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MAXIMUM HOURS LEGISLATION AND FEMALE EMPLOYMENT IN THE 1920s: A REASSESSMENT

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ABSTRACT

The causes and consequences of state maximum hours laws for female workers, passed from the mid-1800s to the 1920s, are explored and are found to differ from a recent reinterpretation. Although maximum hours legislation reduced scheduled hours in 1920, the impact was minimal and it operated equally for men. Legislation affecting only women was symptomatic of a general desire by labor for lower hours, and these lower hours were achieved in the tight, and otherwise special, World War I labor market — hours of work declined substantially for most workers in the second decade of this century. Most importantly, the restrictiveness of the legislation had no effect on the employment share of women in manufacturing. The legislation was, on the contrary, associated with a positive impact on the employment share of women in sales (another covered sector). Finally, labor force participation rates of women across cities during the 1920s were strongly and negatively correlated with shorter hours of work per day, consistent with one time-series explanation for the increase in female market work. These results are consistent with a labor market model in which scheduled hours of work per day are negatively related to days worked per week, and that assumption is justified using previously untapped data on actual hours, scheduled hours, and days worked for women in the covered sectors.

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> The development of . . . state legislation on hours has tended to follow a very definite pattern. An insistent and persistent demand for general legislation to insure shorter hours for all led to the passage of general eight-hour laws. When statutes of such unrestricted application proved unavailing, attempts at hours' regulation concentrated on specific classes of employees (Cahill 1968, orig. 1932, p. 94).

State laws mandating daily and weekly maximum hours of work appeared as early as 1847 and by 1921 all but four states passed such legislation. Half the states adopted their first laws during the initial two decades of this century, and 40 states passed some form of hours legislation during the second decade. While the precise number of hours and the details varied by state, one aspect was common to all -- the laws applied almost exclusively to the employment of women.[1] At the time of their passage they received mixed reviews. To their champions the laws would serve to protect women from their employers however others predicted they would result in reduced female employment.

The motivation for and impact of protective legislation have received renewed attention. In her study of maximum hours legislation Elisabeth Landes (1980) concluded that it greatly reduced hours worked per week by women in 1920 and lessened their employment share in manufacturing, the major covered sector. Furthermore, the reduction in employment was most pronounced among the daughters of the foreign born, and the passage of this legislation was, by inference, supported by native-born, male manufacturing workers, who stood the most to gain.

This paper reassesses the interpretation of maximum hours legislation and introduces new information on its impact. The findings differ substantially with those of Landes. Although maximum hours legislation reduced scheduled hours, the impact was minimal and it operated equally for men. The reasons for this apparently curious result are clear from the headnote. Legislation affecting only women was symptomatic of a general desire by labor for lower hours, and

these lower hours were achieved in the tight, and otherwise special, World War I labor market. It is important at the outset to point out that states that passed legislation did not always have lower scheduled hours; there is no relationship between scheduled hours of work by state in 1909 and subsequent legislation.[2]

Most importantly, the restrictiveness of the legislation had no effect on the employment share of women in manufacturing. The legislation was, on the contrary, associated with a positive impact on the employment share of women in sales (another covered sector). Finally, higher labor force participation of women across cities during the 1920s was strongly correlated with shorter hours of work per day, consistent with one time-series explanation for the increase in female market work. A by-product of this endeavor has been the collection of information on the relationships among actual hours, scheduled hours, and days worked for women. The evidence indicates that shorter scheduled hours per day were associated with more days worked per week. More days worked per week were translated, by way of the U.S. Population Census question on gainful employment, into greater labor force participation rates.

Some of the differences between my findings and those of Landes are rooted in misspecifications in the original article, while some are founded in new evidence on hours of work. None of the differences between this paper and the Landes article detracts from the contribution of the original, which was to highlight an important and almost forgotten part of the history of hours of work, female employment, and protective legislation.

The resolution of the impact of hours legislation is particularly relevant with the recent passage of comparable worth legislation and with renewed interest in the political economy of "rent seeking" behavior. Various types of protective

legislation, such as child labor laws, compulsory attendance, and pay equity, which were once viewed as humanitarian in origin, have also been reinterpreted as directly benefiting certain groups -- but not the ones to which the legislation directly applied.[3]

Maximum hours legislation may be relevant, as well, to understanding the long-term decline in hours of work over the course of this century. The findings of this paper regarding the relationship between the decline in male and female hours necessitate further study of the decline in hours in general. The average scheduled work week in manufacturing fell by almost 9 hours from 1900 to 1920, or by one full work day. Much of the decline occurred in the brief period from 1916 to 1920 (Historical Statistics 1975, Series D 769, p. 168) during and just after an outpouring of state hours legislation (38 important laws were passed from 1911 to 1919) and coinciding with generally favorable economic conditions and trade union strength (1920 was the year of maximum membership). The roles of World War I legislation, such as that affecting the railroads, and special product demand, such as in lumber, complicate the general decline in hours but not the relationship between it and protective legislation.

I. The Impact of Maximum Hours Legislation on Hours of Work

Did maximum hours legislation have an impact on the scheduled hours of women and, if so, by how much? Landes (1980) explored this question with state-level data from the 1919 U.S. Census of Manufacturing, which aggregated male and female employees and gave scheduled (not actual) hours of work per week.

To separate the impact of hours legislation on male and female employees an identity is estimated in which mean scheduled hours by state are regressed on the female share of employment in manufacturing (PMFF20), a dummy variable

equal to one if the state passed a maximum-hours law by 1914 interacted with the percentage female (PMFF20 * DUM), and several variables (South dummy, urbanization) to account for differences in hours across states. By including only PMFF20 * DUM, the maximum-hours law dummy multiplied by percentage female, the impact of hours laws is constrained to fall entirely on female employees. The coefficient on PMFF20 * DUM is then the decrease in the number of hours worked by women in states with hours legislation.[4]

A more general specification would also include the dummy variable (DUM), the coefficient of which is the decrease in the number of hours worked by men in states with hours legislation. The coefficient on PMFF20 * DUM is the difference in the decline in hours (due to legislation) of women compared with men, and that on the percent female (PMFF20) is the difference between average hours for females and males in the unconstrained states. The constant term is the unconstrained value of male hours.[5]

Various hours equations estimated across states (and the District of Columbia) are presented in Table 1. Column 1 gives the results in Landes (1980); column 2 reestimates the same equation following the variable construction in the original article and results in similar coefficients. The equation in column 5 is identical to that in 2 but weights the observations by the square root of the number of manufacturing employees in each state. Column 3 omits the interaction of the dummy variable with the percentage of manufacturing labor that was female but includes the dummy variable. Finally, column 4 contains the least constrained estimation.

Landes' estimation of the more restrictive equation indicated that hours legislation decreased scheduled hours of women by 8 per week. Note that 8 hours per week was 15 percent of mean scheduled hours per week -- almost one

general, on the relationship between $(\varepsilon_f + 1)$ and β -- essentially a battle between the usual labor supply elasticity and the less conventional elasticity of days with respect to hours per day.

The elasticity of interest, that pertaining to female employment, can be negative or positive even under the parameter restrictions in the Landes formulation.[22] Furthermore, the sign is independent of the signs of the other elasticities. Female employment can increase with either an increase or a decrease in the wage. The increase in female employment with a decrease in hours now operates through two effects and is therefore easier to achieve with given parameter values. It operates first through the initial increase in wages as hours decline and secondly through the (negative) elasticity of labor with respect to hours $(-\beta)$.[23] Note that the data on scheduled hours and days worked in Table 2 can be used to estimate the parameter β, which is about -1 indicating that actual hours worked per week were relatively constant.[24]

The possibility that maximum hours laws could have expanded female employment should not be surprising. It has been frequently asserted that female labor force participation rates rose over the long run because scheduled hours of work per day declined, enabling women with responsibilities at home to work more days.[25]

In the employment equation estimated by Landes, the dependent variable was the percentage of the total manufacturing labor force that was female in 1920 and the key independent variable accounted for the degree of restrictiveness of the state's maximum hours legislation.[26] Other variables were included to account for differences in the demand for or supply of female workers, such as urbanization, region, and a lagged employment share in manufacturing capturing a host of relevant factors.

hours legislation (once again, that cover only women) was virtually identical to that from the full estimation in Table 1.[9]

These findings suggest that protective legislation for women was associated with a decline in hours of work for men. The reason for this apparently peculiar result is, as suggested by the headnote, that laborers in states that passed protective legislation for women had sentiments for decreased hours of work in general. They were able to lobby more forcefully for laws covering women whose plight appealed to legislators, and state supreme courts did not, in general, challenge those laws. Note that this analysis does not assess whether women were "hours constrained" in the presence of legislation or whether men and women were hours constrained prior to the large declines in hours from 1909 to 1919. Those are separate and difficult issues.

The proposition that protective legislation was passed in states in which male labor lobbied vigorously for general hours reductions can be tested by using disaggregated data by industry for 1914 and 1919 from the 1920 Manufacturing Census. In each state the two major female-intensive industries and the two major male-intensive industries were selected. In the former, females were, on average, about 50% of the labor force; in the latter, however, they were less than 2% of the labor force. The male-intensive industries therefore could not have viewed increases female labor as a direct threat; these industries (lumber, foundries, steam car railroads) never contained many female employees (if any at all).

Define MDIFF to be average scheduled hours for males in 1919 minus average scheduled hours for males in 1914 and FDIFF to be the same for females. Let LIM14 be the existing weekly hours limit in 1914 (with the zero limit set equal to 66 hours). Then,

$$\underset{\quad (5.67)\ (3.12)}{MDIFF = -20.75 + 0.268\ LIM14} \underset{\quad (1.54)}{+ 1.35\ SD} \underset{\quad (1.47)}{+ 0.0320\ PURB} \qquad R^2 = 0.232$$

is obtained when estimated across the 49 states (plus D.C.) and indicates that the 1914 hours limit is positively related to the decline in hours for males from 1914 to 1919. However,

$$\underset{\quad (0.53)\ (0.90)}{FDIFF = 2.80 - 0.072\ LIM14} \underset{\quad (0.03)}{+ 0.022\ SD} \underset{\quad (2.44)}{- 0.0493\ PURB} \qquad R^2 = 0.139$$

indicates that the decline in female hours was not related to the existing 1914 limit. These results, taken together, suggest that labor in male-intensive industries lobbied effectively for female hours limits in states in which they were ultimately successful at lowering their own hours. In many of these states the dominant male-intensive industry was lumber, in which the Wobblies led successful strike activity in the unique World War I environment (see Hidy, et al. 1963, pp. 332-51). Organized labor in male-intensive industries cared about female hours of work probably because the more laborers working shorter hours, the more it becomes the norm for all. Labor was successful in obtaining shorter hours in the special 1914 to 1919 period.[10]

A further problem with the assertion that hours legislation substantially reduced hours of work is that the data analyzed are for scheduled, not actual, hours. It is actual hours worked that are at issue. Data on actual hours are unavailable on a national basis for this period of time, but exist for 17 states in various surveys of the Women's Bureau. These states are not, however, a random sample; the Women's Bureau directed its efforts at states with higher than average scheduled hours.[11] Even with this bias to the sample, the unweighted mean of scheduled hours is 51.2 or exactly 1 hour below the unweighted mean of scheduled hours in the 1919 Census of Manufacturers, which is the average for males and females.[12]

Scheduled weekly hours, actual weekly hours, the hours laws in effect at the time of the survey, and days worked per week are given in Table 2 for the various states included in the Women's Bureau bulletins. The data show that mean actual hours were far more similar across states than were mean scheduled hours. While it is true that states with the least restrictive hours legislation had the highest scheduled hours per week, actual hours per week worked by female employees in manufacturing and mercantile establishments were far less than were average scheduled hours. In Missouri and South Carolina which had among the highest scheduled hours, actual weekly hours worked were only 82 percent of scheduled hours. In Illinois, New Jersey, and Rhode Island, which had among the lowest scheduled hours, the ratio was over 90 percent. The elasticity of actual hours with respect to scheduled hours was 0.82.[13]

How did employees manage to work fewer than the scheduled number of hours? Female workers achieved fewer hours by working fewer days per week, not by working fewer hours per day.[14] Thus the difference between actual and scheduled hours per week is found in the number of days worked, not the number of hours worked in a day. Thus hours worked per day can be appropriately proxied by scheduled daily hours, but the same is not true of hours worked per week. This finding will be of particular relevance in exploring the impact of scheduled daily hours on the employment of women.

The claim that hours worked per day varied less than did days worked per week is supported in these data by various types of evidence. One is the relationship between average days worked and average actual hours worked per week. The data on days worked come from employees whose time was reported in days and the data on hours per week come from employees whose time was reported in hours.[15] Thus the two data series are derived from different individuals. The

question is whether the individuals who reported their time in days actually worked full days. (The data necessary to do this exercise are not given in Table 2.) Multiplying the number of days they claim to have worked by the average number of scheduled (not actual) hours in a day, will give the average number of hours worked, if individuals varied days and not hours per day. The fact that this number is very close to that obtained by a different group of individuals, those reporting time in hours per week (column 2), indicates that both groups probably varied days and not hours per day.[16]

The close resemblance of the hours equation in Table 1 to that in the original article indicates that the variables used are nearly identical. Thus the next stage of the empirical work, that on employment, using an almost identical set of variables should produce similar results. That, however, is not the case.

II. The Impact on Employment: Theoretical Underpinnings and Empirical Results

The impact of maximum hours legislation on the employment of women in the covered sector provided the key result in the Landes article. The estimation was motivated by a model of a labor market which predicted, under the most reasonable parameter values, that the female share of the covered sector would decline with effective maximum hours legislation.

Landes posits a model of labor hours in which individuals choose hours of work (h_i), say per week, as a function of their hourly wage (w):

$$h_i = w^{\varepsilon_{hi}}$$

and then choose to supply their labor (L_i), say in laborers per week, as a function of their weekly earnings (wh_i):

$$L_i = (wh_i)^{\varepsilon_{Li}}$$

where i = male (m), female (f) workers. Workers are perfect substitutes for each other, and thus the wage is the same for both groups. Total hours of labor services, $S = \sum h_i L_i$, are identical, in equilibrium, to firm demand:

$$D = w^{-\eta}$$

Effective maximum hours legislation for females alters the equilibrium in two manners: the elasticity of female hours with respect to the wage (ε_{hf}) automatically becomes 0 and hours of work for females are reduced if the constraint is binding. The effects of the reduction in female hours on the total supply of hours, the wage, female labor, and male labor are given by: $dS/dh_f > 0$; $dw/dh_f < 0$; $dL_m/dh_f < 0$; $dh_m/dh_f < 0$; and $dL_f/dh_f \gtreqless 0$.

Thus all effects are unambiguous in sign except for that on female labor which is the derivative of interest. It depends on the relationship between the elasticity of demand for labor hours plus an elasticity weighted male labor force share, and the female labor force share, $(\eta + \varepsilon'_m s_m - s_f) \gtreqless 0$.[17] As Landes points out, the most reasonable parameter estimates yield a positive impact. The female labor force in the covered sector would decline with effective maximum hours legislation.

This result is tested (and affirmed) in the Landes article by estimating the impact on the female share of the manufacturing labor force of hours legislation. Although the empirical results obtained by Landes are consistent with the predictions of this model, I will demonstrate that they are in error. The corrected results can be better explained by a slight revision of the model, which is, as well, consistent with the data in Table 2 on actual hours of work. Those data indicate that hours of work per week varied by the number of days worked and not by the number of hours worked in a day. That is, hours per day were not a choice variable to individuals, at least not at a point in time. The difference

is one of major importance because maximum hours legislation frequently mandated both maximum hours per day and per week. If the only intent of the legislation was to constrain the number of hours women worked, only hours per week would have been necessary.

The evidence suggests that the number of hours worked per day is given to the worker and the worker decides on the number of days. While the number of hours per day varies by firm and by industry, it varies far less than does the total number of actual hours worked per week. Assume, therefore, that hours per day are the same across all firms.[18] Tastes for work at each prevailing wage-hours point will vary across individuals; some will not desire to work at all when the work day is 10 hours, while some will work only a few days a week. A shorter work day will lead a greater percentage to enter the labor force and will lead those in the labor force to work more days per week.[19]

Assume that the negative relationship between days worked and minimum hours per day exists for women but not for men -- a reasonable assumption given the aggregate labor force participation rates of the two groups. Therefore the supply of female labor is given by:[20]

$$L_f = h_f^{-\beta} (wh_f)^{\varepsilon_f}$$

while that for men is given by:

$$L_m = (wh_m)^{\varepsilon_m}$$

where h_i = the given number of hours per day, L_i = days of labor supplied per time period, w = the wage, f = female, and m = male. The demand for hours of labor is assumed identical to that in the original model ($D = w^{-\eta}$). Note that in this model, as in the original, firms treat hours of work as fungible across

laborers -- two six-hour shifts are equivalent to one 12-hour shift. The absence of extreme substitutability would reduce employment of the constrained group.

The new version of the model is distinguished from the old because minimum hours of work per day demanded by employers affects the number of days worked by females. To obtain this result I assume that hours worked per day is not a choice variable.[21] There are now three effects generated by a mandated decline in hours of work per day, rather than two. The two in the original model are that days worked decreases because the reduction in hours reduces earnings, but days worked increases because the wage rate increases. A third effect, serving to increase the supply of labor, is added through the negative relationship between minimum hours per day and days worked per time period.

The four elasticities of interest are those concerning total labor hours (S), female labor (L_f), the wage (w), and male labor (L_m), and they are given by:

$$(h_f/S)(dS/dh_f) = \eta s_f(\varepsilon_f - \beta + 1)/\alpha \gtreqless 0 \qquad \text{as } \varepsilon_f - \beta + 1 \gtreqless 0$$

$$(h_f/L_f)(dL_f/dh_f) = \{\varepsilon_f(\eta + s_m\varepsilon_m - s_f) + \eta(\varepsilon_f - \beta)\}/\alpha \gtreqless 0$$
$$\text{as } (\varepsilon_f - \beta) + \{\varepsilon_f(\eta + s_m\varepsilon_f - s_f)/\eta\} \gtreqless 0$$

$$(h_f/w)(dw/dh_f) = -s_f(\varepsilon_f - \beta + 1)/\alpha \lessgtr 0 \qquad \text{as } \varepsilon_f - \beta + 1 \gtreqless 0$$

$$(h_f/L_m)(dL_m/dh_f) = -\varepsilon_m s_f(\varepsilon_f - \beta + 1)/\alpha \lessgtr 0 \qquad \text{as } \varepsilon_f - \beta + 1 \gtreqless 0$$

where $\alpha = (\eta + s_f\varepsilon_f + s_m\varepsilon_m)$, and $s_i = (L_i h_i/S)$, the female or male share of total labor hours. In the original model, maximum hours legislation for women reduced their equilibrium hours and increased the equilibrium wage rate. Thus the impact on female labor was ambiguous because earnings declined through hours but increased through wages. The impact on male labor was unambiguously positive, operating only through wages. All effects are now ambiguous and depend, in

general, on the relationship between $(\varepsilon_f + 1)$ and β -- essentially a battle between the usual labor supply elasticity and the less conventional elasticity of days with respect to hours per day.

The elasticity of interest, that pertaining to female employment, can be negative or positive even under the parameter restrictions in the Landes formulation.[22] Furthermore, the sign is independent of the signs of the other elasticities. Female employment can increase with either an increase or a decrease in the wage. The increase in female employment with a decrease in hours now operates through two effects and is therefore easier to achieve with given parameter values. It operates first through the initial increase in wages as hours decline and secondly through the (negative) elasticity of labor with respect to hours $(-\beta)$.[23] Note that the data on scheduled hours and days worked in Table 2 can be used to estimate the parameter β, which is about -1 indicating that actual hours worked per week were relatively constant.[24]

The possibility that maximum hours laws could have expanded female employment should not be surprising. It has been frequently asserted that female labor force participation rates rose over the long run because scheduled hours of work per day declined, enabling women with responsibilities at home to work more days.[25]

In the employment equation estimated by Landes, the dependent variable was the percentage of the total manufacturing labor force that was female in 1920 and the key independent variable accounted for the degree of restrictiveness of the state's maximum hours legislation.[26] Other variables were included to account for differences in the demand for or supply of female workers, such as urbanization, region, and a lagged employment share in manufacturing capturing a host of relevant factors.

The restrictiveness variable (REST) measures the percentage of the state's manufacturing labor force in 1909 that worked (in actuality, the percentage working in establishments that had scheduled hours) over the legal maximum in effect in 1914. Note that the restrictiveness variable is a highly appropriate variable for this exercise and is considerably better than a simple dummy variable indicating whether or not a state passed an hours law from 1905 to 1914. The REST variable accounts for prior conditions and gives the proportion of the labor force in 1909 that would be constrained by the hours legislation passed by 1914. Landes' estimated regression, given in column (3) of Table 3, indicates that states with more restrictive legislation had a lower female employment share in manufacturing. Further estimations by Landes indicate that most of the decline in the employment share occurred for the daughters of the foreign born and for foreign born women. These results provided persuasive evidence that hours legislation was passed under the guise of humanitarian concern through the efforts of labor groups and others that stood the most to gain from restricting the employment of immigrant women and their daughters.

Note, however, the other regressions for the manufacturing sector appearing in Table 3. These were estimated on identical variables by state, most of which were also in the Table 1 estimation. Unlike those in Table 1, there is little relationship between my results and those of Landes. Most importantly, the coefficient on REST is insignificant and that on the hours legislation dummy variable is significant only at unconventional levels.[27] These results are robust to restricting the sample to the 40 states (and District of Columbia) that are highlighted in the original article (that is, excluding 8 mountain states having few manufacturing workers), to weighting the regression by the square root of manufacturing employment in the state (not included in the

table), and to estimating a (weighted) logistic transformation of the dependent variable (also not in the table).[28]

The source of the difference is in a computational error in the original estimation. States that had the most restrictive legislation passed both daily and weekly hours laws. The REST variable in the original article was inadvertently computed using a weekly restriction that was always 6 times the daily restriction. That procedure resulted in the correct weekly restriction in many of the cases, but 11 states (or one-quarter of the sample) had more restrictive weekly hours.

Focus now on a different equation in Table 3, one in which the dependent variable is the percentage of sales (not clerical) labor force that is female in 1920 (PSF20), as in column (4). Retail trade was also covered by maximum hours legislation and in many states mercantile establishments were covered before manufacturing firms. An equation similar to that for the manufacturing sector is estimated for the sales sector with results that are very different. Rather than declining, as in the original article, and rather than being insignificant, as was the case for the manufacturing equation estimated in this paper, the female share of sales employment actually increased in states having more restrictive hours legislation.[29] It should be emphasized that the decline in the female share of the manufacturing labor force during the 1900 to 1920 period did not mark a new trend. The female share of the manufacturing labor force had been declining for decades preceding maximum hours legislation, and the share probably peaked as early as the 1840s (see Goldin and Sokoloff, 1982). Female employment in the sales sector, however, began to increase during the first decades of this century. The coefficient on REST in this equation suggests that maximum hours legislation, by reducing daily hours in this sector, increased the employment share of females. Thus maximum hours

legislation may have had little or no effect on female employment in manufacturing and a positive effect on female employment in sales. The possibility that there was a differential effect of hours legislation on these two sectors should not be disturbing. The framework outlined earlier suggested that certain parameters would determine the sign of the effect, in particular s_f which was higher in sales, and it is possible that other parameters differed by sector.

The variables used thus far to measure the employment effect are the shares of women in a particular sector. The female labor force participation rate could also have been altered by hours legislation because, under the gainful worker definition, participation is related to the average number of days an individual works (see Goldin, forthcoming). To assess this proposition a relationship was estimated across large urban areas (cities having over 100,000 persons) in various states between the labor force participation rate of a group of women, for example native-born white married women, and mean scheduled hours of work in manufacturing.

Constant elasticity equations were estimated for white women of native-born, foreign-born, and native-born of foreign-born parents, separately for married and all marital statuses. The coefficients on hours per day in all equations were negative, indicating that shorter hours were associated with higher participation rates. The result holds across all subgroups of white women, but it is strongest, by nativity, for married women (except for the foreign born).[30] The generally larger elasticities for married women indicate that days worked per year were more responsive to scheduled hours per day for those with greater home responsibilities.

How important is the effect of hours on days worked and thus on labor force participation rates? The mean labor force participation rate of married

native-born white women living in large urban areas in 1920 was 10.6 percent and mean scheduled hours per week were 51.5. Mean scheduled hours per week fell to about 44 by 1940 and the labor force participation rate of white married women in large urban areas rose to about 18 percent.[31] The increase in the participation rate predicted by the decrease in hours worked is 3.6 percentage points or almost half the difference in the actual change.

III. Summary Comments

The causes and consequences of maximum hours legislation have been explored and found to differ from the reinterpretation presented by Landes (1980). In particular, hours declined for men as well as for women in states with hours legislation and the employment share of women in manufacturing did not decrease with the restrictiveness of the legislation. Indeed, the employment share of women in another covered sector, sales, rose with increasing restrictiveness and female labor force participation rates were positively correlated with shorter hours.[32]

These findings are explained within the context of a model similar to that in Landes (1980) but in which scheduled daily hours is a binding constraint on the worker. Workers with home responsibilities choose fewer days when face with higher daily hours. Thus lower daily hours, within some limits, increase days worked. The negative relationship between scheduled hours and days worked is explored with previously unused data sources.

This work has raised further questions about hours legislation and the long-term decline in the work day and week in America. I have suggested the reasons for the relationship between the decline in hours worked by men and legislation protecting women, but it is still not clear what precise mechanisms operated to reduce hours of work for all.

Table 1
The Impact of Hours Legislation on Scheduled Weekly Hours by State, 1920

Dependent Variable HRS19 = mean scheduled hours in manufacturing in 1919 (unweighted mean = 52.2; weighted mean = 51.7)

Independent Variables	(1) Landes	(2)	(3)	(4)	(5) Weighted[a]
Constant	53.3 (69.1)	53.4 (80.7)	54.4 (88.1)	54.8 (56.2)	53.6 (69.3)
SD	1.72 (3.43)	1.34 (2.27)	1.47 (2.57)	1.51 (2.60)	0.85 (1.24)
PURB	-0.05 (3.72)	-0.058 (3.72)	-0.056 (3.85)	-0.058 (3.83)	-0.067 (3.52)
PMFF20	0.11 (1.93)	0.142 (2.36)	0.067 (1.35)	0.030 (0.36)	0.158 (2.61)
PMFF20 * DUM	-0.08 (1.81)	-0.105 (2.04)		0.055 (0.56)	-0.088 (1.66)
DUM			-1.61 (2.77)	-2.162 (1.87)	
R^2	67.	61.3	63.4	64.2	65.2
Number of Observations	49	49	49	49	49

Notes: SD = dummy variable for southern states
PURB = percentage of state's population that was urban in 1910
PMFF20 = percentage of manufacturing labor force that was female
DUM = 1 if state passed its first maximum hours law by 1914
The means of the (unweighted) independent variables are:
SD = 0.31; PURB = 41.0; PMFF20 = 12.3; DUM = 0.694
Absolute values of 't' statistics are in parentheses.

a The weight is the square root of the manufacturing labor force in each state. Note that none of the equations has been weighted to account for heteroscedasticity in estimating an identity, however see text for a justification.

Sources: Column (1): Landes (1980, p. 480). Columns (2), (3), (4) and (5): Hours data are from U.S. Bureau of the Census (1928); PMFF20, manufacturing employment data from U.S. Bureau of the Census (1923); DUM from information in Landes (1980, table 1) and U.S. Women's Bureau (1931).

Table 2
Mean Scheduled Hours, Actual Hours, and Days Worked by State, 1920s

State (survey date)	(1) Scheduled Hours	(2) Actual Hours	(3) (2)/(1)	(4) Hours Law in Effect Daily/Weekly	(5) Actual Days Worked
Alabama (1924)	53.9	46.4	86.1	none	5.24
Arkansas (1922)	51.5	47.7	92.6	9/54	5.71
Delaware (1924)	50.4	41.1	81.5	10/55	5.23
Georgia (1920)	55.5	47.9	86.3	10/60[a]	4.48
Illinois (1924)	49.0	44.7	91.2	10/none	n.a.
Iowa (1920)	n.a.	50.3	n.a.	none	n.a.
Kansas (1920)	43.4	37.7	87.0	8/55	n.a.
Kentucky (1921)	51.7	45.0	87.0	10/60	n.a.
Maryland (1921)	48.2	n.a.	n.a.	10/60	n.a.
Mississippi (1925)	55.6	49.8	89.6	10/none	n.a.
Missouri[b] (1922)	53.1	43.5	89.5	9/54	5.42
New Jersey (1922)	48.4	44.3	91.5	9/50	5.23
Ohio (1922)	48.4	43.3	89.5	9/50	5.21
Oklahoma (1924)	51.1	44.4	86.9	9/54	5.64
Rhode Island (1920)	49.0	46.0	93.9	10/54	n.a.
S. Carolina (1921/22)	54.6	44.9	82.2	10/55/60[c]	4.48
Tennessee (1925)	52.8	48.7	92.3	10.5/57	5.10
Virginia (1919)	n.a.	52.5	n.a.	10/none	n.a.

a Applies only to women working in cotton and woolen mills.
b Data for white women only.
c 55 hours applies to textile factories; 60 hours elsewhere.

Sources: U.S. Women's Bureau, (1919 to 1927).

Table 3
The Effect of Hours Legislation on the Employment Share of Women in Manufacturing and Sales, 1920

Dependent Variables: Mean of PMFF20 = 0.123[a]; Mean of PSF20 = 0.333

Independent Variables	PMFF20 (1)	Means	PMFF20 (2)	PMFF20 (Landes) (3)	PSF20 (4)
Constant	-0.011		-0.023	-0.00168	0.149
	(1.17)		(1.73)	(1.11)	(6.14)
EMP_{-1}	0.728	0.156	0.775	0.79	0.772
	(10.6)		(9.30)	(9.66)	(8.47)
SD	0.013	0.306	0.016	0.0005	-0.006
	(1.34)		(1.61)	(0.06)	(0.61)
PURB	0.0006	41.0	0.0005	0.0005	-0.0005
	(2.59)		(2.16)	(2.26)	(2.79)
DUM	-0.0112	0.327	-0.0134	-0.0012	-0.0082
	(1.34)		(1.42)	(0.14)	(0.92)
REST	-0.0005	0.324	0.0048	-0.0253	0.026
	(0.04)		(0.33)	(1.49)	(1.88)
R^2	85.5		83.4	83.	79.4
Number of Observations	49		41[b]	41	41

Notes: PMFF20 = female employment share of manufacturing in 1920; PSF20 = female employment share in sales (salespersons and clerks in stores) in 1920; EMP_{-1} = Female employment share of manufacturing (sales for col. 4) in 1900 (1910 for sales); DUM = 1 if a maximum hours law was passed from 1905 to 1914; REST = proportion of employees in 1909 who worked greater than the maximum number of weekly hours in effect in 1914. Column (3) from Landes (1980, p. 484) divides all coefficients by 100 (except EMP_{-1}) because the numbers in Landes express the share as a percentage rather than as a proportion. OLS estimation used for consistency with Landes. A weighted logit transformation yields almost identical slopes around the mean for the 49 states (and D.C.) and the nonmountain sample.

Sources: Column (3): Landes (1980, p. 484). Columns (1), (2), and (4): DUM constructed from data in Landes (1980, table 1) and U.S. Women's Bureau (1931); REST constructed from U.S. Bureau of the Census (1913) and U.S. Women's Bureau (1931); EMP_{-1} from U.S. Bureau of the Census (1904) and (1914); PMFF20 and PSF20 from U.S. Bureau of the Census (1923).

a The mean is given for the entire 48 states plus District of Columbia.
b The eight mountain states are excluded for consistency with the Landes estimation.

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FOOTNOTES

1. Mississippi (in 1910) and Oregon (in 1920) passed legislation covering men, and the Georgia law covered all textile workers (see Cahill, 1968). Many other states attempted to pass general legislation but were thwarted by various state supreme courts, except when the laws explicitly allowed contracts for more than the maximum number of hours -- rendering them virtually useless.

2. The possibility that hours legislation was passed in states in which hours had already declined, and therefore in which there was less opposition, is reduced by the estimation in Landes (1980, p. 481) of an hours equation for 1909. States which passed hours legislation after 1909 did not have lower average scheduled hours in 1909. It is conceivable, however, that actual hours of work for men greatly exceeded scheduled hours because of overtime, but there is no indication that overtime work was negatively related to the existence of hours restrictions.

3. On child labor laws in Britain see Marvel (1977). Note that Landes and Solmon (1972) interpret the passage of compulsory schooling legislation as coming after most children were in school for the legislated amount of time. Neither E. Landes nor I have been able to find convincing empirical evidence to support the hypothesis for the case of hours (see footnote 7).

4. The identity is simply:

$$H = \alpha_f H_f + (1 - \alpha_f)H_m + (\alpha_f * DUM)\beta_f H_f$$

where H is average scheduled hours, H_f is average scheduled hours for females in unconstrained states, H_m is average scheduled hours for males in unconstrained states, DUM is = 1 if a state has a maximum hours law, α_f is the percentage of manufacturing employment that is female, and β_f is the marginal impact of hours laws on mean female hours and is expected to be negative. Rewriting yields the estimated equation:

$$H = H_m + (H_f - H_m)\alpha_f + (H_f\beta_f)(\alpha_f * DUM)$$

Thus the coefficient on α_f is the difference in female and male hours in unconstrained states and the coefficient on α_f * DUM is the decline in female hours in constrained states.

5. The more general specification adds to that in footnote 3 a term for the impact of hours legislation on male hours.

$$H = \alpha_f H_f + (1 - \alpha_f)H_m + (\alpha f * DUM)\beta_f H_f + [(1 - \alpha_f) * DUM]\beta_m H_m$$

Rewriting yields the estimated equation:

$$H = H_m + (H_f - H_m)\alpha_f + (H_f\beta_f - H_m\beta_m)(\alpha_f * DUM) + (H_m\beta_m)DUM$$

6. The percentage of the manufacturing labor force that was female was 12.3 (unweighted). Multiplying by the coefficient on PMFF20 * DUM from column 2 gives 1.29.

7. The weighted version of this equation yields a somewhat lower and less significant coefficient on DUM.

8. As noted in the table, the equations are not corrected for possible heteroscedasticity problems inherent in estimating identities.

9. The results for the foundry data (using the variable definitions and constructions in Table 1) are, first for the unweighted sample and then for the weighted sample:

$$\underset{}{\text{HRS19}} = \underset{(60.9)}{54.7} - \underset{(3.11)}{0.052}\ \text{PURB} - \underset{(0.14)}{0.109}\ \text{SD} - \underset{(1.54)}{1.31}\ \text{DUM} \ ;\ R^2 = 35.5;\ N = 44$$

$$\underset{}{\text{HRS19}} = \underset{(56.3)}{54.8} - \underset{(2.03)}{0.033}\ \text{PURB} - \underset{(0.40)}{0.336}\ \text{SD} - \underset{(2.06)}{1.84}\ \text{DUM} \ ;\ R^2 = 30.9;\ N = 44.$$

Five states had insufficient employment in foundries to be listed in the census.

10. Note that there is no implication that female employees were unconstrained in states with maximum hours legislation, although I have not been able to estimate a decline in their hours (for the female-intensive industry sample) in states with restrictions (an exercise similar to that in Table 1 of the paper). Male-intensive industry hours, however, are lower by 1.5 in states with legislation, consistent with the foundry data.

11. The Women's Bureau did include several states (such as New Jersey and Ohio) which had restrictive hours legislation. These states had requested surveys to assist in evaluating their legislation or formulating minimum wage standards.

12. One problem with making comparisons between the 1919 Census of Manufacturers figure and that of the Women's Bureau Bulletins is that the latter span the period 1919 to 1925. Beney (1936) and others (Historical Statistics, 1975) find, however, that hours were relatively level during the 1920s and declined sharply from about 1914 to 1920.

13. An equation estimated across the 15 states with complete information yields:

$$\log \text{Actual Hours} = \underset{(0.78)}{0.576} + \underset{(4.40)}{0.821}\ \log \text{Scheduled Hours}$$

$R^2 = .598$; $\bar{R}^2 = .57$; t-statistics in parentheses
Source: Table 2

14. The difference between scheduled and actual hours is due to two sets of factors: those affecting the firm, which are a constraint on the individual, and those resulting from individual choices. It seems clear that states with a high percentage of women working in cotton textile mills had shorter work weeks

because of firm closings.

15. It is probably the case that the individuals who reported time in hours were primarily time workers and those who reported time in days were primarily piece-rate workers. The bulletins are not clear on this distinction, but those surveys that requested information on time and piece-rate work contain data that are consistent with this interpretation.

16. The result for New Jersey, for example, is 45.2 hours compared with actual hours of 44.3 per week. A second set of data (not given in the table) demonstrates the same point. Information in the Women's Bureau bulletins indicates that the majority of individuals who worked fewer than scheduled hours lost hours in multiples of the modal daily scheduled hours (or modal Saturday hours) for the state. That is, they did not lose, for example, 3 or 17 hours per week but 6 or 16 hours per week, when modal daily scheduled hours were 10 and modal Saturday hours were 6. Such evidence creates a prima facie case that individuals varied days and not hours.

17. The term $\varepsilon'_m = \varepsilon_{Lm} + \varepsilon_{hm} + (\varepsilon_{Lm} * \varepsilon_{hm})$.

18. The choice of hours per day by these firms will depend on the technology used, in particular the degree of complementarity across types of labor and the cost of idle capital. It will also depend on the distribution across individuals of the cost to them of working.

19. This negative relationship between hours and days worked will only hold within some range. Surely as the given number of hours per day of work gets low enough, some individuals will not find it worth their while to go to work.

20. The notation in the model and the empirical work that follows is almost identical to that in the Landes article. The only difference is that the subscripts 1 and 2 are replaced here by f and m.

21. If hours per day were a choice variable, women could work fewer hours per day and not have to trade-off days per week and hours per day.

22. That is, if $(\varepsilon_f - \beta) + \{\varepsilon_f(\eta + s_m\varepsilon_m - s_f)/\eta\} < 0$, which is needed for L_f to increase with a decrease in h_f, then $\{(\varepsilon_f - \beta) + 1\}$ can be of either sign. The only restriction that can be imposed is that $(\eta + s_m\varepsilon_m - s_f) > 0$, as suggested by Landes from historical evidence.

23. The precise difference is as follows. In the Landes model there is a positive elasticity of male hours per day with respect to the wage rate, ε_{hm}, which is zero in my model because hours per day are exogenous. The requirement in the original model for $dL_f/dh < 0$ is:

$$\varepsilon_f(\eta + \varepsilon_m s_m - s_f) + \varepsilon_f s_m \varepsilon_{hm}(1 + \varepsilon_m) < 0$$

The requirement for $dL_f/dh < 0$ in my model is:

$$\varepsilon_f(\eta + \varepsilon_m s_m - s_f) + \eta(\varepsilon_f - \beta) < 0$$

Thus it is clear that there are weaker restrictions in my model because of the existence of the elasticity of female labor (in days) with respect to hours per day ($-\beta$).

24. The equation is:

$$\log \text{Days} = \underset{(2.66)}{5.41} - \underset{(1.85)}{0.955} \log \text{Scheduled Hours}$$

Number of observations = 10; R^2 = .301; $\bar{R}^2$ = .213; t-statistics in parentheses
Source: Table 2

25. As John Durand noted (1948, p. 118), "The secular decrease in weekly hours of work is perhaps almost as important as the change in occupational composition of the demand for labor, as a factor in the increasing employment of women. The length of the working week is especially important in connection with the availability of married women for jobs."

26. Note that $d(L_f/L_t)/dh_f$ can be < 0 even when $dL_f/dh_f > 0$ in the original formulation of the model. That possibility is less likely to occur in the new version.

27. The dummy variable indicates the passage of the first hours law from 1905 to 1914 and is therefore a less reliable indicator of the level of hours restrictions than is the REST variable.

28. Another set of key estimations in the original paper focused on the impact of hours legislation on the employment share of native-born, foreign parentage women and foreign-born women. The results of these estimations yielded larger and more statistically significant coefficients than in the entire sample. My attempt to replicate these results did not yield significant effects on the key variable, REST. These equations have been estimated across the 41 (non-mountain) states (and D.C.) highlighted in the original article.

Share of Native-White, Foreign-Parentage Women in Manufacturing Labor Force

$$= \underset{(0.92)}{-0.0050} + \underset{(7.52)}{0.692}\ EMP_{-1} - \underset{(0.14)}{0.0007}\ SD + \underset{(2.06)}{0.0002}\ PURB - \underset{(2.55)}{0.0119}\ DUM + \underset{(0.56)}{0.0042}\ REST$$

R^2 = 87.2 ; N = 41 ; Mean of dependent variable = 0.036.

Share of Foreign-Born Women in Manufacturing Labor Force

$$= \underset{(3.12)}{-0.0083} + \underset{(14.6)}{0.669}\ EMP_{-1} + \underset{(1.07)}{0.0028}\ SD + \underset{(4.70)}{0.0003}\ PURB - \underset{(0.68)}{0.0018}\ DUM - \underset{(0.88)}{0.0036}\ REST$$

R^2 = 94.5 ; N = 41 ; Mean of dependent variable = 0.020.

29. Note that the restrictiveness variable is computed for the manufacturing labor force because scheduled hours for mercantile establishments are not available. The Women's Bureau bulletins cited in Table 2 indicate, however, that there was relatively homogeneity within states across manufacturing and

sales hours schedules. Note, as well, that the estimation includes the percentage of sales workers who were female in 1910 rather than the percentage in 1900, as in the manufacturing estimations. While it would have been more appropriate to use 1900, only 1910 data are available for sales workers.

30. The elasticities of labor force participation with respect to mean scheduled hours of work per week in manufacturing for various nativity groups of married and all women in 1920 are:

	Elasticity	t-statistic		Elasticity	t-statistic
Married			All Marital Statuses		
NN	-2.32	(2.58)	NN	-1.24	(2.42)
NF	-3.70	(3.93)	NF	-2.71	(4.07)
FB	-2.33	(2.98)	FB	-2.45	(3.86)

where NN = native-born, native parentage; NF = native-born, foreign parentage; FB = foreign born. Source: Hill (1929). Equations were estimated across the large urban areas of 31 states.

31. The figure for scheduled hours in 1940 is approximate; only data for actual hours are readily available.

32. One finding that is not in dispute is the relationship between the passage of maximum hours laws and union strength, which Landes found to be a prime determinant of the restrictiveness of legislation as of 1914 (using the state's unionization ranking in 1964). My interpretation of this result, however, is that unions were less interested in restricting female employment than they were in reducing hours in all industries, especially male-intensive ones such as lumber and steel.