Boyer is associate professor of labor economics at Cornell University's School of Industrial and Labor Relations. His current research examines various aspects of labor markets in Victorian Britain. An earlier version of this article was presented at the 1996 meeting of the Economic History Association (EHA) in Berkeley. He thanks Tim Hatton, Michael Huberman, Robert Hutchens, George Jakubson, Andrew Rutten, two anonymous referees, and the participants at the EHA session for helpful comments, and Jesse Leary for able research assistance.

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