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Abstract
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Keywords
Compensation Packages, Overtime Hours, Labor Demand

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THE STRUCTURE OF LABOR COSTS WITH OVERTIME WORK IN U.S. JOBS

ANTHONY BARKUME*

The author analyzes employment contract and labor demand models of the Fair Labor Standards Act overtime pay regulation to determine their effects on employers' labor costs. Using National Compensation Survey data to obtain a representative sample of U.S. private-industry jobs, he assesses each model's ability to predict either the adjustment of wage rates if overtime is warranted (the employment contract model) or the probability of using overtime to meet labor demands (the labor demand model). Using quasi-fixed employment costs as independent variables allows for a better accounting of labor demand. He finds that lower wages go hand-in-hand with jobs requiring more overtime work, which indicates that overtime pay regulation influences the structure of compensation.

The overtime provisions of the Fair Labor Standards Act (FLSA) have been an integral part of the regulatory fabric of the U.S. job market for more than seventy years, with the Act requiring firms to pay time and a half to employees who work more than forty hours in a week. Two analytical perspectives dominate studies of the effects of FLSA overtime pay regulation, and each reaches considerably different conclusions about the impact on overtime use and labor costs. The employment contract perspective (e.g., Lewis (1969) and Barzel (1972)) holds that that when workers and firms develop a contract for *total* labor earnings and hours worked, the FLSA overtime pay provisions need not have any effect on overtime use or labor cost. In contrast, the labor demand perspective (e.g., Hamermesh (1993: 44–54)) maintains that the higher "overtime wage" with the required time-and-a-half premium induces firms to reduce overtime use and increases the cost of labor. As shorthand for further discussion, I label the latter analytical perspective the Labor Demand model and the former the Employment Contract model.

Trejo (1991) developed an empirical strategy to compare the strength of the job market outcomes in the context of FLSA regulation using both models. He concluded that the effects on overtime use and labor cost predicted by the Labor Demand model were reduced somewhat—but far from completely—by the labor market forces that the Employment Contract model suggests. In other words, Trejo concluded that though wage rates in otherwise similar

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jobs declined with greater overtime hours, they were not enough to prevent the FLSA overtime provisions from increasing labor costs. Trejo's analysis, however, used only household data that contained no information on a key component of the Labor Demand model: employer's quasi-fixed employment costs, including health insurance, retirement contributions, and other benefits that do not depend on hours worked (see the Appendix for a list of the elements of job compensation used in this study to measure quasi-fixed costs). Ehrenberg (1971) and Ehrenberg and Schumann (1982) provided evidence that quasi-fixed employment costs influence employer overtime choices.

In this paper, I adapt Trejo's methodology to analyze data for a representative sample of jobs in U.S. private industry that include a measure of quasi-fixed employment costs as well as a measure of usual overtime hours for individual jobs. By including a crucial labor demand variable omitted from the Trejo study, I can use these data to provide a more complete documentation of the structure of labor costs with overtime work for the U.S. job market.

In using this more complete data set, I obtain empirical results similar to those of Trejo (1991); I move beyond his findings, however, by showing that the inferences from the results depend upon whether overtime premiums arise naturally without regulation. If these premiums include a market component, then the labor market adjustments suggested by the Employment Contract model necessary to negate the effects of the FLSA time-and-a-half overtime pay requirement on labor costs can be substantially less than Trejo assumed in his analysis of the issue.

FLSA Overtime Provisions: Labor Demand vs. Employment Contract Views

My analysis of the Employment Contract model centers on the employment bargain between the worker and the firm for a combined *package* of labor earnings and hours worked. The FLSA overtime pay provisions need not have any effect on such an employment bargain as long as a straight-time wage rate could be set to accommodate the time-and-a-half overtime pay requirement. For example, if an employment bargain were arranged for 44 hours of work weekly in exchange for $440 weekly (an average wage rate of $10 per hour), FLSA regulation would have no effect on hours of work and labor earnings as long as a straight-time wage of $9.57 was established, since that wage rate would generate about the same weekly labor earnings for the same hours of work in the absence of FLSA overtime pay regulation. Such wage adjustments in response to regulation are not considered in the Labor Demand model. The Employment Contract model also implies that the FLSA overtime pay regulation could reduce the probability of overtime work in jobs paying at or near the minimum wage because a minimum wage prevents the necessary downward adjustment in the wage rate to accommodate payment of the overtime premium while not increasing labor costs.

The Employment Contract model incorporates a worker–firm exchange perspective; it does not, however, consider how FLSA overtime pay regulation influences the firm's choice of capital and labor, nor how the total labor services between the number of workers employed and hours per worker are allocated.[1] The employment contract considerations could imply a lower straight-time wage rate with FLSA overtime pay regulation, yet a time-and-a-half requirement can still increase the overtime wage. In contrast, seen from the perspective of the Labor Demand model, the employer is motivated to minimize labor costs. An imposed overtime wage increases the marginal cost of additional hours per worker beyond the standard work week, which may decrease the probability of the employer needing to use overtime. The substitution that occurs between the number of workers and hours per worker in the Labor Demand model also depends on

[1] Given these differences in perspectives, Trejo (1991) characterized the Employment Contract Model as a "fixed job" analysis because it ignores worker-hour substitution and the Labor Demand Model as a "fixed wage" analysis because it ignores wage adjustments to preserve the employment bargain.

per-worker costs that do not vary, regardless of hours worked, such as those accrued to the employer for employee benefits. Since such quasi-fixed employment costs may be an essential component of the employment bargain characterized in the Employment Contract model, these costs should be accounted for in estimating the relative importance of employment contract and labor demand considerations in the effects of FLSA overtime pay regulation. I discuss this more thoroughly in the next section.

Wage-Overtime Trade-off Test of the Employment Contract Model in Trejo (1991)

Trejo (1991) used cross-sections of household labor force data from the 1970s to test the empirical relevance of the Employment Contract model predictions for the effects of FLSA overtime pay regulation. One of his principal findings was that "straight-time wages adjust significantly but incompletely to the presence of overtime pay regulation [for employment contract considerations to offset the predicted effects of the Labor Demand model]" (p. 735). In this section, I review the methodology that Trejo used to derive this conclusion and identify some problems with his analysis.

Trejo estimated a hedonic wage equation for the straight-time wage rate in jobs covered by the FLSA overtime regulations, W_R, adding to the usual set of other wage-determining characteristics a variable for the share of weekly hours, H, required to be paid as overtime hours:

$$(1)\quad lnW_R = \theta + \Sigma\beta_j X_j + \Phi(H) + \alpha[(H-40)/H] + \varepsilon$$

where X_j is a set of observed wage-determining characteristics, ε is an error term reflecting omitted wage-determining characteristics, and Φ(H) is some function of total hours worked.[2] Trejo argued that the Employment Contract model predicts that the α parameter is negative, with FLSA overtime pay regulation requiring lower straight-time wage rates in jobs with more overtime hours, but with otherwise identical wage-determining characteristics, so that a trade-off between wage rates and overtime hours would be observed in the cross-section data. Furthermore, he proposed that α predicted by the Employment Contract model in (1) should be exactly –0.5, assuming that no overtime premiums would be paid in absence of the FLSA overtime pay regulation (although total earnings and the average wage could depend on total hours worked). Let the relevant wage without overtime pay regulation be W; then, if labor earnings are equal among otherwise identical jobs,[3]

$$(2)\quad W\,H = W_R\,[H + 0.5\,(H-40)]$$
$$\rightarrow \mathrm{Log}(W_R) = \mathrm{Log}\,(W) - 0.5\,[(H-40)\,/\,H].$$

Trejo did obtain negative and statistically significant estimates for α, but these estimates were less than half (in absolute value) of –0.5, ranging from –0.1282 to –0.2448 in different cross-sections of data. He concluded that the FLSA overtime pay regulations do raise labor costs, as predicted by the Labor Demand model, because the reductions in the straight-time wage rate with higher overtime use were substantially less than those he assumed were necessary in the Employment Contract model to neutralize the effects on labor costs from FLSA overtime pay regulation.

There are two problems with Trejo's inferences on the effects of the FLSA overtime pay regulations on labor costs. First, the lack of data on worker quasi-fixed employment costs could have generated an omitted variable bias in Trejo's estimation of α in the wage equation. With the household data Trejo used to estimate (1), firm expenditures for retirement or health benefits that are part of the employment contract would have been included only in the error component ε. If such quasi-fixed employment costs influence the firm's choice of overtime hours, the resulting correlation between ε and the overtime hours share variable would lead to a biased estimation of the α parameter by

[2] Trejo used observations on wages and hours for workers presumed to have been exempt from FLSA overtime provision to identify the **α** parameter in the wage equation (1).

[3] The equivalence in (2) is obtained by noting that 40 + 1.5 (H – 40) = H + 0.5 (H – 40) and using the approximation log [1 + 0.5 (H – 40)] ~ 0.5 (H – 40).

least squares in Trejo's wage equation. For example, if quasi-fixed employment costs are positively correlated with overtime hours and with wage rates, then the estimates of α would be upward biased (less negative).

Second, Trejo's assumption that no overtime premium would be paid without overtime pay regulation relies on a special case of the Employment Contract model. Though the standard work schedule for a job may be different from the typical 40 hours per week, theory and evidence suggests a market premium for overtime work in the absence of overtime pay regulation can arise when overtime work is intermittent. Labor demand fluctuations generate uncertainty in the timing of work, introducing an element of risk to the worker's earnings and to the allocation of time. Barzel (1973: 227–228) used the Employment Contract model to demonstrate that modest fluctuations in labor demand could justify including substantial overtime premiums in the employment contract. In addition, Hart and Ma (2000) showed that establishing an overtime premium in the employment contract can overcome contract inefficiencies in such a work environment. Other research has also documented that overtime premiums do exist in markets without overtime pay regulation. Bell and Hart (2003), for example, analyzed overtime premiums in English labor contracts, which are not subject to overtime pay regulation. In the United States, overtime work given in part-time jobs, such as for extra work hours beyond an eight-hour day, is not subject to FLSA overtime regulation. (For example, in jobs with 4-day standard eight-hour shifts, employers would not be required to pay the overtime premium as long as the overtime hours worked amount to less than 8 hours weekly.) However, several studies have found that a substantial fraction of workers in part-time jobs do receive overtime pay, even though employers are not required to pay it. Trejo (1993, Table 4) found that 1985 U.S. labor force data indicated that about 29 percent of workers with standard weekly hours below 40 received overtime pay. Using U.S. establishment data on overtime pay and provisions, Barkume (2007) found a similar magnitude to what Trejo found; these data revealed that about 28 percent of workers on part-time schedules of 32 hours or less weekly were in hourly jobs that required some usual overtime for which they were paid usual overtime pay.

Using plausible values for a market overtime premium and a standard workweek that could have prevailed in the absence of FLSA overtime pay regulation, the Employment Contract model generates a prediction that is considerably lower in absolute value than Trejo's proposed value of $\alpha = -0.5$. Suppose that the market overtime premium and standard workweek without FLSA overtime pay regulation would have been the same as observed in the U.K. job market, in which Bell and Hart (2003) reported that the mean market overtime premium was 1.28 and the corresponding mean standard workweek was 39.9 hours, about the same as the 40-hour threshold for required payment of overtime in U.S. jobs. Modifying the equal labor earnings condition in (2) to fit this scenario, the predicted value for α in the wage equation (1) would be –0.22. With a 1.28 market premium without regulation, imposing the FLSA time-and-a-half requirement increases the overtime premium by only 22 percentage points and requires less adjustment in the straight-time wage to maintain contracted labor earnings while meeting the time-and-a-half overtime pay requirement.

Research Strategy

To better assess employers' reactions to the FLSA overtime pay regulation predicted by the Employment Contract and Labor Demand models, I obtained 2004 data on quasi-fixed employment costs and overtime use. Including quasi-fixed employment costs in the specification of wage equation (1) allows for a better estimate of the adjustment of wage rates predicted by the Employment Contract model. Moreover, including quasi-fixed employment costs in a study of the incidence of overtime use makes it possible to assess indirectly the predictive of power of the Labor Demand model; that is, the model assumes that the FLSA overtime pay regulation reduces the probability of offering overtime by

increasing the relative price of hours vs. workers.

Ideally, an analysis of these models would recognize interdependencies in the joint determination of the probability of overtime use and hours of overtime use. However, my strategy was to follow Trejo's general research design by conducting separate studies of the incidence of overtime work and the wage adjustment to hours of overtime use. Trejo studied overtime incidence to test the prediction of the Employment Contract model that FLSA overtime pay regulation should reduce the probability of overtime work in jobs paying at or near the minimum wage. He found strong negative effects (ranging from –0.15 to –0.34) on the estimated probability of working overtime among workers earning the minimum wage. The research reported here includes a replication of this analysis as well.

Data on Quasi-Fixed Labor Costs and Usual Overtime Hours

The study uses data from a March 2004 cross-section of the BLS National Compensation Survey (NCS). The NCS, an establishment survey, provides a representative sample of U.S. private-industry jobs and is the source of data for estimation of the BLS Employment Cost Index series. At the initiation of NCS data collection, a BLS field agent draws a sample of multiple jobs within an establishment, collecting information on the sampled establishment (e.g., industry, establishment employment size), as well as various characteristics of the sampled jobs (e.g., straight time wage, job title and description, union status).

Of key importance to the research is that the NCS data can be used to construct job-specific measures of quasi-fixed employment costs. To obtain these measures, I applied a standard taxonomy to job-level information collected in the NCS on the various components of annual employer costs for sample jobs. The Appendix presents the NCS compensation components in this measure of quasi-fixed employment costs.[4] Though the quasi-fixed employment cost measures are used as independent variables in the analyses below, some components of this measure can directly depend on the wage rate (for example, paid leave). Ehrenberg and Schuman (1982) used worker characteristics as instrumental variables to derive exogenous measures of industry-level quasi-fixed employment costs, but the NCS job-level data are not linked to data on worker characteristics.

The NCS collects information on whether sampled jobs have overtime pay provisions and whether overtime work is actually used in a particular job, which allow for direct measurement of the incidence of overtime work. For jobs that do use overtime work, the NCS also collects data on usual annual overtime hours per job, which is a measure of overtime work closer to the concept considered in the Employment Contract model than the overtime hours measure available from the Current Population Survey (CPS). The CPS asks respondents whether they worked overtime hours in the survey week, but because overtime work is intermittent, the measured incidence of overtime work in any week is substantially lower than the incidence of workers that report overtime pay as part of their usual earnings.[5]

NCS data collection does not directly identify whether sampled jobs are subject to FLSA overtime pay regulations, but the set of jobs with overtime pay provisions and a work schedule of exactly 40 hours a week should include most jobs subject to FLSA regulation. The NCS data indicate that relatively few workers (an estimated 600,000 in March 2004) are in jobs that have both overtime pay provisions and weekly work schedules that go beyond 40 hours. Much

[4] In the NCS, no data are collected on training costs but data are collected on hiring bonuses and severance payments. Unemployment insurance payroll taxes are included in the quasi-fixed employment measure because these taxes are levied upon only the first $7,000 of annual earnings in most states.

[5] Using the 2003 CPS Basic Files, I estimate that among all private industry wage earners paid hourly who were not multiple job holders and reporting weekly hours of 40 or more, 9.39 percent reported working overtime in the survey week whereas 18.06 percent reported receiving usual overtime pay.

of this employment is concentrated in transportation industries, in which many jobs are exempt from FLSA regulation because they are separately regulated by the U.S. Department of Transportation.

Table 1 reports some summary statistics on the job characteristics for the cross-section of data for the incidence and wage–overtime trade-off studies. All jobs in the data set have weekly work schedules of exactly 40 hours, but since usual overtime hours and quasi-fixed employment costs are annual measures, seasonal jobs and jobs on academic work cycles were excluded from the analysis. The studies used a sample of 16,219 jobs in 5,574 establishments representing an employment of about 48 million in U.S. private industry in March 2004.6 About three-quarters of the workers were in jobs requiring usual overtime work. The average usual overtime hours was 134.5 hours per year. Quasi-fixed employment costs averaged $8,320 per worker per year.

Incidence of Overtime Use

Using the NCS data on whether overtime hours were worked in jobs with overtime pay provisions, I estimated several models of the probability of overtime use. Following Trejo (1991), I estimated a multivariate logit model that included indicators for the occupation, industry, and other characteristics of the job and the establishment. Further, to exploit the characteristic of the NCS sample design that multiple jobs are sampled from a single establishment, I estimated two models using the establishment as a fixed effect to identify within-establishment differences, a linear probability least squares regression model and a conditional logit model. Conditional logit models differ from conventional logit models in that the data are grouped (here, by establishment) and the likelihood is calculated relative to each group (e.g., see Greene (2003, Chapter 21)).[7] The conditional logit estimates are based on a much smaller sample (3,052 jobs in 859 establishments) since data are not used from establishments where either all jobs require overtime or none does.

The firm's choice of using overtime could be influenced by both labor demand and employment contract considerations. From the standpoint of the Labor Demand model, higher quasi-fixed employment costs should increase the probability of overtime use since the relative price of additional overtime hours is lower, holding the straight-time wage rate constant. Observing the relationship between quasi-fixed employment costs and the incidence of overtime provides indirect evidence of labor demand adjustments to FLSA overtime pay regulation on the extensive margin.

From the perspective of the Employment Contract model, predicted effects on the probability of overtime use from FLSA overtime pay regulation would be limited to jobs with straight-time wage rates close to or at the minimum wage because in those jobs there is a limit to how far the wage rate can adjust downward to accommodate payment of time and a half. However, identifying jobs with wage rates at or very near the minimum wage is difficult in the NCS data because the straight-time wage rates are averages over all workers employed in the job. Within a job where most workers receive the minimum wage, some workers in that job may have higher wages (e.g., those with more job tenure), so the average wage for the job could be above the minimum wage even though most workers in the job do receive only minimum wages. To deal with this problem, I classified as "low-wage jobs" those likely to include workers earning the minimum wage. In states using the Federal minimum wage, "low-wage jobs" were defined as all those with average straight-time wage rates in the range of $5.15 per hour to $6.00 per hour. In the ten states with state minimum wages above $6.00 per hour in 2004, a job was classified as a "low-wage job" if it fell within a wage range of $6.15 to $7.00 per hour. (To control for other particular state influences on overtime incidence, the analysis included individual state location indicators.)

[6] The statistics reported in Table 2 reflect sample weights.

[7] Marginal effects could not be estimated for the conditional logit model. Reported in Table 3 are estimated effects on odds ratios, which do not vary with levels of the variables.

Table 1. Summary Statistics From The National Compensation Survey Used for the Studies, U.S. Private Industry March 2004 Cross-Section

Data Characteristic:	*Summary Statistic*
Sample Size (number of jobs)	16,219
Establishments in sample	5,574
Employment representation (millions of workers)	48.364
Straight–time wage rate (dollars per hour)	14.95 (7.51)
Quasi – fixed employment costs for job (dollars per year)	8,320.53 (7,321.66)
Usual annual overtime (hours per year)	134.5 (150.3)
Paid leave provided in job[a]	0.962
Establishment employment	679.7 (1,940.5)
Union job[a]	0.143
Job pay includes commissions or piece rates[a]	0.046
Job requires usual overtime[a]	0.768
Low wage job[b]	0.018
Low wage job in high minimum wage state[c]	0.006
Usual annual leave (hours per year)	179.6 (85.6)

[a] Fraction of total employment.
[b] Jobs with wage rates between $5.15 and $6.00 in states using Federal minimum wage.
[c] Jobs with wage rates between $6.15 and $7.00 in states with state minimum wage of $6.00 or more.
Source Job-level microdata from BLS National Compensation Survey, March 2004 cross-section; sample restricted to year-round jobs with overtime pay provisions and a 40 standard hour weekly work schedule. Numbers in parentheses are standard deviations.

Several additional job characteristics were used as statistical controls in the analysis, such as indicators for whether the job provided paid leave, whether it was a union job, and whether pay depended on sales commissions and piece rates. Providing leave to workers can increase the costs of coordination of the firm's labor force due to absenteeism. Sales commissions or piece rates may provide the firm substitutes to using overtime premiums as incentives for inducing more labor effort. A measure of the establishment employment size was also included as a statistical control.

Table 2 reports the estimated effects on the probability of overtime use for these job characteristics. The effect of the log of quasi-fixed employment costs is positive and statistically significant in all three models. Also, the estimated marginal effect is similar, about 0.09, whether estimated in the multivariate logit model or in the linear probability model using within-establishment differences. The estimated effect of being in a low-wage job in states using the Federal minimum wage is negative and statistically significant in all three models, consistent with the prediction of the Employment Contract model. In the multivariate logit model—the model closest in form to that which Trejo specified—the estimated impact is at the low end of what Trejo found. The differences in impacts between what Trejo found for the 1970s and those thirty years later could reflect the substantially reduced importance of the minimum wage in employment outcomes, since both the inflation-adjusted value of the minimum wage and the share of wage and salary workers earning the Federal minimum declined substantially over this period.[8] Among the much smaller group of low-wage jobs in states with high minimum wages, none of the estimates is statistically significant.

Except for the indicator of being a union job, all the other job characteristics have statistically significant effects on the probability of overtime use. The effects for provision of paid leave and use of commissions or piece rates are also consistent with a labor demand interpretation. The paid leave provision is associated with a higher probability of overtime use, and commission or piece rate pay in earnings reduces the probability of overtime use.

Wage–Overtime Hour Trade-Offs

Since the results from the incidence study indicate the probability of offering overtime is influenced by quasi-fixed employment costs, the measure was added as an independent variable in the estimation of a wage equation for the wage–overtime hour trade-off study, in order to avoid the omitted variable bias discussed above. My strategy in this study is similar to Trejo's, but I use the NCS data to analyze wage-overtime hour trade-offs between jobs rather than between workers. My analysis assumes markets for a job with a given complex of skills and responsibilities, employed across a range of firms but with wages varying with overtime hours as well as other job and firm characteristics.[9] In this hedonic framework, quasi-fixed employment costs are considered as another job characteristic, even though they may be mutually determined with wage rates. To adapt Trejo's hedonic wage specification given in (1) above to the NCS data, total hours worked (H) was measured as the sum of annual standard (work schedule) hours plus annual overtime hours, minus hours of annual paid leave. (The NCS data include a measure of average annual hours of paid leave (e.g., vacation leave and average use of sick leave) for each sample job.) Denoting standard hours as S, overtime hours as O, and leave hours as L, I estimated the following equation by least squares, allowing for correlation of errors across jobs within an establishment:[10]

$$(3) \quad lnW_i = \theta + \Sigma\, \beta_j X_{ij} + \alpha\left({}^{O_i}/_{S_i+O_i} - L_i\right) + \varepsilon_i$$

One important difference between Trejo's specification of a wage equation in (1) and the specification used for this study in (3) is the absence of a term controlling for the effect of total hours worked on the wage rate (the Φ(H) term in (1)). Although all jobs in the sample have year-round schedules and the same 40-hour weekly work schedule, usual overtime and leave vary across jobs. Trejo identified the overtime share variable by using data on total hours worked for

[8] For example, in 1979 about 4.6 percent of wage and salary workers earned the Federal minimum wage; this percentage declined to 1.6 percent in 2004. See http://www.bls.gov/cps/minimumwage2007.htm.

[9] Kinoshita (1987) constructed a hedonic model of the job market that incorporates the determination of a package of hours and earnings envisioned in the Employment Contract Model.

[10] Equations specifying (O/O+S)) and (L/S) as separate variables were also estimated; the results are very similar to those obtained using (3).

Table 2. Estimated Effects on the Probability Of Overtime Use Among U.S. Private-Industry Jobs, March 2004

Independent Variable	*Multivariate Logit Model*[a]				*Within–Establishment Comparisions*[b] *(Fixed-Effect Models)*			
	Coefficient Estimates		*Marginal Effects*		*Linear probability model, marginal effects*		*Conditional logit model, odds ratios*	
Quasi-fixed employment costs (log)	0.552**	(0.076)	0.088**	(0.012)	0.093**	(0.010)	2.930**	(0.454)
Straight-time wage rate (log)	–0.668**	(0.144)	–0.107**	(0.023)	–0.122**	(0.011)	0.197**	(0.035)
Low wage job in state with Federal minimum wage	–0.810**	(0.348)	–0.159**	(0.079)	–0.084**	(0.032)	0.328**	(0.135)
Low wage job in state with minimum wage above $6	0.608	(0.686)	0.088	(0.079)	–0.057	(0.069)	0.740	(0.764)
Other job and establishment characteristics:								
Paid leave provided in job	0.764**	(0.256)	0.147**	(0.057)	0.211**	(0.042)	2.788**	(1.716)
Employment size of establishment (log)	0.108**	(0.030)	0.017**	(0.004)	[no between–job variance]		[no between–job variance]	
Union job	–0.058	(0.143)	–0.009	(0.023)	–0.021	(0.012)	0.725	(0.171)
Commission or piece rates pay in job pay	–0.046**	(0.149)	–0.081**	(0.041)	–0.080**	(0.019)	0.475**	(0.132)
Sample Size (No. of jobs)	16,166				16,218		3,052	
Adjusted R^2 (LPM); Pseudo-R^2 (logit)	0.118				0.622		0.060	

[a] Model also includes indicators for occupational group (55 categories) of job, state location of establishment, major industry division (8 categories) and whether the establishment is located outside an SMSA.

[b] Linear probability model are least squares estimates; estimates in the conditional logit model are effects on the odds of use of overtime, with statistical significance tests for rejection of the null hypothesis for an odds ratio of one—equivalent to zero effect on probability. In both models, establishment controls are fixed effects for establishment where the job is employed (5,574 establishments in linear probability model, 859 establishments in the conditional logit model).

Other Notes: Job-level microdata from BLS National Compensation Survey, March 2004 cross-section; sample restricted to year-round jobs with overtime pay provisions and a 40 standard hour weekly work schedule. Dependent variable is whether or not job requires usual overtime work, given overtime pay provisions.

**Statistically significant at the 0.05 level.

workers who were presumed not to be covered by FLSA overtime pay regulations; in the seventies, significant fractions of workers in retail trade and services were not covered by the FLSA provisions. Unfortunately, for updating such comparisons in the current labor market, relatively few full-time workers who are paid hourly are now exempt from FLSA overtime coverage.[11]

Without a control for total hours worked in (3), a negative estimate for α could be due to wage rates falling with higher hours, independently of the effect of FLSA overtime pay regulations. To indirectly assess this alternative explanation for a wage–overtime hour trade-off in the data, a wage equation similar to (3) was estimated using data for a set of jobs *without* overtime pay provisions in jobs and having standard-hour work schedules with 40 or more weekly hours. In this data set, the share of "excess" standard hours (standard hours of more than 40 weekly) in total hours worked replaces the overtime share variable in the wage equation. If the "excess hours" variable is statistically significant, then some evidence would exist suggesting that wage rates decline with longer hours of work, independently of the effects of FLSA overtime regulation predicted by the Employment Contract model—at least in jobs without overtime provisions. However, the differences in the statistical results could be due to variations in job characteristics in the two samples. In the sample of jobs without overtime provisions, the mean straight-time wage of $29.22 is about twice the mean wage in the job sample with overtime previsions. Moreover, in this comparison sample, the percent of unionized jobs is very low (1.3%) and the percent of use of commissions or piece rates is very high (17%), relative to the respective values in the sample with usual overtime work shown in Table 1.

Least squares estimates of (3) were obtained separately for each job sample, assuming the hours-worked variable and the error term from the wage equation are uncorrelated, but allowing for the correlation of errors across jobs within the same establishment. The equations included indicators for the specific occupation of the job (six-digit Standard Occupational Classification codes assigned to the job during data collection) as well as the job characteristics summarized in Table 1.

Table 3 summarizes the estimation results for these two sets of jobs. For jobs with long standard hours *without* overtime pay provisions, results show that the estimated effect of the "excess" standard hours variable is neither negative nor statistically significant. In contrast, among the jobs with 40-hour-a-week standard work schedules, usual overtime work, and overtime pay provision, the overtime hours share variable is negative and statistically significant. The estimate of the coefficient using the 2004 NCS data sample is –0.199, similar in magnitude to the coefficients Trejo estimated. In both sets of data, the estimates for the effect of the quasi-fixed employment costs on the straight-time wage rate variable are positive and statistically significant.

Table 4 provides a further analysis of the wage–overtime hour trade-off. I re-estimated the wage equation using the overtime provisions sample after replacing the overtime share variable with a quadratic in usual annual overtime hours[12] to allow the wage adjustment predicted by the Employment Contract model to vary over the distribution of overtime hours observed in the sample. Line 1 of Table 4 gives the estimated log wage differential with a statistically equivalent job without overtime hours. These estimates range from about a 0.3 percentage point lower straight-time wage at the 25th percentile (38.7 hours of annual overtime) to about a 2.8 percentage point lower wage for a job with overtime hours at the 90th percentile of the distribution (292 annual hours).

[11] The proportion of workers exempt from FLSA overtime provisions declined from 34 percent in 1970 to 16 percent by 1989 (Trejo (2003, Table 1)). Since 1989, further reductions of firms in retail sales and services that are exempt from coverage have likely occurred, since exemption for these firms depends on a nominal dollar sales threshold ($500,000 per year) that has remained unchanged over time.

[12] In the quadratic equation, the ratio of leave hours to standard hours is entered as a separate variable.

Table 3. Estimated Effects on Straight-Time Wage Rate Among U.S Private-Industry Jobs, March 2004

Independent Variable	*All jobs with overtime pay provisions and standard hours of 40*		*Jobs without overtime pay provisions, including jobs with long hours*	
Overtime hours as a share of total hours worked[a]	–0.199**	(0.068)	———	
"Excess" standard hours as a share of total hours worked[b]	———		0.073	(0.488)
Quasi-fixed employment costs measure (log)	0.180**	(0.033)	0.332**	(0.020)
Other job and establishment characteristics:				
Establishment employment (log)	0.012*	(0.002)	0.020**	(0.005)
Job provides no paid leave	0.186**	(0.033)	0.634**	(0.136)
Whether union job	0.141**	(0.012)	–0.203	(0.118)
Whether commissions or piece rates used in job pay	0.116**	(0.021)	0.230**	(0.055)
Establishment located outside metropolitan area	–0.076**	(0.014)	–0.050	(0.033)
Sample size (no. of jobs)	16,219		5,509	
Adjusted R^2	0.742		0.651	

[a] Total hours worked = usual annual standard hours + usual annual overtime – usual hours of paid leave.
[b] "Excess" standard hours are usual annual standard hours over 2080.
Other Notes: Job-level microdata from BLS National Compensation Survey, March 2004 cross-section. Jobs with overtime pay provisions have weekly standard hours of exactly 40 hours; jobs without overtime provisions have weekly standard hours of 40 or more. All jobs are year-round jobs. Least squares estimation, using sample weights and allowing for correlation of errors across jobs within an establishment. Data in parentheses are standard errors. Occupational fixed effects are six-digit Standard Occupational Classification codes that are assigned to jobs in data collection (589 occupations in the sample with overtime pay provisions, 363 occupations in the sample without overtime pay provisions). Equations also include indicators for major Census regions, major industry divisions, no usual overtime hours in the overtime provisions sample, and no "excess" hours in the sample of jobs without overtime pay provisions.
**Statistically significant at the 0.05 level.

Lines 2(a) and 2(b) provide predictions of the corresponding log wage differential by the Employment Contract model for the two scenarios for the unregulated overtime premium discussed above. Line 2 (a) shows the predictions for the case of an overtime premium being purely an artifact of FLSA regulation; in this case, the predicted wage adjustments are substantially larger than those estimated. For example, the estimated relative wage differential for jobs with overtime hours at the 90th percentile of the distribution is only about 41 percent of that predicted by the Employment Contract model to offset the impact of the FLSA time-and-a-half premium on labor cost. In contrast, if U.S. overtime premiums had been 1.28 in absence of FLSA overtime

regulations (the mean overtime premium as reported by Bell and Hart (2003) for U.K. manufacturing), the Employment Contract model would predict that much smaller wage adjustments would be needed to accommodate the FLSA time-and-a-half overtime requirement without raising labor cost. The estimated wage differentials on line 1 are about 80 percent of the predicted wage adjustments for this case, shown in line 2(b).

The estimated wage differentials in Line 1 of Table 4 were also used to estimate the cost differential between a job with usual overtime hours and a statistically equivalent job without overtime work, which I will term the "effective" average overtime premium. These estimates, shown in Line 3 of Table 4, indicate how much lower wage rates applied to all hours worked offset the impact of the FLSA time-and-a-half rate applied to overtime hours on labor cost. Let the market wage function be given by $W(O)$ so that for a job with standard hours $\hat{S}$ and overtime hours $\hat{O}$, labor cost is $W(\hat{O})[S + 1.5)(\hat{O})]$, and the ratio of labor cost in this job to a statistically equivalent job without overtime hours is $[W(\hat{O}/W(0)][1 + 1.5)(\hat{O})/\hat{S}]$ The "effective" average overtime premium, $\overline{K}$, for this labor cost differential satisfies the condition:

$$(4) \qquad [W(\hat{O})/W(0)]\ [1 + 1.5(\hat{O}/\hat{S})] = 1 + \overline{K}\ (\hat{O}/\hat{S}).$$

The estimates of $\overline{K}$ shown in Line 3 of Table 4 were derived using the estimated wage differentials for $[W(\hat{O})/W(0)]$ in Line 1. The estimate for the "effective" overtime premium for jobs with median usual overtime hours is about 1.31 and declines slightly with higher levels of usual overtime. The small estimated wage differentials with overtime use estimated in line 1 are consistent with the estimates for the "effective" premium being substantially lower than the mandated time-and-a-half requirement because lower straight-time wages in jobs with overtime hours apply to all hours worked whereas overtime hours are a relatively small proportion of all hours worked in most jobs.

Conclusions

Using a representative sample of jobs for the U.S. job market, I find evidence for the proposition that one reaction to FLSA overtime pay regulation is to lower the straight-time wage rate in jobs with usual overtime work in order to offset the impact of the imposition of the time-and-a-half requirement for overtime pay on labor cost of a given employment contract. In jobs at or close to the minimum wage, I find a lower incidence of usual overtime use. This result is consistent with the view that the minimum wage prevents the downward adjustment in the wage rate that may be necessary to provide the package of total earnings and hours worked in the employment contract. Further, as the Employment Contract model predicts, when a market-based overtime premium is lower than the FLSA time-and-a-half requirement, I find that straight-time wage rates fall with more hours of overtime among 40-hour-a-week jobs. Using a plausible scenario for the overtime premium and standard work hours in the absence of the FLSA overtime pay regulation, I show that the estimated wage adjustments would be about 80 percent of the wage adjustments predicted by the Employment Contract model to completely offset the effects of FLSA overtime pay regulation. A conclusion about the quantitative importance of these employment contract effects, however, depends on what overtime pay would be in absence of regulation. Trejo (1991) estimated wage differentials with overtime work similar to those found in this research but, assuming that overtime premiums are only an artifact of regulation, he concluded that employment contract effects are much less important.

I also find new evidence for the relevance of the Labor Demand model, showing that higher quasi-fixed employment costs increase the probability of whether overtime is offered. The relative strength of this effect is similar when comparing jobs either across establishments or within the same establishment. Just as they do with the overtime wage, quasi-fixed employment costs determine the relative price of workers

Table 4. Comparison of Estimation Results with Alternative Predictions of the Employment Contract Model and Estimation of the "Effective" Overtime Premium with Estimated Wage Differentials

Estimate	*Usual Annual Overtime Hours in Job*				*(Percentile in Distribution)*			
	38.70 (25th percentile)		92.16 (50th percentile)		183.92 (75th percentile)		292.04 (90th percentile)	
1. Log wage differential relative to a no-overtime job[a]	–0.0034**	(0.0017)	–0.0081**	(0.0039)	–0.0158**	(0.0073)	–0.0247**	(0.0107)
2. Predicted impact of FLSA overtime regulation by Employment Contract Model for case of:								
(a) No overtime premium and standard hours equal to total hours worked without FSLA	–0.0091		–0.0210		–0.0398		–0.0597	
(b) 1.28 overtime premium and 40 hour standard workweek without FLSA[b]	–0.0041		–0.0097		–0.0194		–0.0308	
3."Effective" average overtime premium, given estimated wage differentials with overtime[c]	1.311		1.306		1.299		1.290	

a Cost differential with quadratic estimation in straight-time wage rate relative to a job with no usual overtime hours with the same job and establishment characteristics.
b Mean employment contract provisions in the United Kingdom reported by Bell and Hart (2003).
c Derived by applying equation (4) in the text to the estimated wage differentials in Line (1).
Other Notes: Job level microdata from BLS National Compensation Survey, March 2004 cross section; sample of year-round jobs with exactly 40 weekly standard hours and overtime pay provisions (N = 16,166 jobs). Estimation replaces in the specification given by equation (3) in the text the share of overtime hours with a quadratic function of usual annual overtime hours and a ratio of paid leave hours to standard hours. Data in parentheses are standard errors.
**Statistically significant at the 0.05 level.

and hours in the Labor Demand model. These findings suggest adjustments on the extensive margin by firms to reallocate labor services between workers and hours in response to differences in the relative price of workers and hours. Such adjustments are not considered in the Employment Contract model.

A 2004 change in FLSA overtime pay regulation, the Department of Labor FairPay Initiative,[13] may provide an opportunity to assess further the relevance of the two models, avoiding assumptions about what the overtime premium would have been in absence of legislation. White-collar workers (workers in executive,

[13] For more background on the FairPay Initiative, visit: http://www.dol.gov/esa/whd/regs/compliance/fairpay/main.htm on the Department of Labor web site.

administrative, professional, and computer-related occupations) can be exempt from FLSA overtime pay regulation by meeting a specific "duties" test, although such an exemption option can only be used if weekly earnings exceed a certain dollar threshold. The FairPay Initiative substantially increased the dollar earnings threshold below which the "duties" test could not be applied, thus extending overtime pay coverage to workers with earnings under the new threshold. The Department of Labor estimated that as many as 6.7 million additional workers in 2004 (primarily assistant managers in retail and service establishments) would be affected by this regulatory change.[14] For the workers subject to these changes, the Labor Demand model would predict an increase in labor earnings and reduced overtime use.[15] In contrast, the Employment Contract model would predict no change in earnings or hours worked, since this model assumes that the employment contract had already reflected the agreed-upon package of earnings and total hours worked prior to the change in regulations.

[14] Economic Report on 29 CFR Part 541, Department of Labor, Federal Register, April 23, 2004, p. 22191.

[15] The Department of Labor (implicitly relying on the Labor Demand model) estimated an increase of $375 million in overtime payments as a result of the regulatory change. See footnote 13.

Appendix
Components of Quasi-Fixed Employment Costs Measure

Vacation and Holiday Paid Leave	Health Insurance
Paid Sick Leave	Life Insurance
Other Paid Leave (e.g., for jury duty)	Sickness and Accident Insurance
Shift Differential Payments	Long-Term Disability Insurance
Bonuses unrelated to worker hours or output	Defined Benefit Retirement Contributions
Severance Payments	Federal, State Unemployment Insurance taxes
Supplemental Unemployment Insurance	

Notes: Employment cost components are data elements in the estimation of the BLS Employer Costs for Employment Cost (ECEC), derived from the National Compensation Survey. Expenditures for benefits are employer contributions only.

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