NBER WORKING PAPERS SERIES

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Working Paper No. 3883

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
October 1991

September 22, 1991. This paper is part of NBER's research program in Labor Studies. Any opinions expressed are those of the authors and not those of the National Bureau of Economic Research.

NBER Working Paper #3883
October 1991

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ABSTRACT

This paper examines the role that work incentives play in the determination of work hours. Following previous research by Lang (1989), we use a conventional efficiency wage model to analyze how firms respond to worker preferences regarding wage-hours packages. We find that when workers are homogeneous, the role of worker preferences in determining work hours is similar to the simple neoclassical model of labor supply. For instance, if worker preferences shift in favor of shorter hours, firms will respond by offering jobs entailing shorter hours.

When workers have heterogeneous preferences, however, employers will want to use a worker's hours preferences as a signal for the responsiveness of the worker to the work incentives used by the firm, and workers in turn may not reveal their hours preferences. Our key finding in this instance is that the labor market equilibrium may be characterized by a sub-optimal number of short-hour jobs. This shortage of short-hour jobs is likely to be found in high wage labor markets.

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1. Introduction

Female labor force participation has increased dramatically over the past three decades. Much of this change is due to the increased participation of married women and women with children.[1] In households where both adults participate in the labor force, or where there is a single working parent, individuals will often have greater demands on their time at home and may therefore desire patterns of work hours that differ from other workers. Given the gender based division of labor in most American households, many of the women entering the labor force may prefer shorter (and perhaps more flexible) work weeks.[2] Furthermore, as sex roles adjust to accommodate the changing work and career aspirations of women, it is reasonable to expect that increasing numbers of men will also prefer shorter work weeks. The prospects for equality of economic opportunity between men and women rest in large measure on how well and how rapidly labor markets accommodate the hours preferences of workers who desire this flexibility.

In this paper we ask whether labor markets will provide the optimal number of short-hour jobs in response to an increase in demand for short hours on the part of employees. According to the simple textbook model of the determinants of work hours, the answer to this question is clearly yes. Firms have an incentive to elicit information about their hours preferences because this allows them to offer labor contracts that minimize cost. Similarly, workers have an incentive to reveal their preferences to firms because this information is used to construct wage and hours packages in which workers are asked to work the utility maximizing number of hours at the market-clearing wage.

In this paper we suggest that labor market outcomes may be considerably more complex in a setting where firms rely on work incentives to regulate the effort exerted by employees.[3] We find that in a simple efficiency wage model (along the lines of Shapiro and Stiglitz [1984] and Bowles [1985], but with a heterogeneous work force) workers' hours preferences may provide an indicator of their responsiveness to the work incentives. In this setting employers will in general not be able to elicit accurate information about hours preferences from employees. We show that this market failure may lead in turn to labor market equilibria which are characterized by an underprovision of short-hour jobs. We find further that the shortage of short-hour jobs most likely occurs in high wage labor markets.

Our model suggests that the simple textbook analysis of hours determination relies upon the wrong market metaphor. The conventional approach presumes that the determination of work hours is similar to the determination of car colors. Workers have an incentive to reveal their true hours preferences and employers have an incentive to solicit these preferences for the same reason that consumers have an incentive to reveal their color preferences and car makers have an incentive to solicit these preferences.

In our view, a more appropriate market metaphor for hours determination is the market for health insurance. Employees have an incentive to portray themselves as desiring long hours for the same reasons that purchasers of health insurance will want to portray themselves as having no health problems. Insurance providers must be concerned about the unobservable characteristics of individuals who are attracted to the various insurance contracts they offer. We suggest that employers face similar concerns when offering wage and hours packages.

The paper proceeds as follows: In the next section (section 2), we analyze the determination of wages and work hours when firms use dismissal threats to motivate a homogeneous group of workers. Section 3 examines the case where workers have heterogeneous preferences with respect to hours of work. In Section 4, we consider whether our argument about a shortage of short-hour jobs can be reconciled with the rapid growth of part-time work observed in the United States since the 1950's. Section 5 provides concluding remarks.

2. Wages and Hours with Homogeneous Workers

2.1. A Simple Model of Work Incentives

In this section, we develop a model in which firms uses dismissal threats to regulate the intensity with which their employees work. Models based on dismissal threats are analytically convenient and match nicely with the employment-at-will legal doctrine that governs labor law in the United States. However, the logic of our argument would not be appreciably altered if incentives revolved around promotion probabilities rather than separation probabilities.

The setup is quite simple. The economy is composed of a large number of firms each making use of the same concave production technology, such that the demand for labor is an inverse function of unit labor cost.

In each period there is a flow of identical workers into the labor market. These workers form queues at the firms, which in turn select workers from their own queue. Worker who are hired remain with the firm until they retire or are dismissed for working at low intensity. We assume that workers who are not hired when they first join the labor force will drop out of the market, and we similarly assume that workers who retire or are dismissed do not seek re-employment with other firms.[4]

Workers in any period derive utility from income, the level of work effort, and leisure. Workers can adopt two levels of intensity, "high" or "low". A worker providing the lower level of effort is said to be "shirking." Let $U^s(y,N)$ be the utility in any period of a worker who is shirking at a job paying income y with N hours of work. Similarly, let $U^n(y,N)$ be the utility of a worker who is not shirking. Incentive problems arise because

$U^s(y,N) > U^n(y,N)$.

Firms will attempt to get employees to work at the high level of work intensity by dismissing those workers found to be providing the low level of intensity. These shirking workers are detected and dismissed in any period with probability D.[5] Under the assumption that employers learn about employee behavior by observing them on the job, D is a function of N, with $D(0) = 0$ and $D' > 0$.

For convenience, we abstract from issues relating to pensions and rising wage-tenure profiles by stipulating that workers are infinitely lived and that wages in each period are the same.[6] We also assume that the probability a worker retires, q, is the same each period. Under these conditions, the discounted present value of employment for a worker producing at the high level of work intensity is

$$V^n = U^n + \frac{(1-q)V^n}{(1+r)} + \frac{qV^u}{(1+r)}, \tag{1}$$

where r is the discount rate and V^u is the discounted present value of leaving the current job (i.e., V^u is the present value of the flow of utility when both y and N are 0).

In contrast to non-shirkers, shirking workers can be dismissed when they are discovered working at the low level of work intensity. The expected discounted present value of lifetime utility for a shirking worker is

$$V^s = U^s + \frac{(1-q)(1-D)V^s}{(1+r)} + \frac{[1-(1-q)(1-D)]V^u}{(1+r)}. \tag{2}$$

A rational worker will not shirk when $V^n \geq V^s$. Let U^u be the utility derived from a single period of full time leisure. Using equations (1) and (2) we notice that workers will not shirk as long as,[7]

$$U^n - U^u \geq \Gamma,$$

where

$$\Gamma = \frac{(U^s - U^n)(r+q)}{(1-q)D}. \tag{3}$$

The term Γ is the minimum value of the difference between current utility of employment and unemployment that is required to assure no-shirking. Since this "employment rent" is always positive, the utility of employment at the high level of work intensity exceeds the utility of not working for the marginal worker. Assuming that the no-shirking condition represents a binding constraint in the market, there will be workers who cannot find employment.[8]

2.2. Determining Hours of Work

In the absence of fixed employment costs, cost minimizing firms will set hours, N, so as to minimize the wage that assures no-shirking. Consider the case where utility from working N hours at wage w for a shirking and non-shirking worker is given, respectively, by the following simple quasi-linear form:

$$U^s = wN - e_s(N) + \mu g(N),$$

and

$$U^n = wN - e_n(N) + \mu g(N), \tag{4}$$

where wN is the utility of income, $g(N)$ is the utility derived from leisure ($g' < 0$, $g'' < 0$), μ is a positive parameter, and $e(N)$ is the disutility of work effort. For both shirking and non-shirking workers, $e(0) = 0$, $e'(N) > 0$ and $e''(N) \geq 0$, and since working at the higher level of effort is distasteful, $e_n(N) > e_s(N)$. With this utility function, the no-shirking condition becomes

$$wN - e_n(N) + \mu g(N) - \mu g(0) \geq \Gamma, \tag{5}$$

with

$$\Gamma \equiv \frac{(r+q)E}{(1-q)D},$$

and

$$E = e_n(N) - e_s(N).$$

By examining the derivative of equation (5) we find that firms will be paying the minimum wage consistent with no-shirking when they set hours such that

$$w - e_n' + \mu g' = \Gamma_N, \tag{6}$$

where

$$\Gamma_N = \frac{(r+q)E'}{(1-q)D}\left(1 - \frac{D'/D}{E'/E}\right).$$

The terms on the left-hand side of equation (6) represent the utility of income generated from an additional hour of work (w) adjusted for the disutility of work effort ($-e_n'$), and the utility lost from giving up an hour leisure ($\mu g'$). For any given wage, the worker will be maximizing utility when he or she works the number of hours for which the sum of these terms is zero.

The wage and hours package offered by firms will entail the utility maximizing number of hours only when the employment rent is invariant with respect to hours, i.e., when $\Gamma_N = 0$.[9] While it is in principle possible that Γ_N will be zero, it also possible for $\Gamma_N > 0$. When this happens, the employment rent increases with work hours and firms offer a wage and hours package such that the effort-adjusted marginal utility of income exceeds the marginal loss of utility from giving up leisure. Employees accepting this wage-hours package will therefore perceive themselves to be hours constrained.[10]

For our purposes, the central question is how labor markets will respond when worker preferences shift in favor of shorter working hours. Let (w_0, N_0) be the cost minimizing wage and hours package. Differentiating the no-shirking condition (5) and first order condition for cost minimization (6), and assuming that the second order condition holds for the minimization problem, it is easy to demonstrate that

$$\frac{dw_0}{d\mu} = \frac{g(0) - g(N_0)}{N_0} > 0, \tag{7}$$

and

$$\frac{dN_0}{d\mu} = \left[\frac{d^2 w}{dN^2}\right]^{-1}\left[g' - \frac{dw_0}{d\mu}\right] < 0. \tag{8}$$

The result given by expression (8) is not surprising. As μ increases so does employees' marginal utility of leisure relative to income. Since firms prevent shirking by offering a wage-hours package that is attractive to workers, firms will want to respond to this shift in preferences by offering jobs entailing shorter hours. The result that $dw_0/d\mu$ is positive (equation (7)) also has a strong intuitive appeal. The effectiveness of dismissal threats rests on denying shirking workers access to high future income streams. Since an increase in μ corresponds to an increase in the value workers place on leisure relative to income, a higher income stream (and therefore a higher wage) is required to assure no-shirking.[11]

Our findings suggest that when the work force is homogeneous, firms using efficiency wage incentive schemes will respond to a change in employee preferences favoring shorter hours by offering wage-hours packages entailing both shorter hours and higher wages. Nonetheless, jobs may be characterized by hours constraints, and individual workers may not perceive themselves to be working optimal hours.

3. Wages and Hours with Heterogeneous Workers

3.1. Work Hours as a Signal

We turn next to the analysis of incentive schemes firms use when employees have heterogeneous preferences. We focus our attention on the wage-hours packages firms offer when individual workers have different values of μ, i.e., differing marginal rates of substitution between leisure and income.

In the preceding section, we notice that workers desiring short hours (i.e., workers with high values of μ) will require a higher wage to assure no shirking. If worker preferences are known to firms, firms will clearly choose not to hire the more expensive short-hour workers. If worker preferences are not apparent to firms, however, this simple outcome may not be possible. Employees, fearing the consequences of the signal they are sending by asking to work a given number of hours, will not reveal their true hours preferences to their employers.[12]

In sections 3.2 and 3.3 below we explore the implications this market failure has for the ability of markets to respond to the preferences of workers desiring short hours. To highlight the role played by the unobservable (to the firm) worker heterogeneity, we assume in what follows that the probability of dismissal, D, and the single period utility gain from shirking, E, are linear functions of N such that $D = dN$ and $E = eN$. As noted in footnote 9, $\Gamma_N = 0$ in this case, and thus no hours restrictions would emerge if workers were homogeneous.

3.2. Pooling and Separating Contracts

We consider a labor force with two types of workers, type S and type L. These workers are identical in all respects except that $\mu_S > \mu_L$. Note that type S workers will, at any wage, prefer shorter hours than type L workers; we refer to type S and L workers as, respectively, short- and long-hour workers. Let θ represent the proportion of short-hour workers in the population.

We suppose that firms independently name contracts that they always proceed to honor. These contracts specify wages and hours available to employees, and always stipulate that workers who provide the low level of effort will be dismissed if detected. As we proceed, we will assume, for simplicity, that shirking workers produce zero output.

The presence of two types of workers leads firms to offer one of two types of employment contracts, "pooling contracts" or "separating contracts." Under a pooling contract, a firm offers a single wage-hours package to all workers. In principle, this contract could be a "long-hour" or "short-hour" pooling contract — formed to meet the no-shirking conditions of either long- or short-hour workers. In the long-hour pooling contract, a firm would offer to all employees the minimum cost wage-hours package necessary to elicit the high level of work effort from long-hour workers. In the short-hour pooling contract, a firm would offer employees the minimum cost wage-hours package necessary to elicit the high level of work effort from short-hour workers. However, short-hour pooling contracts will always be at least as expensive as the separating contracts we discuss in the following paragraph.

In analyzing pooling employment contracts we therefore need only concern ourselves with long-hour pooling contracts.

Under long-hour pooling contracts (henceforth, simply "pooling contracts"), long-hour workers provide high levels of work effort, while short-hour workers shirk. For a firm that wants to prevent shirking among *both* types of workers, the cost minimizing strategy is to specify a contract allowing workers to select either a long- or short-hour option. We refer to such contracts as "separating contracts." Under a separating contract, the firm's objective is to offer the minimum cost wage-hours packages subject to the constraints imposed by the no-shirking conditions.

A final type of contract that could arise might be termed a "screening contract." Under this contract a firm would offer a wage and hours package with very long hours, so that short-hour workers would find the positions less attractive than the alternative of unemployment. These workers would thus be effectively screened out of the labor force. For a screening contract to be effective, the wage and hours package must not only be sufficiently unattractive to short-hour workers, but must also meet the no shirking condition for long hour workers. Screening contracts will not always be feasible, and where they are feasible they may be more expensive than the pooling or separating contracts. In the present analysis we will assume that screening contracts are not a viable option to firms. Thus firms will restrict attention to two types of contract — pooling contracts and separating contracts. We procede by describing first the pooling contracts, then the separating contracts.

Pooling Contracts: With a pooling contract, an employer offers all workers the wage-hours package designed to prevent long-hour workers from shirking. Short-hour workers hired under this contract shirk, and the resulting dismissals increase the exit rate of short-hour workers. Thus, the proportion of short-hour workers in the population, θ, exceeds the proportion of short-hour workers who are employed in firms offering a pooling contract, θ_P.

It is straight forward to demonstrate that in a steady state the following relationship holds:

$$\theta_P = \frac{q\theta}{q + (1-\theta)(1-q)D}. \tag{9}$$

It is clear that $\theta_P \leq \theta$, with the equality holding only when θ equals zero or one. For future reference it is also worth noting that θ_P is a monotonically increasing function of θ.

Due to shirking, the average productivity of the short-hour workers is less than the long-hour workers. Here we are assuming shirkers produce zero output. Thus, in an equilibrium in which all firms offer pooling contracts, the per unit labor cost will be $w_0/(1-\theta_P)$, where w_0 is the minimum wage consistent with no-shirking on the part of long-hour workers. Using (9) we can express unit costs in this case, C^p, as a function of the proportion of short-hour workers in the population, θ:

$$C^p(\theta) = w_0 \left[1 - \frac{q\theta}{q + (1-\theta)(1-q)D}\right]^{-1}. \tag{10}$$

Notice that unit labor cost in the pooling equilibrium is an increasing function of θ.

Separating Contracts: Firms may alternatively offer a separating contract in response to worker heterogeneity. The problem for the firm is to construct wage-hours packages, (w_S, N_S) and (w_L, N_L), such that the package taken by any worker will meet that worker's no-shirking condition. Suppose that for a firm offering this separating contract, θ_S is the proportion of the short-hour workers. Then the formal cost minimization problem is,

$$\min \left[\frac{\theta_S w_S N_S + (1-\theta_S) w_L N_L}{\theta_S N_S + (1-\theta_S) N_L}\right], \tag{11}$$

subject to binding no-shirking condition for the type S worker,[13]

$$w_S N_S - e N_S + \mu_S g(N_S) \geq \Gamma + \mu_S g(0), \tag{12}$$

and the constraint that type L workers prefer the (w_L, N_L) package,

$$w_L N_L - e N_L + \mu_L g(N_L) \geq w_S N_S - e N_S + \mu_L g(N_S). \tag{13}$$

For a concrete example, suppose that the utility for leisure is a simple quadratic term, $g(N) = -N^2$. For ease of notation we let $\mu_L = 1$ and note that μ_S must then exceed unity. After several algebraic steps, we find that a firm's minimum unit labor cost when offering a separating contract is

$$C^s(\theta_S) = e + 2\Gamma^{\frac{1}{2}} \left[\frac{\mu_S - (1-\theta_S)}{\theta_S + (1-\theta_S)(\mu_S - 1)}\right]^{\frac{1}{2}}. \tag{14}$$

The hours offered to short- and long-hours workers respectively are

$$N_S = \frac{C^s - e}{2\left[1 + \frac{(\mu_S - 1)}{\theta_S}\right]}$$

and

$$N_L = \frac{C^s - e}{2}. \tag{15}$$

Figure 1 illustrates such a separating contract. In this figure, NSC_S and NSC_L represent the no shriking conditions for short- and long-hour workers, respectively. Firms offer a wage-hours package, (w_S, N_S), that attracts short-hour workers, and meets their no shirking constraint. Also offered is a package, (w_L, N_L), with hours and wages that are as attractive to long-hour workers as the short-hour package.[14]

An important feature of the separating contract is that the labor cost for a firm adopting the separating equilibrium, $C^s(\theta_S)$, depends crucially on the mix of the two types of workers. As the proportion of type S workers (θ_S) approaches 0, the labor cost approaches

$$C^s(0) = e + 2\Gamma^{\frac{1}{2}}, \tag{16}$$

which, it can be shown, is simply the minimum no-shirking wage for the long-hour workers, w_0. Unit labor cost is strictly increasing in θ_S, and as θ_S approaches 1, labor cost converges to the minimum wage that solves the no-shirking constraint for short-hour workers,

$$C^s(1) = e + 2(\mu_S\Gamma)^{\frac{1}{2}}. \tag{17}$$

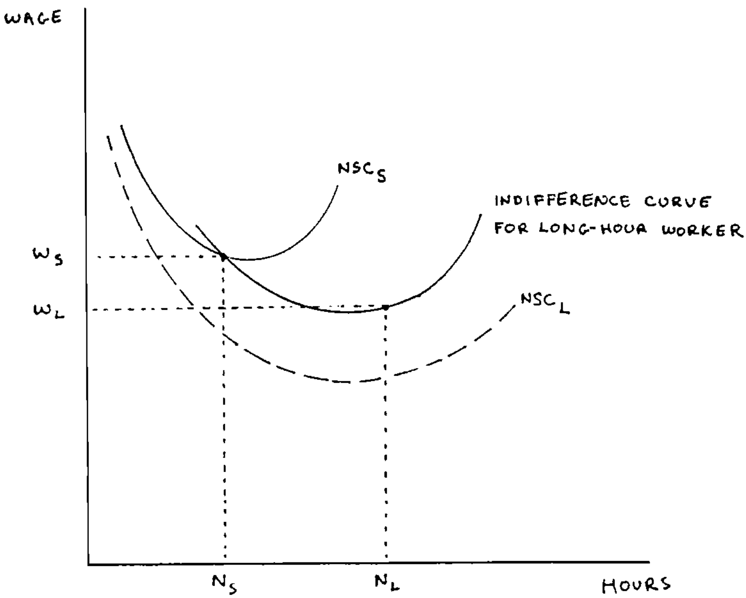

FIGURE 1. A SEPARATING CONTRACT

3.3. The Provision of Short Hour Jobs

Our central concern in this paper is analyzing the response of labor markets to an influx of workers desiring short hours. Beginning with a labor market composed entirely of long-hour workers, we explore how the wage-hours packages offered by firms change as we increase the number of short-hour workers. Our focus will be on steady states.

As outlined above, all firms must choose between naming pooling contracts in which some fraction of employees will shirk, or separating contracts in which all workers are given wage-hours packages that induce no-shirking. In deciding which strategy to pursue, firms will compare the costs of pooling and separating contracts. The cost of each contract for any firm depends in turn on the composition of workers in that firm's job queue.

Recall that we have assumed that workers who enter the labor force form queues at each firm, and when hiring, a firm selects at random workers from its own queue. A worker cannot at any time be in more than one queue. We assume that workers choose which queue to join based on the contracts named by the prospective employers. More precisely, under our assumption that individuals maximize expected utility, a worker's decision to join a job queue is based upon the expected utility of the job and the probability of being hired into the job out of the queue. This latter probability is determined by the number of vacancies to be filled and the number of workers in the queue.

With this in mind, suppose a firm is considering a switch from offering the pooling labor contract to a separating labor contract. As we have seen, the cost of labor in the separating contract will hinge on the mix of workers the firm attracts, θ_S. In turn, the proportion of short-hour workers in any firm depends on the actions of other firms in the market. In a market in which all firms are offering only long-hour jobs, a firm that deviates from the market by offering a mix of short- and long-hours jobs will generally attract a disproportionate number of workers who prefer short-hour work. Indeed, such a firm may well attract only short-hour workers.

The process we describe can easily lead to a sub-optimal market equilibrium. In particular, an equilibrium can persist in which individually optimizing firms offer pooling contracts, even though a switch by all firms to separating contracts would (i) reduce unit labor cost and thus lead to higher labor utilization, and (ii) increase wages and utility of employment for all workers.

To establish this result, we examine first the decision of a firm considering the shift from a pooling contract to a separating contract. The firm will pursue this option only if the shift reduces unit labor cost, i.e., if $C^s(\theta_S) < C^p(\theta)$. Suppose that a firm offering a separating contract attracts exclusively short-hour workers.[15] In this case, the firm will prefer the separating contract if

$$C^s(1) < C^p(\theta). \tag{18}$$

Using (10) and (17), expression (18) can be rewritten to show that the firm will offer the separating contract only when θ is such that

$$e + 2(\mu_S\Gamma)^{1/2} < (e + 2\Gamma^{1/2})\left[1 - \frac{q\theta}{q + (1-\theta)(1-q)D}\right]^{-1} . \tag{19}$$

The right-hand side of (19), the unit cost of offering a pooling contract, is increasing in θ, and approaches infinity as θ tends toward one. Thus, when the workers who prefer short hours constitute a large enough group in the labor force, the firm will always find it profitable to offer short-hour positions. On the other hand, if the fraction of type S workers in the population is small enough (i.e., θ close to 0), inequality (19) cannot hold. In this case, no firm will be inclined to deviate from the norm of offering only long-hour positions.

Notice, however, that if *all* firms in the market were to switch from offering pooling to separating contracts, each would attract the *population* proportion of short-hour workers to its queue. Such a switch would reduce labor cost if θ were such that

$$C^s(\theta) < C^p(\theta), \tag{20}$$

or, using (10) and (14),

$$e + 2\Gamma^{\frac{1}{2}}\left[\frac{\mu_S - (1-\theta)}{\theta + (1-\theta)(\mu_S - 1)}\right]^{\frac{1}{2}} < (e + 2\Gamma^{1/2})\left[1 - \frac{q\theta}{q + (1-\theta)(1-q)D}\right]^{-1} . \tag{21}$$

The term in brackets on the left-hand side of (21) is always less than μ_S. Thus by comparing inequalities (19) and (21), we observe a key feature of our model — that there is a range for the value of θ for which unit labor cost declines when *all* firms switch to separating contracts, but for which any individually maximizing firm nonetheless continues to offer the pooling contracts. That is, there are values of θ for which

$$C^s(\theta) < C^p(\theta) < C^s(1). \tag{22}$$

Figure 2 illustrates this point. When θ exceeds θ', labor cost will be lower in the separating equilibrium than in the pooling equilibrium. Equation (18) suggests, however, that no firm will have the incentive to offer a separating contract unless θ exceed θ''. Thus we have the result that for any mix of workers such that (22) holds, unit labor cost will decline and output will increase if firms collectively adopt separating contracts. Nonetheless, no one firm finds it advantageous to abandon its practice of offering pooling contracts. As compared with the pooling equilibrium, the separating equilibrium is characterized by lower labor cost, even though the wages received by both types of workers are higher. In the separating equilibrium, the quantity of labor utilized and market output are higher. Both short-hour and long-hour workers gain higher utility from employment in the separating equilibrium than in the pooling equilibrium.

It is tempting to suggest that the coordination problem highlighted above might be circumvented if, by collective agreement, all firms were to agree to offer separating employment contracts. However, each firm will have an incentive to defect from this agreement by offering a pooling contract. The defecting firm would in this way attract a disproportionately large number of relatively inexpensive long-hour workers. If other firms were to follow suit, the separating equilibrium would unravel and the market would once again be characterized by a sub-optimal pooling equilibrium.

An important implication of our model is that extra-market intervention can improve welfare in this labor market. Consider, for instance, a law that eliminated the pooling

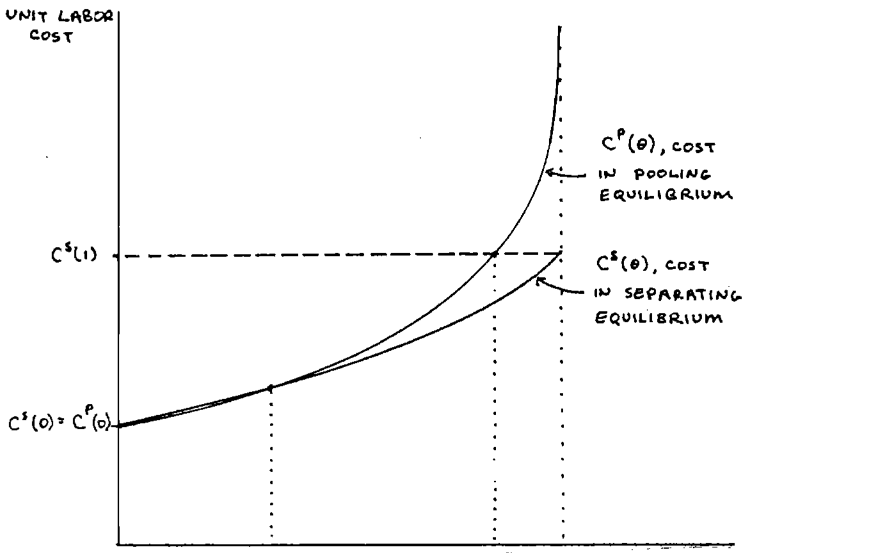

FIGURE 2. LABOR COST AS A FUNCTION OF θ

equilibrium by mandating that (i) all employees must be offered the option of working at short or long hours, and (ii) dismissals must be for just cause. If the dismissal of short-hour workers in high proportion were taken as evidence of violation of the law, firms would be induced to offer short-hour jobs by providing separating contracts. As we have demonstrated, it is possible that such a law will result in lower labor cost to firms *and* higher wages to workers. While it may seem paradoxical that by restricting the actions of parties to an exchange one could improve the welfare of the parties, this conclusion has been reached in a number of other models where information is imperfect.[16]

4. Labor Market Segmentation and Part-Time Work

Prior to 1950, part-time work was virtually non-existent in the United States economy. During the 1950's employers began offering jobs having less than 35 hours per week as a means of attracting older, married women into the labor force (Goldin [1990], p. 180-183). Over the past twenty years, the percentage of women working part-time has remained roughly constant at about 25 percent (Blank [1990]). Considering the rapid growth of the female labor force, this figure suggests a significant rate of growth of part-time employment.

Can the rapid growth of part-time work be reconciled with our claim that work incentives inhibit the introduction of short-hour jobs? To answer this question we enrich our model slightly by introducing two different labor markets—primary and secondary. The primary labor market is composed of firms making use of the dismissal based incentive schemes described in the preceding sections. Firms in the secondary labor market produce different goods than those in the primary labor market. Most importantly for our purposes, the technology used in secondary labor markets makes it easy to observe the work activities of employees. It follows then that secondary labor markets pay a market clearing wage. Workers who are not fortunate enough to get selected out of the queue for primary jobs, and workers who are dismissed from primary jobs can always secure employment in the lower paying secondary sector. Notice that in equilibrium there will typically be an excess supply of workers to the primary market.[17]

In the secondary labor market, firms do not use dismissal based work incentives and will therefore allow employees to choose the hours of work that maximize utility. This stands in contrast to the primary labor market where firms offer the minimum cost wage and hours package that satisfies the no-shirking condition. On the basis of our model, we would expect that most part-time jobs are found in the secondary sector. The examination of separating contracts presented in the preceding section suggests that where part-time jobs do exist in the primary sector, part-time employees may receive a *higher* wage than full-timers.

Consistent with the hypothesis that part-time jobs are generally found in the secondary labor market, Rebitzer and Taylor (1991) find that industries with high concentrations of part-time workers tend to be low wage industries. In a study of labor market segmentation among non-union men, Rebitzer and Robinson (forthcoming) find that 4.9 percent of the men in the primary sector work part-time. In contrast, 31 percent of the men in the secondary sector are part-timers.

Blank (1990) offers an extensive analysis of wage differences between part-time and full-time workers. The data she presents indicate that more than 70 percent of part-time workers are found in the generally low wage sales, clerical and service occupations and only 22 percent are found in the relatively high wage professional, managerial and technical occupations (Blank [1990], p. 129). After controlling for selection effects, Blank reports that within occupations the effect of part-time work on wages is generally positive although not always statistically significant. However, she emphasizes that part-time workers in "professional and managerial positions show particularly large and positive wage differentials, holding all other variables constant" (p. 143).[18] These results are consistent with our expectation that within the primary sector, employees having short-hour jobs may receive higher wages than other employees.

5. Conclusion

Firms look for workers whose attitudes and preferences make them responsive to the work incentives prevalent in the firm. These incentives often involve promises to provide (and threats not to provide) income in the future. Thus preferences towards income and leisure will be important to firms in deciding whom to hire.

This paper has presented a model of wage and hours determination in which firms use dismissal threats to elicit high levels of work effort. In our model workers who prefer long hours will be more responsive to dismissal based incentive schemes than other workers. Employers will therefore whenever possible put job seekers with preferences for short hours at the bottom of the queue of workers seeking jobs.

In order to avoid unemployment or employment in low wage positions, job seekers will not reveal their true preferences for income and leisure. We demonstrate that the response by employers may result in the provision of fewer short-hour jobs than is optimal. In the context of a model of labor market segmentation, the shortage of short-hour jobs will occur in the high wage, primary sector.

The logic of the model we present suggests that labor markets will not adjust smoothly to the changes brought about by the rise in female labor force participation. In the absence of some intervention in the market, firms will find it difficult to provide the optimum number of short-hour jobs in response to the increasing numbers of female and male workers seeking to balance job and family responsibilities.

End Notes

1. In 1950 the labor force participation rate of married women was 29.5 percent compared to 51.1 percent in 1980 (Goldin [1990], p. 17). The 1950 figure includes women over age 14, while the 1980 figure includes only women over 15 years old. In 1970 the labor force participation rate of women with children under 18 was 42.1 percent. By 1985 this figure was 62.1 percent (Bergmann [1986], p. 2).

2. Fuchs (1986) estimates that in 1979 women spent 1,497 hours per year on non-market work compared to 595 hours for men. Non-market work includes activities like shopping, yard work and child care. Leete-Guy and Schor (1990) estimate that on average women in 1979 spent 1514 hours per year on non-market work. This figure declined to 1442 in 1987. The comparable figures for men were 860 and 853 respectively (Leete-Guy and Schor, 1990, Table 2).

3. A number of previous studies have concluded that work incentives may influence the determination hours of work. Lang (1989) and Lazear (1981) argue that work incentives may cause employers to offer wage-hours packages under which employees do not perceive themselves to be working optimal hours. Bulow and Summers (1986) argue that reliance upon work incentives may cause employers to seek to avoid hiring employees having preferences for short hours. Bulow and Summers' consideration of heterogeneous workers focuses primarily on the case where different hours preferences (and turnover propensities) are known to the employer because they vary by an observable characteristic, gender. For a discussion of the effects of worker heterogeneity on unemployment and wages, see Weiss (1990).

4. In an earlier version of this paper, we set up our model using an alternative assumption that workers who quit or are fired may subsequently re-enter the labor force. This alternative set-up leads to similar results as those presented here, but the derivations are much more cumbersome.

5. We assume that firms always correctly identify shirkers. It is straight forward, however, to introduce erroneous dismissals into the model. For a discussion of the implications that erroneous dismissals have on labor market outcomes see Levine (1989).

6. For a discussion of these issues in a closely related model see Lazear (1981) and Akerlof and Katz (1990).

7. To highlight the central point of the model, we do not allow workers to post performance bonds. (Dickens, Katz, Lang and Summers [1989] provide a discussion of this issue.) Further, we stipulate that workers in each period are paid prior to the observation of their work activities in the period. Thus the discipline effect of dismissal is derived entirely from lost future earnings.

8. The finding that labor market equilibria may be characterized by unemployment is common to many effort regulation models. See Bowles (1985) and Stiglitz (1987).

9. For example, Γ_N will be equal to zero when both E and D are linear functions of N. In this case $D'/D = E'/E = 1/N$, since $D(0) = E(0) = 0$. Γ_N may also be zero if $E' = 0$.

10. This is the case analyzed in Lang (1989). Lang ensures that $\Gamma_N > 0$ by assuming D to be concave and e_s to be zero. In theory, it is also possible for Γ_N to be negative. In this situation workers will be required to work more than the optimal number of hours. Empirically, however, one finds that the incidence of "excess hours" is small compared to the number of workers reporting they worked optimal hours or were hours constrained (see Kahn and Lang [1987, 1988a, 1988b], Altonji and Paxson [1986, 1988], Best [1978], Dickens and Lundberg [1985], and Shank [1986]).

11. Bulow and Summers (1986) express this point vividly by noting, "Firms prefer to give jobs to workers who 'really need them' than to workers who gain less surplus from holding them" (p. 400).

12. In order to eliminate short-hour workers from their job queues, firms may discriminate in hiring against groups known to have, on average, a preference for shorter hours. Such discrimination may be important in many labor markets. In this paper we abstract from statistical discrimination because it not essential to our argument.

13. Note that because the no-shirking wage is lower for long-hour than for short-hour workers at any N, only the no-shirking condition for short-hour workers will be binding in this problem.

14. As shown in Figure 1, hours constraints can arise due to the nature of the separating contract. For instance, short-hour workers are asked to work fewer hours than they would choose given their wage, w_S. This occurs because firms do not find it optimal to provide short-hour jobs lying at the minimum point of these workers' no-shirking curve, NSC_S. In comparison with this minimum point, a move by the firm to the left along the no-shirking curve has only a small adverse effect on the wage, w_S. This effect is more than offset by the reduction in cost associated with the decline in the use of the relatively expensive type S workers and the drop in the wage that must be paid type L workers.

15. All we need to establish the results that follow is that there be *some* adverse selection at work, i.e., that the proportion of type S workers the firm attracts be greater than the population θ. The presentation of the case where $\theta_S = 1$ simplifies the exposition.

16. See, for example, Levine (1990) and Aghion and Hermalin (1990).

17. This dual labor market model is essentially the same as that presented in Bulow and Summers (1986). The theory of dual labor markets has generated a large body of qualitative and quantitative research. For surveys see Rebitzer (1989) and Dickens and Lang (1988).

18. Blank also found that part-time workers were in all occupations less likely to receive health insurance and pension benefits. However, Blank's data does not allow us to estimate the discounted present value of these benefits and we therefore cannot compare the total

hourly compensation of part-time and full-time employees.

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