THE WAGE AND THE LENGTH OF THE WORK DAY: FROM THE 1890S TO 1991

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I investigate how the relationship between the wage and the length of the work day has changed since the 1890s among prime-aged men and women. I find that across wage deciles, within wage deciles, and within industry and occupation groups the most highly paid worked fewer hours than the lowest paid in the 1890s, but that by 1973 differences in hours worked were small and by 1991 the highest paid worked the longest day. I examine several explanations for the compression in the length of the work day and investigate the implications of hours inequality for earnings inequality.

The length of the work day fell sharply between the 1880s when the typical worker labored ten hours a day six days a week and 1920 when his counterpart worked an eight hour day six days a week. By 1940 the typical work schedule was eight hours a day five days a week. Although further reductions in work time largely took the form of increases in vacations, holidays, sick days, personal leave, and earlier retirement, time diary studies suggest that the work day has continued to trend downwards to less than eight hours a day.[1] This decline in work hours, unmeasured by such common indicators of well-being as income per capita, surely represents one of the larger increases in the standard of living during this century.

Since mid-century the primary beneficiaries of the relatively small declines in the length of the work day and work week have been lower paid workers. Robinson and Godbey (1997: 217) note that Americans with a college education work longer hours than Americans with less formal education and, to a lesser extent, those with larger incomes or in professional occupations work the longest hours. Coleman and Pencavel (1993a,b) find that increases in weekly hours of work for the college educated and declines for those with a high school education or less have been ongoing since 1940.

Although the work day declined sharply before 1940, less is known about the distribution of hours worked prior to this year, the first in which a census contained a question on weekly hours worked. Indirect evidence that the distribution of work hours narrowed is available from national consumer expenditure surveys dating back as far as 1888. These show that differences in recreational expenditures, and hence probably leisure hours, by social class narrowed sharply before 1940 (Costa 1998: 133-159), implying that inequality of living standards fell. In contrast, the existing data on trends in wage inequality prior to 1940 (although sometimes contradictory) suggests that wage inequality declined only slightly from the end of the nineteenth century to 1940 and never fell below today's levels (Goldin and Margo 1992). If the lowest paid workers worked the longest hours in the past whereas today it is the most highly

paid who work the longest hours, then wage or wealth data may underestimate long-run improvements in the welfare of the lowest income workers and may present a skewed picture of recent trends in the inequality of living standards.

This paper uses micro-level data to examine the distribution of daily hours of work in the 1890s and uses comparable data from 1973 and 1991 to examine how inequality in the length of the work day by the hourly wage has changed. I present results for men, women, and married couples. The paper first describes the data, then presents tabulations of the length of the work day by the hourly wage in the 1890s, 1973, and 1991, and analyzes the factors that might have affected the distribution of hours. The paper concludes with a discussion of the implications of the findings for earnings inequality.

I Data

In the last quarter of the nineteenth century state Bureaus of Labor Statistics published numerous surveys of the personal, occupational, and economic circumstances of non-farm wage earners. The published state reports reproduced the micro data and many of these surveys are now available in machine readable form.[2] The dataset used in this paper pools the available cross-sectional surveys that provide information on men's and women's daily hours of work, their wages, and their age. The surveys that are used are from California in 1892, Kansas in 1895, 1896, 1897, and 1899, Maine in 1890, Michigan stone workers in 1888, Michigan railway workers in 1893, Wisconsin in 1895, and women in Indianapolis in 1893.[3]

The final dataset contains over 11,000 men aged 25 to 64 and over 1,100 women aged 18 to 64 (see the Appendix for more details). Although the men in the survey are predominately upper working class non-farm wage earners and the women manufacturing operatives, there is enough variation in the data to reweight by broad occupation category. As expected, less than 10

percent of women were married. Although unionized workers are oversampled, the hours-wage relationship is similar both for unionized and non-unionized workers.[4]

The questions that were asked about hours of work varied slightly by state, but all referred to usual hours of work per day.[5] I assume throughout that the usual work day excludes lunch time, breaks, and overtime, but includes time spent on the job not working.[6] None of the states had hours legislation at the dates of the surveys.

The mean length of the work day in the pooled dataset was 10.2 hours for men and 9.5 for women, estimates similar to those obtained from other sources (e.g. Atack and Bateman 1992; Whaples 1990: 33). Mean hours of work remain virtually unchanged when the pooled dataset is reweighted to be representative of the 1900 occupational distribution and the 1910 industrial distribution.[7] Forty-seven percent of the men in the sample stated that they worked ten hours a day (see Figure 1). The California data indicate that the most common pattern was for work to begin at 7:00 am and end at 5:30 pm with a 30 minute break for lunch.

The men and women in the pooled dataset, like most workers at the end of the nineteenth century, probably labored six days a week. Although information on days worked per week is unavailable, women in the Indianapolis survey reported hours worked on Saturday and the 1897 Kansas survey included a question on whether hours of work were reduced or increased on Saturday. Only 9 percent of workers reported that hours of work were reduced. Fourteen percent reported that hours of work were increased and 76 percent that they remained the same. In the same survey almost 40 percent of the men, generally railroad workers, reported that some Sunday work was required. None of the women in the Indianapolis survey reported that they did not work on Saturday. Mean hours on Saturday were 9.7 (as opposed to 9.5 on a weekday) and 72 percent reported that hours increased.

Questions on hours of work comparable to those in the pooled datasets were asked in a supplement to the 1991 Current Population Survey. Mean hours of work per day (5 days a week)

were 8.6 for men and 7.7 for women. Fifty-seven percent of the men in the sample stated that they worked eight hours a day (see Figure 1). The most common pattern was for work to begin at 8 am and end at 5 pm.[8] A comparison of work start and end times and the reported length of the work day suggests that the majority of workers excluded lunch breaks from reported daily hours of work. The questions asked in the 1973 Current Population Survey were somewhat different and usual hours per day were estimated from usual hours per week divided by usual days per week. When similar information is used to estimate hours per day in the 1991 data, the average length of the usual working day falls slightly to 8.4 hours for men and 7.6 for women. The reported work day may include overtime if overtime was "usual" but because the proportion of low wage to high wage decile workers receiving overtime pay did not change between 1973 and 1991, changes in overtime coverage are unlikely to bias my results. Although time diary studies suggest that the length of the work day is overestimated both in 1991 and in 1973, but particularly in 1991, this will not bias my estimates of changes in relative hours of work.[9]

Despite a slight increase in the coefficient of variation of daily hours worked from the 1890s to the present (see Table 1), for men the distribution between the 90th and 10th percentiles has become more compressed since the 1890s because the majority now work an eight hour day (see Figure 1). For women the distribution first narrowed between the 1890s and 1973 and then widened between 1973 and 1991, largely because the widening of the distribution for full-time workers outweighted the narrowing of the distribution for part-time workers.

Wages in the 1890s were reported according to how the worker was paid, by the hour, day, week, month, year, ton, or piece. Sometimes total yearly wages are given as well. For men I construct two wage variables. One is strictly for the set of workers paid by the hour and is the hourly wage as given by workers. The second wage variable, which is my only wage variable for women, is an hourly wage estimated from any available information. Thus for workers who were paid by the day the measure consists of the daily wage divided by usual hours worked per

day. For workers who were paid by the week or the month I estimated an hourly wage assuming a six day week. For workers for whom I have only a yearly wage, I estimated the length of the work year assuming a work year of 307 days (6 holidays and Sundays off) minus the number of days lost due to ill health, unemployment, or other factors. The last two imputation procedures introduce systematic bias, but, by examining workers paid by the hour, I am able to assess the likely effect of this bias on estimates of the wage elasticity of daily hours worked. Workers for whom the only wage information is the amount paid by the ton, mile, or piece were deleted from the sample. All wages were adjusted to be in real 1895 dollars. Using my second wage variable the mean wage in the sample was 19 cents per hour and for workers paid by the hour it was 23 cents per hour. The sample mean is therefore close to the national mean hourly wage for manufacturing workers of 20 cents per hour in 1895 (Series D 765-778 in U.S. Bureau of the Census 1975: 168).

For the 1973 and 1991 data I also construct two wage variables. One is the hourly wage for workers paid by the hour. For workers who were not paid by the hour, the hourly wage is estimated from information on weekly earnings. None of the sample was topcoded in 1973 and in 1991 only 0.03 percent of workers paid by the hour were topcoded and only 0.29 percent of workers stating their weekly earnings. The top-coded value was therefore used in estimating the hourly wage. The 1890s, 1973, and 1991 data are restricted to non-farm, single job holder wage and salary workers.[10]

II Who Worked the Longest Day?

Table 2 gives average hours worked per day by deciles of the average hourly wage both for men paid by the hour and for all men aged 25 to 64 in the 1890s, 1973, and 1991. In the 1890s hours worked were 11 for men in the bottom decile but fell to 9 for men in the top decile. The California sample shows that men in the top decile began work an hour later than men in the

bottom decile (8:00 rather than 7:00 am) and took an hour for lunch rather than a half hour. By 1973 the decrease in daily hours with the wage was less pronounced. Men in the bottom decile worked close to 9 hours and those in the top 8 hours. By 1991 daily hours worked increase with the wage decile, from 8 for those in the bottom to almost 9 for those in the top. Although working 8 am to 5 pm was the most common pattern for both low and high wage decile workers, three times as many top wage decile workers as low wage decile workers were working from 8 am to 6 pm.[11] The same trend towards longer hours for top wage decile workers and shorter hours for low decile workers is observed for women as well (Table 3). However, the difference between the top and bottom deciles was larger for women in 1890s because most women in the top decile were teachers. This difference was larger in 1991 as well because of movement into more traditionally male, long hours jobs.

The trends observed in Tables 2 and 3 persist controlling for such demographic covariates as age. Table 4 shows that when I regress the logarithm of hours worked on the logarithm of the hourly wage and control for age and age squared that the elasticity for all male workers was -0.12 in the 1890s, -0.08 in 1973, and 0.04 in 1991. The difference among workers paid by the hour was even starker, increasing from -0.18 in the 1890s to -0.03 in 1973 and then to 0.06 in 1991. Chow tests rejected the hyphothesis that all three coefficients were equal or that any pairs of coefficients were equal at the one percent level of significance. Among women the differences in coefficients across years were even larger and again Chow tests rejected the hypothesis that any of the datasets could be pooled. The coefficients changed only slightly when the sample of men was restricted to those aged 25 to 44, suggesting that at least for men sample selection caused by early retirement is not affecting the hours-wage relationship.

Table 4 also presents results when control variables other than age are added. For the 1890s data these are dummy variables for foreign birth, whether the worker has any dependents, and fixed effects indicating which State Bureau of Labor Statistics Report the data came from.

These fixed effects are equivalent to state and year fixed effects. Control variables for 1973 and 1991 are dummies for nonwhite and married, state fixed effects, and for 1991 the number of children under 18. Although these control variables are not exactly comparable across all three years, they are comparable as rough proxies. The control variables, however, have very little effect on the coefficients. Additional control variables that were tested in subsets of the 1890s data were measures of home value, the income other members, and savings, but the inclusion of these variables did not affect the hours-wage relationship.

The estimated relationship between hours and wages could be tainted by measurement error in hours or weeks worked. Because hourly wages are constructed from information on annual, monthly, weekly, or daily earnings and on annual weeks of works, hours worked per week, and hours worked per day, this construction builds a spurious negative correlation between daily hours worked and the hourly wage. In fact, when men paid by the hour are compared to all men, the relationship between daily hours and the wage for men paid by the hour is more strongly negative in the 1890s, less negative in 1973, and more positive in 1991, suggesting that measurement error is more likely to lead to a spurious negative relation in the 1973 and 1991 data than in the 1890s data. For the 1890s data, last year's wage is known for a subset of the data and this can be used to instrument for current wage. When I do this the relationship between daily hours and the wage becomes slightly more negative.

Although micro data do not exist to ascertain exactly when between the 1890s and 1973 the distribution of the length of the work day became more compressed, the trend in the mean length of the work day suggests that most of the compression occurred by 1920. The length of the work day for manufacturing workers was 10.0 hours in 1895 and 9.3 in 1914 (Series D 845-876 in U.S Bureau of the Census 1975: 172) and by 1919 eight hour work days were the norm (U.S. Department of Labor 1920: 37). Recall that Table 2 showed that the decline in hours worked between the 1890s and 1973 was largest among men earning the lowest wages.

Therefore most changes in the mean length of the work day probably came from disproportionate changes in the hours of men in the lowest deciles of the wage distribution.

III Occupation and Industry Trends

The previous section showed that there have been two major changes in the distribution of daily hours worked by different wage deciles. The most striking was the sharp compression of the hours distribution between the 1890s and 1973, a compression that was accompanied by the standardization of the work day, and the other was the reversal in who worked the longest day between 1973 and 1991. This section examines distributional trends in hours by occupation and industry to determine whether these changes might be due to occupation or industry shifts. Increasingly smaller percentages of the labor force may now be in industries or occupations that necessitate long hours. If some occupations or industries that experienced large hours declines were the occupations or industries that employed many low decile workers, then hours of workers in the lowest deciles may have fallen simply because they were over-represented in the occupations or industries that experienced hours declines. In some occupations or industries technological change could have led to hours decline. In industries with high fixed costs, such as firing up a blast furnace, employers will desire that their machinery be utilized as long as possible and will therefore schedule long shifts for worker to gain long shifts for their machines (e.g. Thompson 1967). Blue collar workers would therefore be working long days whereas white collar workers would not. If there were a technological change that reduced the costs of shutting down the plant or that enabled plants to run 24 hours per day, operatives would be able to work 8 hours per day. Changes in the hours-wage relationship should therefore primarily be observed when the data are aggregated across industrial sectors and within the manufacturing sector among operatives and crafts workers.

Tables 5 and 6 give the percentage of men within broad occupation and industry category

and their average number of hours worked.[12] In the 1890s professionals, crafts workers, and laborers worked the shortest day while managers, service, and sales workers worked the longest day. The work day of operatives was about average. Classifying men by industry shows that the longest hours were worked in trade and personal service and the shortest in mining and construction. Managers and sales workers still worked the longest hours in 1973 and in 1991, but by 1991 service and clerical workers worked the shortest day. In 1991 the longest hours by industry were in mining, transportation, communication, utilities, and trade, and the shortest in entertainment and personal service. When the data are grouped by occupation, then, with the exception of professionals, the hours of all workers were lower in 1991 than in the 1890s, suggesting that shifts in the occupational distribution cannot account for the changing relationship between daily hours and the wage. When the data are grouped by industry, hours of all workers other than those in mining were lower in 1991 than in the 1890s, suggesting that shifts in the industrial distribution cannot account for the changing relationship between daily hours and the wage. However, certain occupation and industry groups, such as services, experienced particularly large declines in hours worked, suggesting that hours of workers in the lowest deciles fell because they were over-represented in the occupations or industries that experienced declines in hours.

The decline in hours worked within each wage decile can be decomposed into the change due to declines in average hours in each occupation or industry sector, that due to shifts in industry or occupation distribution, and that due to changes in the hours-wage relationship. The daily hours of a worker in wage decile i, h_i, can be written as

$$h_i = \sum_j \alpha_{ij} a_{ij} H_j \ ,$$

where H_j is the average number of daily hours worked in occupation or industry j, a_{ij} is the ratio of daily hours worked in wage decile i to average occupation or industry hours (H_{ij}/H_j),

and α_{ij} is the fraction of workers in wage decile i in occupation or industry j. Then,

$$\Delta h_i = \sum_j \alpha_{ij} a_{ij} \Delta H_j + \sum_j \Delta\alpha_{ij} a_{ij} H_j + \sum_j \alpha_{ij} \Delta a_{ij} H_j \ ,$$

where the first term in the equation gives the change in average hours of work in each sector holding α_{ij} and a_{ij} fixed, the second term gives the change in the occupation or industry distribution holding α_{ij} and average industry hours fixed, and the third term the change in the hours-wage relationship holding average hours and the occupational distribution fixed. Table 7 shows this decomposition by occupation group for men. (Only these results are presented because of the paucity of data in the 1890s on certain industry groups and on women.) Note that whereas declines in hours worked in each decile are predominately due to declines in average hours worked in each sector, changes in the hours-wage relationship account for 62 percent of the relative shift in hours worked between 1973 and 1890 and 77 percent of the relative shift between 1991 and 1973.

Tables 8 and 9 show that for men in the 1890s the hours-wage relationship among professionals, managers, clerical, and sales workers was more negative than among crafts workers and operatives and that the hours-wage relationship was least negative among workers in manufacturing, suggesting that technological change on the factory floor that reduced the fixed costs of operating the plant or that permitted multiple shifts was not the primary factor decreasing shift length.[13] Within manufacturing the longest hours were in paper and grain mills and the shortest in tobacco and meat packing. Workers in leather tanneries, an industry that did not have high fixed costs, labored an average of 9.7 hours the same as in primary iron and steel, an industry with high fixed costs. Among professionals the shortest day was worked by accountants, architects, draftsmen, and teachers and the longest were worked by pharmacists, surveyors, and reporters. Although the elasticity of daily hours with respect to the wage among professionals in the 1890s falls from -0.29 to -0.20 when teachers are excluded from the sample, the hours-wage relation still remains much more negative than that observed among crafts

workers in the 1890s and among professionals in recent data. Among clerical workers agents and book keepers worked long hours and dispatchers and stenographers relatively short hours. These differences, and the considerable variation within these specific occupations, are not easily explained by technological change.

Tables 8 and 9 also show that the time trends observed in Table 2 (the disproportionate decline in the work hours of low wage workers between the 1890s and 1973 and the increase in the work hours of high paid workers and the decrease in hours of low paid workers between 1973 and 1991) persist even within occupation and industry groups. Tests revealed that, with the exception of service workers, laborers, and transportation workers, the data could not be pooled within each occupation and industry group over all three years.[14] The patterns observed in Tables 8 and 9 persist controlling for age, marital status, number of dependents and state and year fixed effects. Furthermore, even within wage deciles the lower paid workers worked the longest day in the 1890s whereas the higher paid workers worked the shortest day in 1991.

IV Explanations

Various factors might account for the compression of the hours distribution and the reversal in who worked the longest day. Unionization rates increased in the first half of the century and unions were active proponents of a shorter work day. Hours legislation may have lowered the hours worked by men and women in the lowest wage deciles. The distribution of daily hours may be a poor indicator of total, yearly, or life cycle hours, particularly in the 1890s when workers who experienced large amounts of seasonal unemployment may have traded off a longer day for a shorter year. The length of the work day may be a poor indicator of the intensity of work, especially if some jobs require large amounts of time spent on the job but not working. Increased synchronization, whether on the factory floor, within the firm, or across firms or the increased demand for synchronization of work schedules within families may also have

contributed to the compression of hours. In the past workers may have responded to wage increases by buying a shorter work day rather than by increasing their hours of work.

A. Unionization

An emphasis on the role of unions in explaining hours declines dates back to Paul Douglas (1930: 562) who argued that in the 1890s and in the early 1900s union members had both higher wages and shorter hours than non-union members. More recent work, however, suggests that mere organization had little impact on hours reductions. Using an 1894 survey of Iowa workers Eichengreen (1987) found that, controlling for skill level, although unionized workers had higher wages than their non-unionized counterparts, hours of work between the two groups did not differ. In the data used in this paper there is no difference in the length of the daily work day between unionized and non-unionized workers. Union campaigns for shorter hours may have led to preemptive actions by employers who feared legislation or labor unrest if they maintained long hours schedules, but there is little direct evidence linking these campaigns to declines in the length of the work week.

B. Hours Legislation

Recall that I argued that because the decline in hours worked between the 1890s and 1973 was largest among men earning the lowest wages, most of the decrease in the mean length of the work day in this time period probably came from disproportionate declines in the hours of men in the lowest deciles of the wage distribution. The mean length of the work day therefore provides a good indicator of inequality in hours worked and testing whether hours legislation affected the distribution of hours worked becomes a test of whether hours legislation affected the average length of the work day.[15]

As previously noted, most of the decline in the length of the work day probably occurred by 1920. But, prior to the 1930s state legislation restricting maximum hours of work applied

only to women and to relatively few men in dangerous industries. Federal legislation applied only to railroad workers. Although hours of work in 1920 were lower in states with hours legislation, hours of work were lower for men as well, even in industries where there were virtually no female employees, suggesting that hours fell where workers favored decreased hours and that the states where workers favored decreased hours passed hours legislation (Goldin 1988). There is some evidence from the Kansas surveys of 1897 and 1899 that hours were low where workers favored hours legislation. Although 73 percent of workers favored hours legislation, 44 percent favored an 8 hour day and 38 percent a ten hour day. Those who worked a longer day were more likely to favor a 10 hour day or longer and those who worked a shorter day an 8 hour day or less.

The overtime legislation that has been in place since 1938 is unlikely to account for the change in the hours-wage relationship between 1973 and 1991. Between 1973 and 1991 the dispersion in hours by wage decile among men working less than 40 hours a week (and hence not subject to legal overtime provisions) widened, suggesting that disproportionate increases in overtime rates of pay cannot explain the changing hours pattern.

C. Weekly, Yearly, and Life Cycle Hours

The highly inegalitarian distribution of daily work hours in the past translated into an unequal distribution of weekly and yearly hours. In the 1890s workers who reported that Sunday work was required were more likely to work a longer day, as were those who reported either no reduction or an increase in Saturday hours. Similarly in 1991 men who worked a longer usual day reported working longer usual weekly hours and more days per week. Although I cannot ascertain from the data whether men working longer weeks or longer days retire earlier or later, since 1940 both the probability that a college educated man would be working longer hours than a non-college educated man during prime working years and the probability that a college educated man would be retiring later than a non-college educated man has increased.[16]

I am also able to rule out the possibility that the longer hours of the lower paid in the 1890s were making up for their greater seasonal employment. Mean days of work lost due to unemployment, sickness, or other causes were less for workers in the bottom decile than for workers in the top decile (see Table 10). They were less even for sickness, perhaps because workers in the lowest wage deciles simply could not afford to take time off for sickness. When I re-estimate the wage as yearly earnings divided by the yearly number of hours worked (the product of 307 days minus days lost times daily hours worked) and regress the logarithm of daily hours on the logarithm of my new wage measure, the coefficient on the logarithm of the wage is -0.108 (standard error= 0.003) controlling only for age and age squared and -0.097 (standard error= 0.003) controlling for other covariates. These estimates are very similar to those obtained using wage estimates that did not account for days lost. Furthermore, the number of days lost by the individual worker in the past year has a negligible, but negative, effect on his usual hours of work. The mean number of days lost by workers in the same 3 digit census occupation is also negatively related to the length of the working day.[17] Controlling for observable characteristics such as the wage and demographic characteristics, workers in occupations where mean unemployment was three months in the year labored almost 2 hours less per day than workers in occupations with mean unemployment of 0. Given their choice of occupation, workers probably had little control over their daily hours.

D. Work Intensity and Synchronization

The hours distribution could have become more compressed because of the increasing synchronization of work schedules, arising either from increased co-ordination within firms or from an increased demand for synchronization by individuals with the schedules of family members, friends, or of stores. Weiss' (1996) model of work schedules, in which the worker with the highest aversion to work sets the standard, implies that compression in the hours

distribution should be accompanied by a reduction in average hours worked. When 12 hour days were the norm in the steel industry, the idle time of an open hearth crew might be 54 percent for second helpers and 70 percent for steel pourers. Workers might even spend some of their idle time sleeping. Workers may have wanted idle time on the job and could take it if they enjoyed broad autonomy over the pace of their work, working as semi-independent businessmen within the firm, as was true of skilled workers in iron, glass, pottery, foundry, mining, and precision industries. Even when workers had no control over the pace of their work, poor planning and routing of work through the plant meant that operatives had considerable periods of waiting time (Montgomery 1979: 11, 37-38, 41). The institution of the 8 hour day at Ford was accompanied both by wage increases and by the speed-up of machinery. The wide spread in hours observed in the 1890s may therefore simply reflect that some workers were laboring in an intensive, industrial fashion in integrated enterprises whereas others still worked pre-industrially in poorly co-ordinated enterprises.

Centralized planning and routing of the successive phases in fabrication did not become common until the mid-1920s. However, by the end of the 1890s many companies had erected new plants that were adapted to the unencumbered flow of materials through the plant and had adopted specialized machinery that required greater co-ordination (Montgomery 1979: 113-114). The increase in co-ordination occurred not just on the factory floor, but also in white collar work. Chandler (1977) emphasized the importance of mass distribution and of the flow of information within the firm in the development of the modern corporation. As the work of managers, agents, and accountants became more synchronized with activities within their own firms and with those of firms that were their customers or suppliers, Weiss' (1996) model predicts that hours among agents and accountants should have become more compressed as well.

Table 11 provides indirect evidence for the relation between the synchronization of work schedules and co-ordination within the firm. Industries in which there was uniformity of hours

should be those in which the production process was more closely co-ordinated. These industries should include textiles, in which there was an intricate division of labor and the integration of the successive operations required to spin yarn and weave cloth had already occurred by the end of the 1850s. They should also include footwear which by 1900 had experienced similar technological changes, and even an industry such as cigar making in which one butcher would assemble the filler tobacco with the aid of a wooden mold and two wrappers would finish the cigar (Montgomery 1987: 151). The list of industries with closely co-ordinated production might also include primary iron and steel and fabricated non-ferrous metals. A Bessemer steel mill required that specialists work in close co-operation with other crew members and these mills rapidly became vertically integrated with mines. In these industries there was considerable uniformity in hours worked in the 1890s data. In textiles 100 percent of workers worked a ten hours day, in tobacco (largely cigar making) 88 percent worked an 8 hour day, in footwear 78 percent worked a ten hour day, in primary metals 66 percent worked a ten hour day and 28 percent a 9 hour day, and in fabricated non-ferrous metals 40 percent worked 9.5 hours per day and 37 percent 10 hours per day.[18] Although all industries were experiencing greater co-ordination of production, there was probably less in industries such as leather tanning, saw milling, furniture, and printing, and in these industries hours heaping was not as considerable. In the meat industry, however, which is commonly cited as an industry that did undergo rapid integration of the production process, 20 percent of workers labored 7 hours day, 8 percent 8 hours a day, 14 percent 9 hours a day, and 20 percent 10 hours a day.

Another form of synchronization that could have been at work was social. Work outside of a “standard” day may be a disamenity because such workers are less likely to enjoy leisure with their spouses or with their friends. Once an 8 to 5 work day became the norm, increases in income may have led even more people to work the standard day.

An examination of the 1890s data suggests that the observed relationship between the

hourly wage and the number of hours most likely depended upon the planning of work throughout the firm rather than upon some workers deliberately choosing on the job leisure. Craftsmen had the greatest control over the pace of their work and therefore might be more likely to work in a less intensive, pre-industrial fashion, but their average hours were lower than those of operatives and they constituted only 9 percent of the bottom 20th wage percentile and 63 percent of the top 20th. Furthermore, the hours-wage relation for craftsmen was less strongly negative than that for operatives (see Table 8). Firms worried about the pre-industrial work habits of their employees sought to pay by the piece or by the hour (Montgomery 1979: 38), but among hourly workers the difference in daily hours between the lowest and highest paid workers was greater than among non-hourly workers (see Table 2). Nor is work intensity likely to affect the recent pattern. The average time of on the job non-work activity of college educated workers was only 3.8 minutes higher than that of those with a high school education or less.[19].

E. Labor Supply

Economic historians have emphasized that the strongly negative relation between hours and wages observed in the past could have arisen from a labor supply response in which income effects were much larger than substitution effects. Income effects may have dominated in the past because a 10 or 11 hour day was so grueling that workers preferred to take their leisure in shorter days rather than shorter work weeks or work lives. In contrast workers today may prefer to buy a longer vacation or a shorter work life. Because workers in the past had a more limited access to capital markets, they may not have been able to transfer consumption (and therefore leisure) over time and thus took all of their consumption in the form of a shorter work day rather than a shorter work life. In addition, because a greater percentage of the population is now employed in skilled jobs and in firms that use promotions as a management tool the returns to intertemporal substitution of labor may now be higher.

The difficulty that economic historians have had in testing whether income effects have fallen is the identification of the labor supply response. Estimates from recent data based on simple regressions of hours on the wage and on income variables have produced estimates that vary widely (see Pencavel (1986) for a review) and which may not be identified.[20] The use of panel data and instrumental variables techniques suggests that changes in hours worked are positively related to increases in wages, even when ordinary least squares indicates that the relationship is negative (e.g. Lundberg 1985; Angrist 1991).[21] Unfortunately, the data needed to identify a labor supply response for the 1890s is unavailable.

Some suggestive evidence, however, is available on the extent of intertemporal substitution. Although it is not possible to calculate the wage profile for a single cohort living circa 1890, the relationship between age and the wage in the cross-sectional data suggests that although the hourly wage peaked at around age 40 to 45 in the 1890s, 1973, and 1991, the wage profile has grown steeper since the 1890s. But the variation in daily hours by age among men in the labor force is small in all years, suggesting both that a changing wage profiles is not a plausible explanation and that if there is intertemporal substitution, it takes the form of exit from the labor force.[22] Certainly increased bunching in annual hours worked over the life cycle, among men both in and out of the labor force, is striking. Circa 1900 men's annual hours were 2641 at ages 45 to 54, 2465 at ages 55 to 64, and 2118 at ages 65 to 74. Between 1940 and 1990, annual hours of men aged 45 to 54 increased from 1732 in 1940 to 1874 in 1960 and then to 1896 in 1990, largely because of the decline in part-year work; among men aged 55 to 64 annual hours fell 1732 in 1940 to 1577 in 1960 and 1291 in 1990. Among men aged 65 to 74 the decline has been particularly pronounced – from 940 hours in 1940 to 590 hours in 1960 and then to 313 hours in 1990.[23]

V Conclusion

The distribution of work hours was very inegalitarian in the 1890s when the most highly paid worked 2 hours less per day than the lowest paid. By 1973 differences in hours worked between the top and bottom deciles were small and by 1991 workers in the top wage decile worked the longest day. This changing wage-hours relationship has implications for earnings inequality. Between 1973 and 1991 26 percent of the increase in men's earnings inequality between the 90th and the 10th wage deciles can be attributed to differences in hours worked. For women more than all of the earnings inequality can be attributed to differences in hours worked.[24] Had the 1991 pattern of hours worked prevailed in the past weekly earnings inequality would have been much greater in the past than it actually was.[25] The inequality of daily work hours in the 1890s thus equalized income, whereas between 1973 and 1991 it magnified weekly earnings inequality.

I argued that the change in the inequality of the length of the work day could not be explained by sectoral shifts, technological change that enabled firms to shut their plants down or operate them for longer periods of time by utilizing different shifts, hours legislation, or substitution across the work week, year, or life. Some of the compression could be explained by the increasing co-ordination of work activities within and across firms and by the increasing synchronization of leisure time activities with those of family members and friends. The strongly negative relation between hours and the wage may also have arisen from a labor supply response in which income effects were much larger than substitution effects, whether because workers preferred to take their leisure as a shorter work day rather than as a shorter work life, because the returns to working hard during prime ages are now greater, or because workers can now more easily re-allocate consumption over different time periods. Regardless of what the explanation is, the results of this paper imply that studies of income inequality must take hours worked into account.

Data Appendix

State Bureaus of Labor Statistics carried out over 100 surveys of workers between the late 1880s and 1910. The surveys used in this research were restricted to those that identified daily hours worked, wages, age, and sex and some of them provide a rich set of information on such other characteristics as union status, years of job experience, years spent with the same employer, the value of assets, the income of other family members, and savings and expenditures during the past year.

The surveys were not random samples of the population. States such as Michigan surveyed workers in specific industries, visiting factories or work sites to question the workers. States such as Kansas distributed survey forms by mail to workers in all branches of industry and judged the returned responses to be representative of the occupational and geographical structure of the state. The surveys do not cover the self-employed nor do they cover those currently unemployed. The surveys also contain relatively few workers above 64 years of age, but because I am mainly interested in younger workers I restrict the samples to those less than 65 years of age. The male sample is further restricted to men older than 24 and the female sample to women older than 17.

The men who were surveyed were predominately upper working-class and the women manufacturing operatives. Almost three-quarters of the male sample consists of crafts workers and operatives, a group that represented 43 percent of non-farm workers in 1900. Relative to the 1900 public use census sample, the datasets contain few professionals, managers, sales workers, and unskilled laborers.[26] Within occupation groups, some occupations are better represented than others. Among professionals the most common occupation was teacher, as it was among professional wage earners in 1910 (the first census that provides information on self-employment status). However, there are no men in the data following the second most common occupation

for professional wage earners in 1910 (clergymen). Railroad employees are over-represented in the manager and clerical classes. Although industry could be assigned to only 72 percent of the sample, transportation workers are oversampled and workers in retail trade are undersampled. For some industries such as banking and insurance or entertainment, there are simply not enough workers to examine the hours-wage relationship within these industries. The data are reweighted by broad occupation group (professional, manager, clerical, sales, craft, operative, service, laborer). Although occupations within groups are not representative of the population, it is possible to test how sensitive the hours-wage relation is to the exclusion of certain occupations.

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Notes

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[1]Estimated from Robinson (1993).

[2]See Carter et al.

[3]These surveys differed in the types of questions asked respondents, in the types of individuals surveyed, and in data collections methods. Some states gathered data through personal interviews. Others sent out mail surveys, with failure to comply a misdemeanor, punishable by law. Some states surveyed workers in specific industries, whereas others polled workers from many different industries.

[4]Because union status is known for only a subset of the sample, the subsequent analysis does not control for unionization. In the sample unionization lowered hours of work by only 2 percent.

[5]In California workers were asked when they started work, when they ended work, and how much time they took off for lunch. In Kansas the questions were "number of hours per day's work" or "average number of hours worked per day," depending on the year. In Maine and in the 1883 Michigan survey the questions were "number of hours employed daily" and "hours employed per day," respectively. The 1893 Michigan survey and the Wisconsin survey asked about summer and winter hours. I averaged summer and winter hours to derive an estimate of usual hours of work.

[6] Atack and Bateman (1992) note that it was customary in the United States to exclude lunch time and work breaks from hours of work. They cite a study of the 1911 Iron and Steel Commission which found that whereas the working day at a blast furnace of a large steel mill was 12 hours, workers were active for fewer hours, depending on the job.

[7]Although industry was generally not asked in the surveys, I could infer it from occupational information for 76 percent of the sample.

[8]Hamermesh (1996) has shown that since the 1970s the incidence of evening and night work has declined, especially for high wage workers. I do not observe evening and night work in the California data, probably because such work was relatively uncommon before widespread electrification.

[9]In contrast to survey data, time diary studies suggest that between 1965 and 1985 the length of the work day has fallen by ten percent (Robinson and Godbey 1997: 321). The extent of the overstatement bias varies by educational group, but the bias did not change between 1965 and 1985. When the sample is restricted to employed men age 25 to 64 the results suggest that the college educated over-state their hours of work by 14 percent whereas those with a high school education or less overstate their hours worked by 6 to 8 percent. (Estimated from Robinson (1993) and Converse and Robinson (1980).)

[10]I do not observe multiple job holders in the 1890s data. The proportion of male multiple job holders increased from 4 percent in 1973 to 7 percent in 1991, but the proportion of multiple job holders was always greater among the college educated than the non-college educated and increased increased disproportionately among the college educated. The proportion of female job holders increased from 2 to 7 percent and, although the fraction of multiple job holders was always greater among the college educated, the increase was more pronounced among the non-college educated.

[11]The 1985 time use survey shows that lunch breaks averaged 19 minutes for the college

educated and 18 minutes for those with a high school education or less.

[12]Comparable numbers are not presented for women because cell sizes are too small for many occupational groupings.

[13]There are too few women in the 1890s data to examine within group patterns among female workers.

[14]It was not possible to reject the hypothesis that the data for service workers, laborers, and transportation workers could be pooled across the 1890s and 1973.

[15]There may be some role for federal action during World War I in hastening the decline in the length of the worky day. But, although the War Labor Policies Board and the War Labor Board required the adoption of the 8 hour day for contract work, the work day did not return to its previously high levels after the war.

[16]Estimated from the 1940-1990 public use census samples.

[17]The mean number of days lost by workers in the same 3 digit census occupation was estimated from the 1900 census which provided information on months lost in the past year.

[18]There is another possible explanation for the uniformity of hours in cigar making. The cigar makers union was able to instruct all members to leave the shop after 8 hours and fined any members caught working late (Montgomery 1987: 196).

[19]Average on the job non-work activity estimated from Robinson (1991)

[20]The results from the 1890s data are similarly problematic. When I regress the logarithm of daily hours on the hourly wage and on measures of home value, the income of other family members, and savings, I obtain income elasticities that are close to zero. Estimates could be biased both because it is not clear if I am identifying a labor supply or labor demand curve and because these income measures are not necessarily exogenous.

[21]If so, then increasing earnings inequality in recent times may have led to increasing hours inequality. However, although earnings inequality today is as high as it was in 1940 (Goldin

and Margo 1992), Coleman and Pencavel (1993) find that in 1940 those with at least a college education worked fewer hours than those with a high school education or less, the reverse of the current pattern.

[22]Although hours peak at about the same age as the wage in 1973 and 1991 they peak at around age 25 in the 1890s.

[23]Estimated from the public use census samples. Yearly hours in 1900 were estimated as the difference of 307 days and the number of months lost due to unemployment multiplied by daily hours, where daily hours were predicted for every occupation group from a regression based on the 1890s data.

[24]At current hours the difference between the 90th and the 10th decile of the logarithm of weekly earnings for men was 1.16 in 1973 and 1.39 in 1991. For women these respective differences were 1.55 and 1.59. At 1991 hours these differences for men would have been 1.36 in 1973 and 1.22 in 1991 and for women 1.53 and 1.69, respectively.

[25]Because the 1890s data are not a random sample of the population, wage inequality in the 1890s is probably underestimated. Nonetheless, the calculation is still instructive. At current hours the difference between the 90th and the 10th decile of the logarithm of weekly earnings for men was 1.13 and for women 1.22. At 1991 hours these differences were 1.36 and 1.53, respectively.

[26]Out of a sample of about 11,000 less than 1 percent of workers were professionals, 3 percent were managers, 1 percent were sales workers, and 12 percent were unskilled laborers. In contrast, in the 1900 national sample 6 percent were professionals, 10 percent were managers, 6 percent were sales workers, and 24 percent were laborers.

Table 1

Distribution of Length Workday, 1890s, 1973, and 1991

	Men Aged 25-64			Women Aged 18-64		
	1890s	1973	1991	1890s	1973	1991
$\sigma/\bar{X}$	0.15	0.17	0.18	0.13	0.19	0.21
90th-10th percentile	4.00	2.00	2.00	2.50	2.00	3.00
90th-50th percentile	2.00	2.00	2.00	0.80	0.00	1.00
50th-10th percentile	2.00	0.00	0.00	1.70	2.00	2.00

NOTE.–The 1890s data are weighted to have the same distribution of occupational categories as the population in 1900.

Table 2

Distribution of Usual Length Work Day by Hourly Wage Deciles, Men Aged 25 to 64, 1890s, 1973, and 1991

Wage	All Workers			Paid by Hour		
Decile	1890s	1973	1991	1890s	1973	1991
$<$ 10 (Bottom)	10.99	8.83	8.05	11.14	8.17	7.64
10-20	10.46	8.47	8.47	10.08	8.23	8.14
20-30	10.50	8.54	8.53	9.62	8.23	8.24
30-40	10.62	8.38	8.61	9.62	8.16	8.30
40-50	10.31	8.34	8.59	9.62	8.12	8.38
50-60	9.99	8.33	8.61	9.33	8.15	8.48
60-70	10.29	8.33	8.47	9.42	8.16	8.26
70-80	10.07	8.32	8.66	8.67	8.20	8.47
80-90	9.64	8.26	8.64	8.50	8.15	8.40
$\geq$ 90 (Top)	8.95	8.22	8.72	8.88	8.01	8.51
90th/10th	0.81	0.93	1.08	0.80	0.98	1.11
90th/50th	0.90	0.99	1.01	0.95	0.98	1.00
50th/10th	0.94	0.94	1.07	0.86	0.99	1.10

NOTE.–The 1890s data are weighted to have the same distribution of occupation categories as the population in 1900.

Table 3

Distribution of Usual Length Work Day by Hourly Wage Deciles, Women Aged 18 to 64, 1890s, 1973, and 1991

Wage	All Workers			Nonmarried	
Decile	1890s	1973	1991	1973	1991
$<$ 10 (Bottom)	10.06	7.36	6.67	7.17	6.23
10-20	9.93	7.19	6.96	7.18	6.61
20-30	9.98	7.25	7.55	7.22	7.22
30-40	9.85	7.58	7.59	7.52	7.77
40-50	9.67	7.56	7.66	7.50	7.90
50-60	9.66	7.70	7.87	7.66	7.86
60-70	9.55	7.70	8.00	7.62	7.90
70-80	9.37	7.81	8.05	7.76	8.14
80-90	8.90	7.78	8.23	7.76	8.35
$\geq$ 90 (Top)	7.97	7.50	8.14	7.39	8.27
90th/10th	0.79	1.02	1.22	1.03	1.33
90th/50th	0.83	0.98	1.05	0.97	1.05
50th/10th	0.96	1.04	1.16	1.06	1.26

NOTE.–The 1890s data are weighted to have the same distribution of occupation categories as the population in 1900.

Table 4

Wage Elasticities From Regressions of Logarithm of Hours on Logarithm of Wage, Men and Women, 1890s, 1973, 1991

Instruments:	None			Last year's wage
	1890s	1973	1991	1890s
Covariates: age, age squared				
Men, all workers	-0.117	-0.083	0.044	-0.120
	(0.003)	(0.011)	(0.005)	(0.006)
Men, paid hourly	-0.184	-0.025	0.063	-0.200
	(0.028)	(0.005)	(0.008)	(0.058)
Men, all workers, age 25-44	-0.117	-0.094	0.045	-0.115
	(0.004)	(0.005)	(0.006)	(0.007)
Men, paid hourly, age 25-44	-0.222	-0.032	0.061	-0.230
	(0.031)	(0.007)	(0.009)	(0.057)
Women, all workers	-0.146	0.009	0.116	–
	(0.008)	(0.006)	(0.008)	–
Women, unmarried	-0.107	-0.020	0.126	–
	(0.008)	(0.009)	(0.015)	–
Covariates: other				
Men, all workers	-0.110	-0.095	0.041	-0.126
	(0.003)	(0.004)	(0.005)	(0.006)
Men, paid hourly	-0.198	-0.031	0.065	-0.200
	(0.030)	(0.005)	(0.008)	(0.058)

Table 4

Continued

Men, all workers, age 25-44	-0.107	-0.104	0.045	-0.124
	(0.004)	(0.005)	(0.007)	(0.007)
Men, paid hourly, age 25-44	-0.231	-0.114	0.062	-0.254
	(0.033)	(0.022)	(0.010)	(0.057)
Women, all workers	-0.187	0.015	0.127	–
	(0.011)	(0.006)	(0.008)	–
Women, unmarried	-0.176	-0.015	0.133	–
	(0.013)	(0.010)	(0.016)	–

NOTE.–Elasticities were predicted from a regression of the logarithm of daily hours on the logarithm of the wage per hour and on the covariates. Other covariates for the 1890s data include age, age squared, dummies for foreign birth, whether the worker has any dependents, and fixed effects indicating which State Bureau of Labor Statistics Report the data came from. Control variables for 1973 and 1991 are age, age squared, dummies for nonwhite and married, state fixed effects, and for 1991 the number of children under 18. Standard errors are in parentheses. Not enough information is available to estimate instrumented wage elasticities for women.

Table 5

Percentage of Men in Each Occupation Group and Daily Hours and by Occupation, 1890s, 1973, and 1991

	% in Occupation Group			Average Daily Hours		
	1890s	1973	1991	1890s	1973	1991
Professional	5.68	15.18	16.67	8.66	8.39	8.66
Managerial	9.67	14.90	17.43	11.34	8.81	9.12
Clerical	5.70	6.78	5.40	10.85	8.09	8.23
Sales	5.96	6.10	4.31	12.17	8.67	9.05
Craft	23.48	24.74	22.40	9.95	8.18	8.48
Operative	20.04	13.39	7.35	10.20	8.12	8.36
Service	5.06	6.49	7.04	11.52	8.39	8.08
Laborer	24.41	12.43	12.38	9.83	8.41	8.74

NOTE.–The 1890s occupational distribution is estimated from the 1900 census.

Table 6

Percentage of Men in Each Industry Group and Daily Hours and by Industry, 1890s, 1973, and 1991

	% in Industry Group			Average Daily Hours		
	1890s	1973	1991	1890s	1973	1991
Mining	5.88	1.48	1.33	9.38	8.45	9.58
Construction	11.43	9.93	11.01	9.43	8.16	8.55
Manufacturing	31.81	35.62	24.65	9.57	8.26	8.59
Transportation, Communication, Utilities	15.88	9.86	11.14	10.64	8.29	8.76
Trade	17.98	15.63	17.36	11.52	8.58	8.77
Finance, Insurance, Real Estate	2.81	4.64	6.00	–	8.42	8.70
Repair	1.86	2.92	6.55	–	8.41	8.61
Personal Service	4.55	1.14	1.99	11.81	8.46	8.43
Entertainment	0.76	0.65	1.70	–	7.84	8.30
Professional	4.51	10.32	13.18	–	8.51	8.60
Public Administration	2.53	7.80	6.06	10.41	8.38	8.39

NOTE.–The 1890s industry distribution is estimated from the 1910 census. Daily hours are missing for industries where cell sizes were too small in the 1890s data. (Industry could not be assigned to all individuals.)

Table 7

Decomposition of Change in Men's Daily Hours of Work

	(1) $<$ 10th Percentile	(2) $\geq$ 90th Percentile	Relative Shift (2)-(1)
1973-1890			
Δh_i	-2.16	-0.73	1.43
$\sum_j \alpha_{ij} a_{ij} \Delta H_j$	-2.46	-2.27	0.1 9
$\sum_j \Delta\alpha_{ij} a_{ij} H_j$	0.06	0.42	0.36
$\sum_j \alpha_{ij} \Delta a_{ij} H_j$	0.24	1.12	0.88
1991-1973			
Δh_i	-0.78	0.50	1.28
$\sum_j \alpha_{ij} a_{ij} \Delta H_j$	0.14	0.25	0.39
$\sum_j \Delta\alpha_{ij} a_{ij} H_j$	-0.05	0.13	0.18
$\sum_j \alpha_{ij} \Delta a_{ij} H_j$	-0.87	0.12	0.99

NOTE.–See the text for details.

Table 8

Wage Elasticities by Occupation Group From Regressions of Logarithm of Hours on Logarithm of Wage, Men Aged 25-64, 1890s, 1973, and 1991

Covariates:	Age, age squared			Other		
	1890s	1973	1991	1890s	1973	1991
Professional	-0.292	-0.125	0.029	-0.265	-0.127	0.030
	(0.068)	(0.012)	(0.015)	(0.081)	(0.012)	(0.015)
Managerial	-0.517	-0.157	0.014	-0.542	-0.159	0.015
	(0.027)	(0.010)	(0.013)	(0.027)	(0.010)	(0.013)
Clerical	-0.214	-0.136	0.078	-0.205	-0.141	0.080
	(0.012)	(0.016)	(0.022)	(0.012)	(0.016)	(0.022)
Sales	-0.247	-0.072	0.015	-0.241	-0.074	0.012
	(0.035)	(0.015)	(0.019)	(0.036)	(0.016)	(0.020)
Crafts	-0.115	-0.099	0.023	-0.097	-0.104	0.021
	(0.005)	(0.007)	(0.010)	(0.005)	(0.007)	(0.010)
Operative	-0.169	-0.042	0.026	-0.175	-0.047	0.024
	(0.007)	(0.010)	(0.016)	(0.008)	(0.010)	(0.016)
Service	-0.204	-0.175	0.130	-0.203	-0.187	0.121
	(0.020)	(0.024)	(0.021)	(0.021)	(0.025)	(0.023)
Laborer	-0.079	-0.076	0.078	-0.068	-0.096	0.079
	(0.007)	(0.012)	(0.020)	(0.008)	(0.013)	(0.020)

NOTE.–Elasticities were predicted from a regression of the logarithm of daily hours on the logarithm of the wage per hour and on the covariates. Other covariates for the 1890s data include age, age squared, dummies for foreign birth, whether the worker has any dependents, and fixed effects indicating which State Bureau of Labor Statistics Report the data came from. Control variables for 1973 and 1991 are age, age squared, dummies for nonwhite and married, and state fixed effects. Standard errors are in parentheses.

Table 9

Wage Elasticities by Industry Group From Regressions of Logarithm of Hours on Logarithm of Wage, Men Aged 25-64, 1890s, 1973, and 1991

Covariates:	Age, age squared			Other		
	1890s	1973	1991	1890s	1973	1991
Mining	-0.242	-0.087	0.000	-0.252	-0.090	-0.000
	(0.023)	(0.023)	(0.025)	(0.025)	(0.023)	(0.028)
Construction	-0.152	-0.057	0.024	-0.145	-0.071	0.021
	(0.007)	(0.010)	(0.011)	(0.010)	(0.010)	(0.011)
Manufacturing	-0.086	-0.067	-0.003	-0.087	-0.075	-0.003
	(0.006)	(0.005)	(0.007)	(0.007)	(0.006)	(0.007)
Transportation, Communication, Utilities	-0.116	-0.109	0.002	-0.130	-0.120	0.003
	(0.005)	(0.013)	(0.015)	(0.005)	(0.013)	(0.015)
Trade	-0.224	-0.109	0.052	-0.190	-0.125	0.050
	(0.035)	(0.010)	(0.016)	(0.028)	(0.010)	(0.016)
Personal Service	-0.016	-0.097	0.230	-0.053	-0.120	0.214
	(0.054)	(0.049)	(0.093)	(0.055)	(0.050)	(0.094)
Public Administration	-0.395	-0.101	0.070	-0.235	-0.103	0.071
	(0.045)	(0.013)	(0.021)	(0.053)	(0.013)	(0.021)

NOTE.–Elasticities were predicted from a regression of the logarithm of daily hours on the logarithm of the wage per hour and on the covariates. Other covariates for the 1890s data include age, age squared, dummies for foreign birth, whether the worker has any dependents, and fixed effects indicating which State Bureau of Labor Statistics Report the data came from. Control variables for 1973 and 1991 are age, age squared, dummies for nonwhite and married, and state fixed effects. Standard errors are in parentheses.

Table 10

Mean Days Lost from Work and Mean Sickness Days by Wage Deciles, Men 25-64, 1890s

Wage	Total Days Lost	Mean Sickness Days
$<$ 10 (Bottom)	28.31	5.19
10-20	30.47	10.41
20-30	36.99	13.53
30-40	35.07	11.88
40-50	25.94	9.40
50-60	38.18	12.55
60-70	33.10	8.87
70-80	28.23	12.18
80-90	28.63	7.17
$\geq$ 90 (Top)	34.51	7.52

NOTE.–Days lost from work include days lost due to unemployment, sickness, vacations, and unspecified causes.

Table 11

Length of the Work Day by Manufacturing Industry

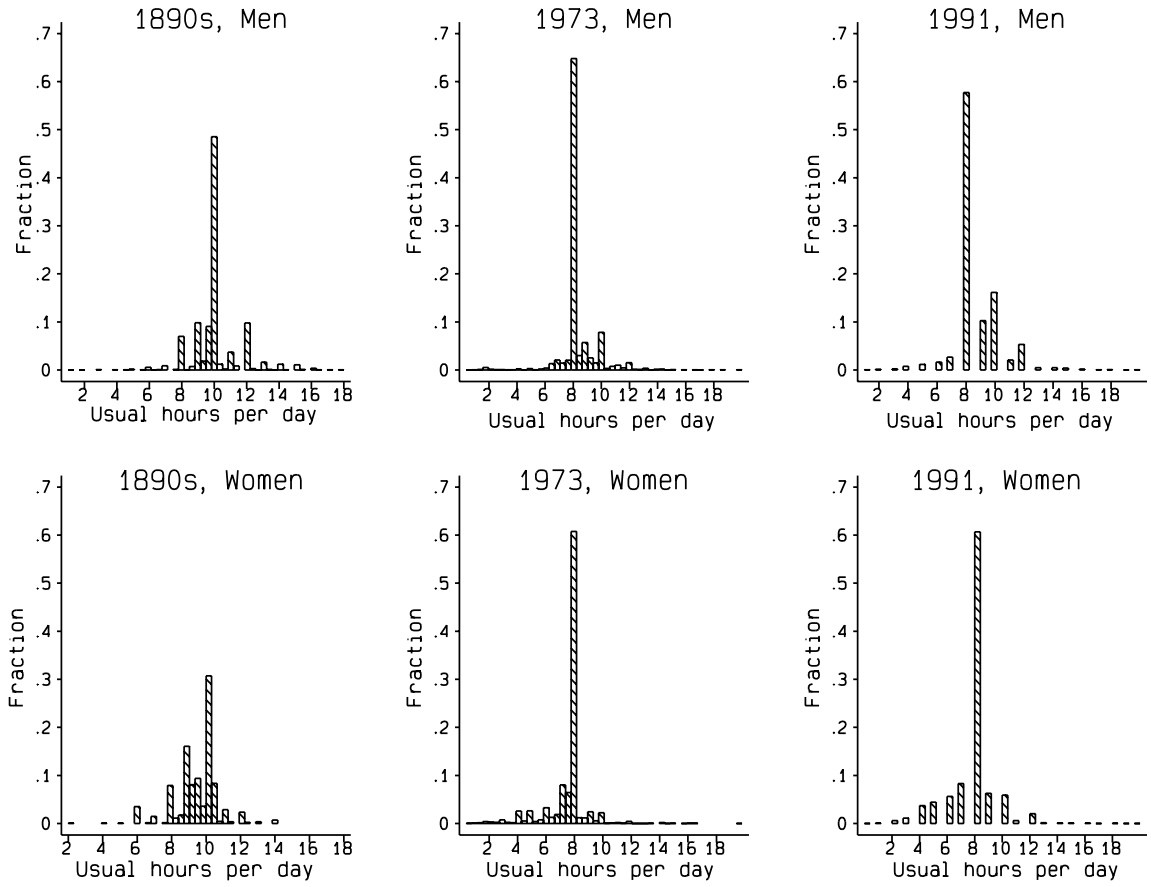
	Percent Working Given Hours per Day								
	7	8	8.5	9	9.5	10	10.5	11	12
Primary iron and steel	–	–	–	28.0	4.0	66.0	–	–	–
Grain milling	–	–	–	7.5	17.5	17.5	–	25.0	25.0
Miscellaneous food	–	–	–	72.0	–	17.7	–	–	–
Tobacco	–	88.4	–	–	–	–	–	–	–
Meat	20.4	8.2	–	14.3	–	20.4	–	–	–
Fabricated non-ferrous metal	–	–	–	12.1	39.5	37.1	–	–	–
Ship and boat building	–	–	–	–	–	84.3	16.0	–	–
Textiles	–	–	–	–	–	100.0	–	–	–
Leather tanning	–	–	–	17.0	14.9	50.0	–	–	–
Leather products	–	–	–	–	12.9	77.4	–	–	–
Footwear	–	–	–	6.4	9.4	77.9	–	–	–
Furniture	–	–	–	51.6	29.5	17.2	–	–	–
Paper	–	–	–	12.9	77.4	–	–	–	–
Printing	–	17.1	–	21.7	10.1	41.9	–	–	–
Saw Milling	–	5.5	–	15.5	–	39.3	–	28.7	–
Miscellaneous wood	–	4.6	8.5	24.3	4.3	46.0	8.5	–	–

NOTE.–Percentages less than 4 percent were not reported.

Figure 1

Distribution of Hours Worked, Men Aged 25 to 64 and Women Aged 18 to 64, 1890s, 1973, and 1991

NOTE.–The 1890s data are reweighted to have the same distribution of occupational categories as the population in 1900.


1890s, Men
1973, Men
1991, Men
1890s, Women
1973, Women
1991, Women
Fraction
0
.1
.2
.3
.4
.5
.6
.7
2 4 6 8 10 12 14 16 18
Usual hours per day