

10-1990

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Geoffrey A. Jehle  
*Vassar College*

Marc O. Lieberman  
*Vassar College*

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## Citation Information

Jehle, Geoffrey A. and Lieberman, Marc O., "Do fringe benefits cause layoffs?" (1990). *Faculty Research and Reports*. 20.  
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DO FRINGE BENEFITS CAUSE LAYOFFS?

Geoffrey A. Jehle\*  
Marc O. Lieberman\*

Working Paper No: 12

October 1990

\* Vassar College, Poughkeepsie, NY 12601

## DO FRINGE BENEFITS CAUSE LAYOFFS?

### ABSTRACT

We examine the role of fringe benefits in the firm's choice between layoffs and work-sharing. We find that when labor markets are characterized by forward-looking implicit contracts, the equilibrium contract will never call for layoffs, regardless of the level of fringe benefits.

## I. Introduction

Worksharing—the practice of reducing hours for *all* employees to avoid layoffs for some during downturns—is still very rare in the United States by comparison to Western Europe. Yet well-known arguments due to Mortensen (1978) and Akerlof and Miyazaki (1980) suggest that, in the absence of complicating factors, an optimal implicit labor contract will always call for worksharing, and never call for layoffs. Three of these complicating factors are commonly cited as the principal explanations for layoffs in the United States. They are: (1) the presence of tax distortions in the US unemployment insurance system which tend to create a “layoff subsidy,” (2) an hours-elasticity in production that typically exceeds the employment-elasticity, allowing firms greater savings through layoffs during downturns, and (3) the savings firms can achieve during downturns on fringe benefits and other fixed costs of employment by the use of layoffs.

The first two pillars of this conventional wisdom have been carefully and rigorously investigated. Support for the first can be found in Burdett and Wright (1989) and in Feldstein (1976). Some empirical support for the second can also be found in Feldstein (1967). However, the role of fringe benefits in discouraging worksharing and encouraging the use of layoffs has so far escaped careful scrutiny. Instead, it owes its continued life in the literature to a series of assertions and conjectures, such as those to be found in Bednarzik (1980), Best and Mattesich (1980), Best (1978), Clark (1977) and Baily (1976), among others.

In this note we demonstrate that when the labor market is characterized by forward-looking implicit contracts, fringe benefits are a wholly *invalid* explanation for the prevalence of layoffs. Our findings thus refute an important lingering part of the conventional wisdom on layoffs and serve to extend the results of Burdett and Wright (1989), Mortensen (1978), and Akerlof and Miyazaki (1980).

In Section II we construct a simple but general model of equilibrium in the labor market where firms offer workers implicit employment contracts which may specify either layoffs or worksharing, or both, during downturns. Then we demonstrate that the optimal contract will call for worksharing—and never call for layoffs—regardless of the level of fringe benefits. Section III offers some concluding remarks.

## II. Market Equilibrium

Consider a set of firms producing a perishable good. Since our results do not depend on any particular structure to competition in the product market, the set of firms concerned may be thought of quite broadly to encompass anything from monopoly to perfect competition. We let both demand and supply conditions be state dependent, and states  $x$  may have any distribution function,  $F(x)$ . Firm output in state  $x$  is produced from labor according to the production function  $f(h_x L_x, x)$ , where  $L_x$  is the number of employees and  $h_x$  is normal hours per employee.<sup>1</sup> Workers join a firm's labor pool before the state of the world is known, and cannot move to another firm *ex post*. The normal pool of workers available to the firm is bounded above, and we choose units so that  $0 \leq L_x \leq 1$ . Thus,  $L_x$  can be interpreted as the share of the firm's labor pool which it employs in state  $x$ . In what follows, we will assume that when firms resort to layoffs, those laid off are chosen by random draw. From the worker's point of view, then,  $L_x$  can also be interpreted as the probability that he or she will be employed in state  $x$ .

Each firm offers an implicit contract to its workers which specifies, for each state  $x$ , the probability of employment  $L_x$ , normal hours  $h_x$ , and the wage rate  $w_x$ , together with any severance pay  $b_x$ , and the cash equivalent of any fringe benefits  $c$ .<sup>2</sup>

Facing a contract which specifies the terms  $\{L_x, h_x, w_x, b_x, c\}$ , firm profits in state  $x$  will be

$$\pi(x) \equiv p_x f(h_x L_x, x) - h_x L_x w_x - (1 - L_x) b_x - c L_x, \quad (1)$$

where the  $p_x$  is the market price of firm output.

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<sup>1</sup>The assumption that output depends only on one factor is not critical to our findings, and is only made for simplicity. We also make the standard assumption of equal hours and employment elasticities of output. This can be relaxed, slightly, to correspond with Burdett and Wright's (1989) Assumption L.

<sup>2</sup>Fringe benefits, provided by the firm to all employed workers, may include such things as medical insurance, life insurance, some types of paid vacations and pension fund contributions. We use the cash equivalent of fringe benefits in order to focus on their salient feature in explaining layoffs, i.e., that these are costs to the firm which do not depend on the hours a person works, but only depend on the person's employment status. Usually, fringe benefits are state-independent as well, and our choice of notation reflects this. However, our results and arguments are unchanged if we allow fringes to be state-dependent and write  $c_x$ .

Severance payments,  $b_x$ , can be interpreted to include unemployment insurance taxes paid by firms and received by workers as unemployment benefits, as long as the tax rate is "perfectly experience rated." We thus rule out any layoff subsidy due to imperfect experience rating. On the role of imperfect experience rating, see Burdett and Wright (1989) and Feldstein (1976).

Workers are assumed to have identical increasing and strictly concave utility functions over income and leisure. Setting total time per period equal to unity, we write utility in terms of income and hours worked,  $U(Y, 1 - h_x)$ . The expected utility of a representative worker in state  $x$ , facing the contract specifying  $\{L_x, h_x, w_x, b_x, c\}$ , will be

$$v(x) \equiv L_x \cdot U(w_x h_x + c, 1 - h_x) + (1 - L_x) \cdot U(b_x, 1). \quad (2)$$

Firms compete for workers by offering implicit labor contracts that provide competing levels of expected utility to their workers. Each firm  $f$  seeks to maximize the expectation of some increasing function,  $\psi^f(\cdot)$ , of state dependent profits. We thus impose neither risk neutrality nor risk aversion on the part of firms, nor do we require that the functions  $\psi^f(\cdot)$  be identical across firms.

The *equilibrium* contract offered by any individual firm must maximize the expectation,

$$\int_{-\infty}^{+\infty} \psi^f(\pi(x)) dF(x), \quad (3)$$

subject to a constraint of the form,

$$\int_{-\infty}^{+\infty} v(x) dF(x) = v^*. \quad (4)$$

Here,  $v^*$  can be interpreted as a “reservation” level of expected utility which makes the marginal worker indifferent between joining the firm’s labor pool and accepting some next best alternative.

In the following theorem, we show that the equilibrium contract will never call for layoffs, regardless of the level of fringe benefits paid to workers. Instead, the firm will always employ its entire labor pool.

**Theorem 1** *Regardless of the level of fringe benefits,  $c$ , the equilibrium contract must specify  $L_x = 1$  for all  $x$ .*

We adapt an argument used by Burdett and Wright (1989, p. 1488) to show that, regardless of the level of fringe benefits, any contract calling for layoffs in some state can be improved upon by a different contract that instead calls for worksharing in that state.

**Proof:** Suppose a contract specifies  $\{L_z, h_z, w_z, b_z, c\}$ , where  $L_z < 1$ , so that layoffs are called for in state  $z$ . First note that any other contract that precludes layoffs in  $z$  by specifying  $L'_z = 1$  and  $h'_z = h_z L_z$ , produces the same output in  $z$  since  $L'_z h'_z = h_z L_z$ . If, in addition, the wage is reset to  $w'_z = w_z + (1 - L_z)(b_z - c)/h_z L_z$ , the terms  $\{L'_z, h'_z, w'_z, b_z, c\}$  will give the same level of firm profits in state  $z$  as the contract calling for  $\{L_z, h_z, w_z, b_z, c\}$ . This is easy to verify by forming (1) in the two cases. However, the contract calling for  $\{L'_z, h'_z, w'_z, b_z, c\}$  must provide a higher expected utility in state  $z$  than the one which calls for  $\{L_z, h_z, w_z, b_z, c\}$ . To see this, compare (2) under the two alternatives. Substituting and rearranging, then invoking Jensen's inequality, we have:

$$\begin{aligned} U(w'_z h'_z + c, 1 - h'_z) &= U(L_z \cdot (w_z h_z + c) + (1 - L_z) \cdot b_z, L_z \cdot (1 - h_z) + (1 - L_z) \cdot 1) \\ &> L_z \cdot U(w_z h_z + c, 1 - h_z) + (1 - L_z) \cdot U(b_z, 1), \end{aligned} \quad (\text{P.1})$$

so workers would be strictly better off with the terms  $\{L'_z, h'_z, w'_z, b_z, c\}$ .

In view of (P.1), there must exist some reduction in wages to  $w_z^* < w'_z$  satisfying

$$U(w_z^* h'_z + c, 1 - h'_z) = L_z \cdot U(w_z h_z + c, 1 - h_z) + (1 - L_z) \cdot U(b_z, 1),$$

because utility is increasing in income. But then any contract calling for  $\{L'_z, h'_z, w_z^*, b_z, c\}$  must give workers the same level of expected utility in state  $z$ , produce the same firm output in  $z$ , and give strictly greater firm profits in  $z$  compared to the contract calling for  $\{L_z, h_z, w_z, b_z, c\}$ . From this we conclude that no contract which calls for layoffs in any state can maximize (3) subject to (4), and thus the *equilibrium* contract must call for full employment in every state. ■

### III. Conclusion

The intuition for the preceding theorem is simple enough. In any state of the world, when output depends only on total labor hours, the firm is indifferent between offering the worker a gamble over income and leisure and guaranteeing the worker the expected value of that gamble. Its revenue and costs will be the same in either case. However, with strictly convex preferences, workers will always prefer the expected value of any gamble in income

and leisure to the gamble itself. There is thus a gain to be realized by preventing layoffs in implicit labor contracts. How this gain is distributed between the firm and its workers will depend on the competitive structure of product and labor markets.

The view that fringe benefits cause layoffs can only be supported in a world where the firm's *ex post* behavior is unrestricted by an implicit contract with workers. Only then can the firm take advantage of the asymmetrical cost savings that come with layoffs. When the labor market is characterized by forward-looking implicit contracts, such *ex post* firm behavior will be ruled out in equilibrium.

## References

- Akerlof, George and Miyazaki, Hajime. "The Implicit Contract Theory of Unemployment meets the Wage Bill Argument." *Review of Economic Studies* 47, (January 1980): 321-338.
- Baily, Martin M. "Contract Theory and the Moderation of Inflation by Recession and by Controls." *Brookings Papers on Economic Activity* 3, (1976): 585-633.
- Bednarzik, R. "Worksharing in the U.S.: Its Prevalence and Duration." *Monthly Labor Review* 103, (July 1980) 3-12.
- Best, Fred and Mattesich, James. "Short-Time Compensation Systems in California and Europe." *Monthly Labor Review* 103 (July 1980): 13-22.
- Best, Fred. "Comment." *National Commission for Manpower Policy, Work Time and Employment* 28 (1978): 213-228.
- Burdett, Kenneth and Wright, Randall. "Unemployment Insurance and Short-Time Compensation: The Effects on Layoffs, Hours per Worker, and Wages." *Journal of Political Economy* 97 (December 1989): 1479-1496.
- Clark, R. *Adjusting Hours to Increase Jobs*. Washington: National Commission For Manpower Policy 1977.
- Feldstein, Martin. "Specification of the Labour Input in the Aggregate Production Function." *Review of Economic Studies* 34 (October 1967): 375-386.
- Feldstein, Martin. "Temporary Layoffs in the Theory of Unemployment." *Journal of Political Economy* 84 (October 1976): 937-957.
- Mortensen, Dale T. "On the Theory of Layoffs." Discussion Paper No. 322. Evanston, Ill.: Northwestern University, Center for Mathematical Studies in Economics and Management Science, March 1978.