THE EFFECTS OF MANDATORY MATERNITY AND PREGNANCY BENEFITS ON WOMEN'S WAGES AND EMPLOYMENT IN TAIWAN, 1984–1996

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The Labor Standards Law of Taiwan requires employers to offer maternity and pregnancy benefits. Because these requirements increase the cost to firms of employing young women, standard economic theory predicts that such workers will experience a relative decline in employment, wages, or both. Using data from Taiwan's Manpower Utilization Survey for the years 1978–96, the authors find that in those sectors of the economy covered by the legislation, wages and employment of young women did indeed fall relative to the wages and employment of two comparison groups, young men and older women.

Since the 1960s, Taiwan has had high economic growth, led by labor-intensive, export-oriented industries that rely heavily on cheap unskilled female labor. One reason the country was able to compete effectively in such industries was that young Taiwanese women had traditionally been willing to work for low wages for a few years before marriage. In 1984, however, responding to both external pressure (from trading partners like the United States) and internal political pressure to treat women more fairly, Taiwan adopted the Labor Standards Law (LSL).

Standard economic theory predicts that workers who become more costly to employ will, barring special circumstances, experience reduced employment opportunities, or reduced wages, or both, relative to other workers. In this study we analyze data from Taiwan's Manpower Utilization Survey to investigate whether the LSL had such effects on young women in Taiwan.

How the Labor Standards Law Protects Female Workers

Several provisions of the LSL mainly affect women. First, the LSL requires that a firm pay eight weeks' maternity leave. Full wages are paid if the worker has been employed by the firm for at least six months. In addition to paying full wages during maternity leaves, employers must pay replacement workers, who are likely to have less experience and thus lower productivity than those they replace. Employers no

longer are allowed to terminate workers when they marry or become pregnant.[1] Second, the LSL requires employers to give new mothers two paid half-hour breaks each day to breast-feed the baby until the baby is one year old. Third, employers must switch women to easier jobs during pregnancy if not doing so could be expected to have an adverse effect on the health of either the baby or the mother.

Although a main aim of the LSL is to improve benefits for female workers, there are also provisions in the legislation that apply equally to men and women. Of particular importance, workers cannot be laid off unless the firm closes or suffers severe financial loses. Those who do lose their jobs must be given severance pay.

Coverage of the LSL changed very little from 1984 until 1998. During this period, the industries covered were manufacturing, mining, electricity, construction, transport, and mass media. Coverage was extended to all industries in 1998.

Enforcement

When the LSL first was established, the legislation provided few new enforcement procedures or personnel. The same political pressures that led to the legislation, however, soon resulted in a greater enforcement effort. An enforcement department (CLA) was established in 1987, and enforcement was further strengthened and centralized with the Labor Inspection Law (LIL) of 1993.

Prior to 1993, the CLA could only inspect those firms with more than 100 employees. In addition, it had delegated some of its authority to local authorities, who were not always eager to enforce the LSL. Other problems included too few inspectors with too little training, overlapping jurisdiction of local inspection agencies,

and successful lobbying by local businesses against any significant penalties.

The 1993 LIL regulates all local inspection agencies, which are now under the direct supervision of the central government's inspection system, thus avoiding duplication of effort, reducing the effectiveness of lobbying by local businesses, and sending a clearer message to employers about the need to comply with the LSL.

Theoretical Expectations

Before estimating the effects of the LSL on the wages and employment of young women, we present some theoretical considerations. Summers (1989) claimed that introducing maternity/pregnancy benefits will shift employers' labor demand curve downward by the expected cost of benefits, and that they also will shift the supply curve downward by a similar amount if the new benefits' cost to the employer equals their value to the employee. If the latter is lower than the former, the supply curve will shift by less than the demand curve.

As shown in Figure 1, if wages are perfectly flexible and if female workers value maternity/pregnancy benefits at cost, then the new equilibrium will occur with no change in employment and at a wage reduced by the cost of the benefits, as illustrated at point E. The cost of maternity benefits varies by demographic group, so wage rates will fall the most among groups for whom the cost of expected benefits is high, mainly young women. If women value the mandated benefits at less than their cost to the employer, the wage will fall by less than the cost of the benefits and there will be a decline in employment, as shown by point B in Figure 1. If the wage is rigid, there will be an excess supply of labor at the original wage, leading to a decline in employment and possibly in hours worked per week. The most realistic case probably is the in-between one, in which there is some wage flexibility, but certainly not enough to differentiate at the individual level among workers whose expected benefits may vary considerably in cost. In this case, benefits lead to smaller wage reductions than if

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[1]Before the Labor Standards Law (LSL) passed in 1984, some firms only hired young single women and forced them to resign when they married or became pregnant (Arrigo 1984, 1985).

Figure 1. The Effects of Maternity and Pregnancy Benefits.

Wage

S_0

S_1

S_2

W_0 ----- A

W_1 --- B

W_2 --- E

D_0

D_1

Employment

E_1 $E_2 = E_0$
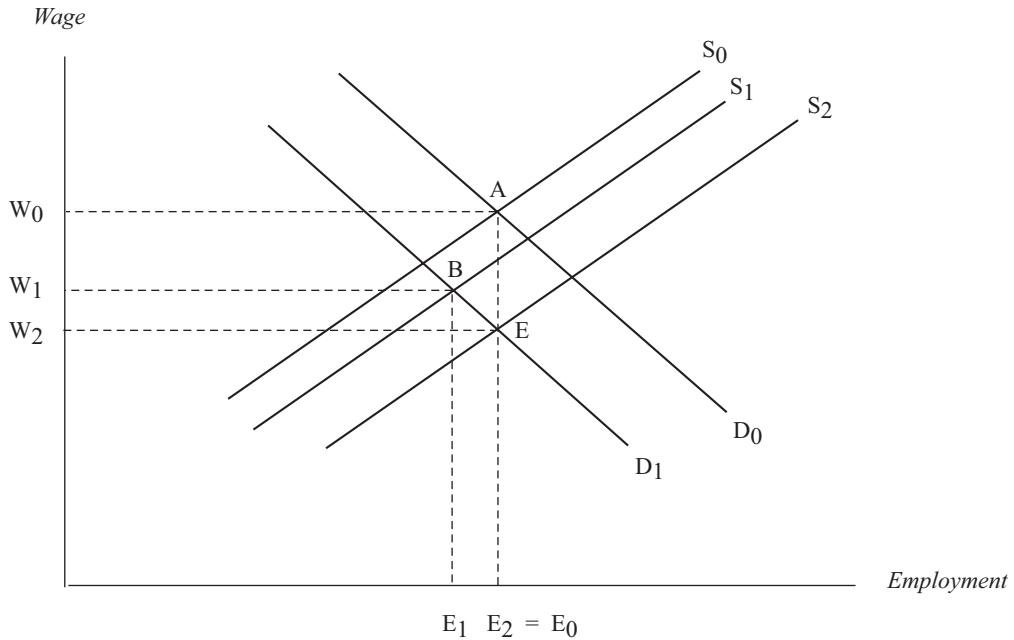
wages were flexible and to employment reductions smaller than if wages were completely rigid.

Data

To estimate the effects of the LSL, we use as our primary data source the Manpower Utilization Survey, a biannual survey of earnings and employment available since 1978. We restrict the sample to nonfarm, full-time, private-sector employees between the ages of 20 and 54, mainly because we want to focus on workers with a strong attachment to the labor force.[2] We use the data from 1978 to 1996, but not beyond, because the LSL was extended to all industries in 1998, thereby making our estimating model invalid starting in that year. When we compare young women to young men, our sample size is 70,815. For the comparison of young and older women it is 51,473.

Estimating Wage Effects

Maternity/pregnancy benefits should have much more effect on young women than on other demographic groups. We assume that other factors, such as changes in product demand across industries, affect young women the same way they affect young men or older women. We also assume that the LSL has little effect on wages

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[2]Farm labor will be less affected than other sectors by the LSL, since most farm laborers are not full-time workers. Because part-time workers do not have any employment protection from the LSL, employers can avoid paying costly maternity/pregnancy benefits by firing these workers when they become pregnant. Self-employed workers pay their own maternity/preg-

nancy benefits. We exclude public-sector workers because the government may not be subject to the same economic pressures as are private-sector employers.

and employment in the noncovered sector. Thus to estimate the effect of the LSL on the wages of young women, we compare post-legislation earnings changes of young women in the covered sector with those of young women in the noncovered sector.

In more technical language, we use a difference in differences in differences (DDD) model to estimate the effects of the LSL on wages. In this model, presented in equation (1), W is the monthly real wage rate, F is a gender dummy variable with a value of 1 for young women and 0 for young men, COVERED is a dummy variable with a value of 1 if the employee works in an industry that is covered by the LSL (or that will be covered by it subsequent to 1984), and YEAR$_i$ is a set of dummy variables for the years 1978 to 1994, with 1984 as the base year. We also include a set of human capital variables as controls. These variables are education, experience (linear and quadratic), tenure (linear and quadratic), and each of these variables interacted with F, the dummy for gender.

The overall effects of gender, year, and industry (including changes in labor demand for workers in these categories) are captured by the variables F, COVERED, YEAR, and the two-way interactions among these three variables. We postulate that the differential effects of gender, for years and industries where the LSL is applicable, should represent the effects of the LSL. Thus the e_i, the coefficients for the three-way interactions, should represent the effect of the LSL. When we compare young women with older women, the model is the same except that we replace F, the dummy variable for gender, with AGE, a dummy variable with a value of 1 for women ages 20–29 and 0 for those 30–54. Note that there will be a different e_i coefficient for each year. We do not believe the LSL should have any effect in 1984, the base year for our YEAR dummies.[3] Thus for each

year after 1984, the corresponding e_i coefficient should give us an estimate of the effect of the LSL on the relative wage rate of young women in that year:

$$(1) \qquad W = a_0 + a_1 F + a_2 \text{COVERED}$$
$$+ \sum_{i=1}^{9} b_i \text{YEAR}_{j(i)} + a_4 \text{HOUR} + a_5 \text{ED}$$
$$+ a_6 \text{EXP} + a_7 \text{EXP}^2 + a_8 \text{TEN} + a_9 \text{TEN}^2$$
$$+ a_{10} F*\text{COVERED} + a_{11} F*\text{HOUR}$$
$$+ a_{12} F*\text{ED} + a_{13} F*\text{EXP} + a_{14} F*\text{EXP}^2$$
$$+ a_{15} F*\text{TEN} + a_{16} F*\text{TEN}^2 + \sum_{i=1}^{9} c_i F*\text{YEAR}_{j(i)}$$
$$+ \sum_{i=1}^{9} d_i \text{COVERED}*\text{YEAR}_{j(i)}$$
$$+ \sum_{i=1}^{9} e_i F*\text{COVERED}*\text{YEAR}_{j(i)} + u,$$

where

$$\sum_{i=1}^{9} b_i \text{YEAR}_{j(i)} = b_1 \text{YEAR}_{78} + b_2 \text{YEAR}_{80}$$
$$+ b_3 \text{YEAR}_{82} + b_4 \text{YEAR}_{86} + b_5 \text{YEAR}_{88}$$
$$+ b_6 \text{YEAR}_{90} + b_7 \text{YEAR}_{92} + b_8 \text{YEAR}_{94} + b_9 \text{YEAR}_{96}.$$

The other summations are defined analogously for both equations (1) and (2).

Wage Rate Effects

The results in Table 1 show the values for the e_i coefficients from equation (1). For different years since the passage of the LSL, these coefficients show the differential effect of being in an industry covered by the LSL on the relative wage rates of young women since the LSL became effective in 1984. In the first column, the comparison is between the wage rates of young women and young men. In the second column, it is between the wage rates of young and older women.

As we can see, from 1986 to 1992 the LSL had an effect of about 4–5% on the wages of young women relative to those of young

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[3]The Labor Standards Law should not have any effect on the 1984 sample, because the survey was completed in May 1984, three months before the Labor Standards Law became effective. Although the

legislation could have effects prior to its effective date, such effects are relatively unlikely in this case, because employers expected little enforcement.

Table 1. Effect of the Labor Standards Law on the Wages of Young Women.

Time Period	Young Women vs. Young Men		Young Women vs. Older Women	
84–86	−0.043	(1.65)*	−0.028	(1.10)
84–88	−0.058	(2.28)**	0.020	(0.86)
84–90	−0.039	(1.54)	−0.032	(1.39)
84–92	−0.054	(2.16)**	−0.013	(0.57)
84–94	−0.108	(4.42)***	−0.042	(1.91)*
84–96	−0.099	(4.02)***	−0.040	(1.82)*

Notes: All estimates are OLS. T-values are in parentheses. The wage results are the coefficients of $F*\text{COVERED}*\text{YEAR}_{j(i)}$, and $\text{AGE}*\text{COVERED}*\text{YEAR}_{j(i)}$ in equation (1). These coefficients indicate how changes in the relative earnings of young women differ in the covered and noncovered sectors for various years since the passage of the LSL in 1984.

*Statistically significant at the .10 level; **at the .05 level; ***at the .01 level.

men, although the results are of marginal statistical significance. For 1994 and 1996, however, the effects are about 10% and are significant at the 1% level. The difference between the results for young women and those for older women is less pronounced, but again is stronger after 1992. In this case the effects in 1994 and 1996 are about 4%, statistically significant at the 10% level. The stronger results starting in 1994 probably reflect the influence of the Labor Inspections Law (LIL), passed in 1993 to improve enforcement of the LSL. The finding of stronger results when the comparison group is young men suggests that the labor of young women is a closer substitute for that of young men than for that of older women, which is plausible if gender roles are less well developed among the young than among older workers. Thus, we believe our results for young women versus young men are our best estimates.[4]

For young women, the direct costs of paid maternity leaves and nursing breaks average about 3% of their wage costs (Lai 2000). The administrative costs may be much greater, especially for hiring and training replacement workers. Therefore our wage

results are not inconsistent with the wage effect being a compensating difference.

Estimating Employment Effects

To estimate the effects of the LSL on employment, we use a model somewhat similar to our wage rate model, but with a dummy dependent variable, EMP, for whether the person is employed in an industry covered by the legislation. We want to see whether young women were less likely to be employed in covered industries after the passage of the LSL than before. We expect such a result because the LSL increased the costs of employing young women, but only in covered industries.

Because EMP is the same as our previous independent variable, COVERED, we cannot use the DDD model of equation (1) to estimate the employment effect. Instead we use the DD model of equation (2). In this equation the employment effect is given by the c_i, the coefficients of $F*\text{YEAR}_{j(i)}$. Controlling for the effect of the other variables, these coefficients indicate the effect of the LSL on changes in the relative employment of women in covered industries.

$$
\begin{aligned}
(2) \quad \text{EMP} = {} & a_0 + a_1 F + a_2 \text{ED} + a_3 F*\text{ED} \\
& + a_4 \text{EXP} + a_5 F*\text{EXP} + a_6 \text{EXP}^2 + a_7 F*\text{EXP}^2 \\
& + a_8 \text{TEN} + a_9 F*\text{TEN} + a_{10} \text{TEN}^2 \\
& + a_{11} F*\text{TEN}^2 + \sum_{i=1}^{9} b_i \text{YEAR}_{j(i)} \\
& + \sum_{i=1}^{9} c_i F*\text{YEAR}_{j(i)} + u.
\end{aligned}
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[4]Our wage variable is monthly earnings, but we control for hours worked per month, so our results should give us the effect of the LSL on hourly wage rates. Also, when we run comparable results for monthly hours, we find no statistically significant effects. In fact, the coefficients are mostly positive.

Table 2. Effect of the Labor Standards Law on Employment.

Time Period	Young Women vs. Young Men		Young Women vs. Older Women	
84–86	0.008	(0.66)	0.013	(1.38)
84–88	−0.007	(0.62)	−0.022	(2.39)**
84–90	−0.018	(1.48)	−0.052	(5.68)***
84–92	−0.022	(1.69)*	−0.063	(6.87)***
84–94	−0.145	(11.51)***	−0.104	(11.51)***
84–96	−0.168	(12.89)***	−0.105	(11.39)***

Notes: All estimates are OLS. T-values are in parentheses. The employment results are the coefficients of $F*\text{YEAR}_{j(i)}$, and $\text{AGE}*\text{YEAR}_{j(i)}$ in equation (2). These coefficients indicate how changes in the relative employment of young women differ in the covered and noncovered sectors.

*Statistically significant at the .10 level; **at the .05 level; ***at the .01 level.

As shown in Table 2, the results indicate that the employment effects initially were very small and statistically insignificant. There were modest effects in the middle of our period (5–6% when the comparison is by age and 2% when it is by gender). Starting in 1994, the employment effects became large and highly statistically significant, with reductions of about 15% when young women are compared with young men and about 10% when the comparison is with older women.[5] One plausible explanation for this decline is the passage of the LIL in 1993, which may have made it more difficult for employers to terminate workers who became pregnant.

Conclusion

Our analysis shows that the Labor Standards Law had statistically significant negative effects on both the relative wages and the employment rates of young women. These effects were most pronounced after passage of the Labor Inspection Law in 1993. Especially in this latter period, the effects were greater on employment than on wage rates, with the relative wage rates of young women most likely declining about 10% and relative employment by over 15%.

A possible alternative explanation for our results is an increase during the 1990s in unskilled temporary-contract foreign workers, who may be better substitutes for young women than for other workers, since most young women have little training. These temporary-contract workers were employed most frequently in labor-intensive export-led manufacturing industries covered by the LSL. Thus it is quite possible that employers were hiring foreign workers to avoid paying for maternity/pregnancy benefits, benefits that had increased the cost of employing young Taiwanese women. If so, then the hiring of unskilled foreign workers was an effect of the LSL. Therefore, even if the increase in foreign workers played an important role, the LSL still would be the main explanation for our results.

The strong effects of the LSL on employment as well as wage rates suggest that the increased costs of employing young women were greater than the decline in their wage rates and that wages were only partially flexible. It also is likely that the value employees placed on the mandated benefits was below their cost to employers. Whereas employees most likely valued both paid maternity leaves and paid nursing breaks, employers bore not only the direct costs of those benefits, but also the admin-

[5]The results in Table 2 all are estimated using OLS, but do not change much if equation (2) is estimated by logit. Similar employment results also were obtained using a model estimated with aggregate data. Results based on these alternative approaches are available from Yu-Cheng Lai on request.

istrative and productivity costs of hiring replacements and switching women to easier jobs during pregnancy. Thus the demand curve shifted by the full amount of the benefits, but the supply curve shifted less, leading to a decline both in the wage rate and in employment.

Contrary to the apparent intent of the legislation, in the short run the LSL has had an adverse effect on the relative economic position of women, since it reduces both their employment opportunities and their average wage rate, even after adjusting for the increase in their maternity/pregnancy benefits. As the LSL expands to cover all industries, its short-run costs are likely to become more pronounced. In particular, young women will no longer have the opportunity to respond to reduced opportunities in the covered sector by simply taking jobs in the uncovered sector.

In the long run, however, the LSL may well lead to a reduction in economic inequality by gender. If the LSL provides greater opportunity and incentive for women to remain employed continuously for long periods, especially with the same employer, it will provide an inducement for women—and their employers—to invest in more human capital. With more human capital, women should attain higher earnings and thus have an incentive to work even more. In this way a dynamic may emerge that could substantially lessen gender inequality in Taiwan.

Appendix Table A1
Variable Definitions and Means

Variable	Young Workers	Female Workers
Dependent Variables		
WAGES: Log of Monthly Real Wage	8.807	8.743
EMP=1: Employees Working in the Covered Industry	0.775	0.755
EMP=0: Employees Working in the Uncovered Industry		
Independent Variables		
F=1: Young Women Ages 20 to 29	0.478	
F=0: Young Men Ages 20 to 29		
AGE=1: Women Ages 20 to 29		0.637
AGE=0: Women Ages 30 to 54		
Dummy Variables for the Following Years:		
$YEAR_{78}$	0.094	0.068
$YEAR_{80}$	0.105	0.081
$YEAR_{82}$	0.104	0.085
$YEAR_{86}$	0.105	0.103
$YEAR_{88}$	0.109	0.113
$YEAR_{90}$	0.100	0.109
$YEAR_{92}$	0.091	0.106
$YEAR_{94}$	0.096	0.117
$YEAR_{96}$	0.086	0.116
ED: Years of Schooling	10.450	9.651
EXP: Potential Experience in Years (AGE−ED−6)	6.548	12.502
TEN: Tenure in Years	2.330	3.329
EXP^2: Experience Squared / 100	0.613	2.784
TEN^2: Tenure Squared / 100	0.096	0.238
HOURS: Log of Monthly Working Hours	5.285	5.273
COVERED=1: Industry Covered by the LSL	0.775	0.755
COVERED=0: Industry Uncovered by the LSL		

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