

Unemployment, Labor Relations, and Unit Labor Costs

By JAMES B. REBITZER*

In his seminal 1943 paper on the political business cycle, Michal Kalecki (1971) argued that "industrial leaders" feared full employment because the economic insecurity created by unemployment was necessary to keep wages low and maintain work intensity and discipline on the shop floor. On the basis of this reasoning, Kalecki concluded that governments would not use demand management policies to achieve permanent "full employment." In terms of current macroeconomic debates, Kalecki had sketched the outlines of a theory of the "neutral" or "natural" rate of unemployment based on the importance of disciplinary unemployment as a regulator of unit labor costs.

Kalecki's pessimism about the prospects for full employment was premised in part on a view of firms in which the threat of dismissal was the central motivational device used by employers, and employees had only a tenuous connection to employers. This assumption may have been appropriate when analyzing labor markets in the United States during the 1930's. Since that time, however, the spread of unions, implicit employment contracts, and large, bureaucratically organized enterprises has resulted in a modern U.S. labor market in which many workers enjoy long job tenure and in which many firms do not appear to rely on dismissal threats as their primary motivational strategy (see David Gordon, Richard Edwards, and Michael Reich, 1982; Sanford Jacoby, 1983; and my forthcoming paper). From this perspective, it is reasonable to ask whether the presence of long-term employment relations alters the regulatory role played by unemployment.

This paper examines the effect that unemployment and long-term employment relations exert on the determination of unit labor costs. The central empirical findings can be

briefly summarized. First, as suggested by Kalecki, movements towards full employment increase the rate of growth of wages and reduce the rate of growth of labor productivity. Second, where long-term employment relations are prevalent, the effect of unemployment on both wage and labor productivity growth is diminished.

I. Work Effort, Unemployment, and Unit Labor Costs

Much of the spirit of Kalecki's view of unemployment as a regulator of wages and work effort is captured in recently developed efficiency wage models that focus on the firm's problem of eliciting work effort from its employees (see Carl Shapiro and Joseph Stiglitz, 1984; Samuel Bowles, 1985; and Jeremy Bulow and Lawrence Summers, 1986). The premise of these "effort-regulation" models is that the labor exchange is open ended in the sense that specific work activities and work intensity are *not* specified in the employment contract. Rather, these aspects of the terms of employment are determined by the ability of the employer to exercise authority over the employee.

Firms exercise authority by supervising the activities of workers and dismissing those found to be shirking or performing in a substandard manner. The effectiveness of dismissal in eliciting work effort depends upon the cost of dismissal to the worker. The relationship between the cost of dismissal and work effort is often modeled by a work intensity function:

$$(1) \quad L^* = h(W^*), \quad h_{W^*} > 0$$

$$\text{and} \quad h_{W^*W^*} < 0,$$

where L^* is the effort exerted per labor hour (i.e., work intensity) and W^* is the cost to the worker of dismissal. W^* is in turn a function of earnings at the current job (W), earnings at alternative jobs (α), the probability of experiencing unemployment if dis-

*University of Texas, Austin, TX 78712. I thank my colleagues Lowell Taylor, Joe Ritter, and Price Fishback for comments on earlier drafts.

missed (U) and whatever nonwage income is provided to unemployed workers by the state (β). Given α , β , and U , the firm chooses a wage that maximizes profits. In most of the published effort-regulation models, the extraction of work effort is considered to be separable from the rest of the production process. In this case, firms set wages so as to minimize the ratio of hourly labor costs to hourly work effort. The equilibrium wage generated by effort-regulation models will generally exceed the market-clearing wage. Equilibrium will therefore be characterized by persistent, involuntary unemployment (Bowles).

The comparative static properties of efficiency wage models suggest that as labor markets tighten, firms' unit labor costs will rise. This property of efficiency wage models follows from the fact that when unemployment falls, firms must offer a higher wage in order to attain any given level of work intensity. Although unit labor costs will tend to rise as the economy approaches full employment, it is not clear if this increase will be caused by rising wages, falling labor productivity, or some combination of the two. For example, in the model developed by Bowles, falling unemployment results in both rising wages and rising productivity. On the other hand, in my (1987) efficiency wage model, falling unemployment may result in rising wages and falling labor productivity.

II. Long-Term Employment Relations

It is widely accepted among economists that long-term employment relations (LTER) in the United States reflect the presence of labor market structures that create lasting bonds or attachments between workers and their firms. The LTERs are frequently associated with the presence of unions, bureaucratic mechanisms of labor control and implicit contracts. Each of these structures can be expected to reduce the effect that unemployment exerts on unit labor costs.

A. Unions

The presence of explicit, union contracts can be expected to increase job tenure and

reduce the effect of labor market conditions on wages (Daniel Mitchell, 1980; Richard Freeman and James Medoff, 1984). In addition, there is good reason to believe that in unionized settings, the threat of dismissal is not an important means of eliciting work effort and, therefore, labor productivity is not responsive to external unemployment rates. In unionized firms, supervisors are typically restricted in their ability to dismiss shirking workers, yet a number of empirical studies have found higher levels of productivity in union than nonunion plants (see Charles Brown and Medoff, 1978, and the review in Freeman-Medoff). Freeman and Medoff suggest that these union-productivity effects may result from mechanisms that have little to do with the threat of dismissal. In their view, the union productivity effect is due to the "voice" institutions unions bring to the work place, especially grievance procedures. By offering a means of expressing discontent, these voice institutions improve morale and employer/employee communications and therefore increase the effective labor input per hour of labor employed. The hypothesis that the threat of job loss is not an important motivational device in unionized firms is also supported by Casey Ichniowski's (1986) study of nine unionized paper mills. He found that layoffs do not influence the productivity of workers who remain after the layoffs. To the extent, then, that long-term employment relations are due to the presence of unions, one could expect that they reduce the responsiveness of both wages and labor productivity to changing labor market conditions.

B. Bureaucratic Control

The "bureaucratic control" approach to LTERs is premised on the observation that large nonunion firms in the postwar period in the United States have established a hierarchical organization in which workers follow career paths determined by the firm's internal job ladders (Richard Edwards, 1979). In these firms there is a well-specified division of labor, and discipline is enforced by impersonal rules governing evaluation, promotion, and dismissal. Under bureaucratic

control, wages and work rules are designed to appeal to notions of procedural "fairness" in order to foster employee commitment to the goals of the firm. Bureaucratic control strategies are closely related to the "partial gift exchange" models developed by George Akerloff (1982) as well as to the various "sociological" aspects of the employment relationship discussed by Robert Solow (1980). Under bureaucratic control, one would expect that wages would be relatively unresponsive to changing labor market conditions. Firms that used a slack labor market to cut wages would be undermining their long-term strategy of cultivating worker loyalty and commitment to the firm. Similarly, bureaucratic motivational schemes rely fundamentally on notions of "fairness" and "legitimacy" rather than dismissal threats to elicit work effort. Therefore one would expect work effort to be unresponsive to changes in the external unemployment rate.

C. *Implicit Contracts*

In the context of efficiency wage models, it can be demonstrated that implicit contracts reduce the sensitivity of unit labor costs to changing labor market conditions. It has long been recognized that high turnover costs resulting from investments in firm-specific training can move firms to offer implicit contracts guaranteeing employment at a wage that rises with job tenure (Arthur Okun, 1981). Implicit contracts can also arise where workers are more risk averse than firms (see Martin Neil Bailey, 1974). In this situation, workers will prefer a less volatile income stream to a riskier income stream. Firms will gladly offer to provide insurance against income fluctuations in exchange for a lower wage rate.

Workers who invest in firm-specific training (or who are more risk averse) suffer a greater loss upon dismissal than other workers paid an equivalent wage. Edward Lazear (1981) has demonstrated that even in the absence of firm-specific training or risk aversion, implicit contracts guaranteeing employment over time at an increasing wage will increase the cost of job loss to the worker. Lazear and Robert Moore's (1984)

study suggests that the slope of observed age-earnings profiles is significantly affected by these sorts of work incentives. Thus one would expect, on the basis of implicit contract theory, that long-term employment ought to be associated with high costs of job loss.

Using a simple efficiency wage model based on equation (1), it can be demonstrated that an increase in the cost of job loss to the worker, W^* , reduces the responsiveness of unit labor costs to changing labor market conditions.¹

III. Estimating the Effect of Unemployment on the Growth of Wages, Labor Productivity, and Unit Labor Costs

The comparative static properties of effort-regulation models suggest that as the economy moves toward full employment, unit labor costs will rise. Diverse theories of long-term employment relations on the other hand suggest that the presence of long-term employment relations ought to reduce the effect falling unemployment exerts on unit labor costs. This section presents the results of empirical explorations of these hypotheses using annual data from 2-digit U.S. manufacturing industries over the period 1961-80.

In order to examine the effect of falling unemployment on unit labor costs, it is necessary to examine the effect unemployment exerts on both wages and labor productivity. Following Mitchell, I estimated a wage equation that regressed the annual rate of growth of nominal wages ($CHEARN$) against the inverse of the civilian unemployment rate (URI) and the lagged rate of growth of the Consumer Price Index ($INFL_{t-1}$). In addition, I included as explanatory variables, the rate of unionization in the industry ($UNMEM$) and variables measuring the ability to pay higher wages (i.e., the current

¹This conclusion follows from the diminishing marginal effectiveness of costly dismissal in eliciting work effort. The effect that increasing W^* has on the unemployment/unit labor cost relationship is discussed more fully in an appendix to this paper which is available from the author upon request.

and lagged rate of growth of labor productivity, $CPROD1_t$ and $CPROD1_{t-1}$, respectively). Variations in the effect of unemployment on wage and labor productivity growth were captured by interacting the unemployment variable ($UR1$) with a measure of the prevalence of long-term employment relations in the industry (JT^*). Similarly the lagged inflation term in the wage equation ($INFL_{t-1}$) was interacted with the measure of long-term employment relations in the industry.²

The measure JT^* was derived from estimates of average industry job tenure. However, microeconomic studies of the determinants of job tenure indicate that it is strongly influenced by factors such as age and gender that are not directly related to the labor market structures described above (see my 1986 paper). Consequently, this study made use of a standardized measure of industry job tenure that controls for cross-industry variation in personal characteristics.³

Data limitations prohibited the estimation of a separate wage growth equation for each industry. Therefore the following pooled time series and cross-sectional equation was estimated:

$$(2) \quad CHEARN_{it} \\ = a_0 + a_1(UR1)_t + a_2(UR1)_t(JT^*)_t \\ + a_3(INFL)_{t-1} + a_4(INFL)_{t-1}(JT^*)_t \\ + a_5(UNMEM)_t + a_6(CPROD1)_{it} \\ + a_7(CPROD1)_{it-1} + v_{it},$$

where v_{it} is the error term for industry i at time t .

In order to examine the effect of unemployment on work effort, I estimated a pro-

ductivity growth equation that used as its dependent variable the annual rate of growth of output per labor hour in the industry ($CPROD1$). The explanatory variables included the inverse of the civilian unemployment rate ($UR1$), the rate of growth of the ratio of capital services to labor hours (CKL), the rate of change of the rate of capacity utilization in the industry ($CWCU$), and the rate of unionization in the industry ($UNMEM$). As additional measures of the quality of the capital stock, the equation also included a variable measuring the average age of the real gross capital stock ($AGE-STOCK$) and a variable measuring the fraction of the gross capital stock that is new investment ($INVRATIO$). Two variables were also introduced into the productivity equation to capture secular trends in the rate of growth of labor productivity. These were $TDUM73$, a dummy variable equal to one for the years 1973–80 and $TDUM66$, a dummy variable equal to one for the years 1966–72. Consistent with the efficiency wage approach, I also included as explanatory variables the rate of growth of real wages in the industry ($CRHEARN$) and the growth of real wages interacted with the measure of LTERs ($(CRHEARN)(JT^*)$). The resulting productivity growth equation can be written:

$$(3) \quad CPROD1 \\ = \alpha_0 + \alpha_1(UR1)_t + \alpha_2(UR1)_t(JT^*)_t \\ + \alpha_3(CKL)_{it} + \alpha_4(CRHEARN)_{it} \\ + \alpha_5(CRHEARN)_{it}(JT^*)_t + \alpha_6(CWCU)_{it} \\ + \alpha_7(AGESTOCK)_{it} + \alpha_8(INVRATIO)_{it} \\ + \alpha_9(UNMEM)_t + \alpha_{10}(TDUM73)_t \\ + \alpha_{11}(TDUM66)_t + \epsilon_{it},$$

where ϵ_{it} is the error term for industry i at time t .

Equations (2) and (3) constitute a system of equations and were estimated using conventional two- and three-stage least squares techniques. The estimates of a_1 , a_2 , α_1 , and α_2 in equations (2) and (3) indicate that an

²Many of the same aspects of long-term employment relations which make wages relatively unresponsive to changing labor market conditions will also make wages more responsive to changing rates of inflation. See my forthcoming paper for a discussion of this issue.

³Details on the construction of JT^* are presented in the appendix (see fn. 1).

TABLE 1—PREDICTED EFFECT OF AN INCREASE
IN THE CIVILIAN UNEMPLOYMENT RATE
FROM 4.8 TO 6.2 PERCENT

Change in Annual Rate of Growth of	LTER Industries		
	Low	Mean	High
Nominal Wages	-0.588	-0.373	-0.184
Labor Productivity	0.328	0.262	0.140
Nominal Unit Labor Costs	-0.916	-0.635	-0.324

Note: Details on calculations provided in the appendix available upon request.

increase in unemployment has the effect of slowing the rate of growth of wages while enhancing the rate of growth of labor productivity.⁴ Moreover, the effect of unemployment is diminished the greater the prevalence of LTERs in the industry. The magnitude of these unemployment effects are illustrated in Table 1.

Table 1 presents estimates of the cumulative effect that a one-time permanent increase in the civilian unemployment rate from 4.8 percent (average unemployment rate, 1960–69) to 6.2 percent (average, 1970–79) has on the growth of labor productivity and wages in low, mean, and high LTER industries.⁵ In low LTER industries, this movement in the unemployment rate will, all else equal, reduce the rate of growth of nominal wages by 0.588 percentage points and add 0.328 percentage points to the annual rate of growth of productivity. The net effect is a reduction in nominal unit labor cost growth rates of 0.916 percentage points. In high LTER industries, the change in

⁴ Three-stage least squares estimates (and *t*-statistics) for a_1 , a_2 , α_1 , and α_2 were 21.525 (3.456), -1.160 (-2.544), -24.601 (-2.780), and 1.361 (2.478), respectively. The mean value of UR_1 was 0.190 and the mean value of JT^* was 12.025. Further details concerning data, estimation techniques and results are presented in the appendix.

⁵ Low, mean, and high tenure industries were given JT^* values of 8.452, 12.025, and 15.316, respectively. The derivation of the total multipliers used to construct Table 1 are presented in the appendix.

unemployment will reduce nominal wage growth by only 0.184 percentage points and increase productivity growth by only 0.140 percentage points. The net effect is therefore a 0.324 percentage point reduction in nominal unit labor cost growth rates.

It is clear from the table that, all else equal, LTERs become relatively expensive during periods of high unemployment and relatively inexpensive during periods of low unemployment. Using the total multipliers calculated from the wage and labor productivity equations, it is instructive to calculate the unemployment rate at which nominal unit labor costs begin to grow more rapidly in long- than short-tenure industries. Assuming that the inflation rate was 7.1 percent per year (the average for the 1970–79 period) and that long- and short-tenure industries were identical in all other respects, then unit labor costs would grow more rapidly in long- than short-tenure industries when the unemployment rate exceeded 5.7 percent. However, if the inflation rate were 10 percent, then unit labor cost growth rates would be higher in long-tenure than short-tenure industries when the unemployment rate exceeded 4.0 percent.⁶

IV. Conclusion

The results presented above have implications for the study of the microfoundations of macroeconomics. The findings suggest that some of the barriers towards achieving full employment identified by Kalecki *do* appear to operate in the modern U.S. economy. As the economy approaches full employment, the tightening of labor markets causes wage growth to increase and labor productivity growth to slow. However, these adverse effects of low unemployment are considerably reduced where firms have established long-term employment relations with their employees. A provocative implication of these findings is that long-term employment

⁶ The relationship between unit labor cost growth rates, inflation rates, and unemployment rates in high- and low-tenure industries is derived in the appendix.

relations of the sort seen in the modern U.S. economy may provide an appropriate microeconomic foundation for a low unemployment macroeconomic regime. Put differently, increased use of long-term employment relations may reduce the "neutral" or "natural" unemployment rate.

The results reported here also have implications for what might be called the macro foundations of microeconomics. It seems to be the case that long-term employment relations become costly relative to short-term employment relations when unemployment and inflation rates are high. Prolonged periods of high unemployment (particularly when accompanied by high rates of inflation) can therefore be expected to erode an otherwise stable system of long-term employment relations. The effect of changing macroeconomic conditions on the stability of long-term employment relations in the United States and elsewhere is a promising area for future research.

REFERENCES

- Akerloff, George A., "Labor Contracts as a Partial Gift Exchange," *Quarterly Journal of Economics*, 1982, 97, 543-69.
- Baily, Martin Neil, "Wages and Employment Under Uncertain Demand," *Review of Economic Studies*, January 1974, 41, 1043-63.
- Bowles, Samuel, "The Production Process in a Competitive Economy: Walrasian, Neo-Hobbesian, and Marxian Models," *American Economic Review*, March 1985, 75, 16-36.
- Brown, Charles and Medoff, James, "Trade Unions in the Production Process," *Journal of Political Economy*, June 1978, 86, 355-78.
- Bulow, Jeremy I. and Summers, Lawrence H., "A Theory of Dual Labor Markets with Applications to Industrial Policy, Discrimination, and Keynesian Unemployment," *Journal of Labor Economics*, July 1986, 4, 376-414.
- Edwards, Richard, *Contested Terrain: The Transformation of Work in the Twentieth Century*, New York: Basic Books, 1979.
- Freeman, Richard B. and Medoff, James L., *What Do Unions Do?*, New York: Basic Books, 1984.
- Gordon, David, Edwards, Richard and Reich, Michael, *Segmented Work. Divided Workers*. London: Cambridge University Press, 1982.
- Ichniowski, Casey, "The Economic Performance of Survivors after Layoffs: A Plant Level Study," NBER Working Paper No. 1807, January 1986.
- Jacoby, Sanford M., "Industrial Labor Mobility in Historical Perspective," *Industrial Relations*, Spring 1983, 20, 261-82.
- Kalecki, Michal, "Political Aspects of Full Employment," in *Selected Essays in the Dynamics of the Capitalist Economy: 1933-1970*, Cambridge: Cambridge University Press, 1971.
- Lazear, Edward P., "Agency, Earnings Profiles, Productivity, and Hour Restrictions," *American Economic Review*, September 1981, 71, 606-20.
- _____ and Moore, Robert, "Incentives, Productivity and Labor Contracts," *Quarterly Journal of Economics*, May 1984, 99, 275-96.
- Mitchell, Daniel J. B., *Unions, Wages, and Inflation*, Washington: The Brookings Institution, 1980.
- Okun, Arthur, *Prices and Quantities: A Macroeconomic Analysis*, Washington: The Brookings Institution, 1981.
- Rebitzer, James B., "Establishment Size and Job Tenure," *Industrial Relations*, Fall 1986, 25, 292-302.
- _____, "Unemployment, Long-Term Employment Relations and Productivity Growth," *Review of Economics and Statistics*, November 1987, 69, 627-35.
- _____, "Efficiency Wages and Implicit Contracts: An Institutional Evaluation," in Robert Drago and Richard Perlman, eds., *Microeconomic Issues in Labor Economics: New York Approaches*, Sussex: Wheatsheaf Books Ltd., forthcoming.
- Shapiro, Carl and Stiglitz, Joseph E., "Equilibrium Unemployment as a Worker Discipline Device," *American Economic Review*, June 1984, 74, 433-44.
- Solow, Robert, "On Theories of Unemployment," *American Economic Review*, March 1980, 70, 1-11.