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Competition in the U.S. Labor Market

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1. Introduction

For those who accept the existence of a natural rate of unemployment as an indicator of equilibrium in the labor market, there must also be a recognition that the labor market spends considerably more time in a condition of excess supply than of excess demand. Gordon (1993) provides estimates of the U.S. natural rate for 1890-1991. Of these 102 years, there were only 39 years in which the actual unemployment rate was below the natural rate, with nine of these years being influenced by war conditions (i.e., 1918-19, 1943-46 and 1951-53). Moreover, consecutive years of excess supply are much longer than consecutive years of excess demand. For example, the eight years of 1980-87 displayed continuous unemployment rates above the natural rates, while the three years 1988-90 had the opposite inequality.

This apparent lack of symmetry in the operation of the labor market may be explained by a systematic bias in Gordon's data. While there continues to be disagreement about the measurement of the natural rate because it is essentially an unobservable variable, Adams and Coe (1989) who use a substantially different technique to obtain their estimate, find only 7 years of excess demand in the 25-year period of 1965-89. In that light, unless the natural rate is defined as a moving average of the actual rate, asymmetry is a distinct possibility and it is important to investigate other sources than measurement bias. One such possibility is that the downward adjustment of the real wage when excess supply prevails is slower than the increase in the real wage rise in situations of excess demand. Were this to happen, the disequilibrium created by symmetrical shocks to the labor market would take longer to eliminate when the unemployment moves above the natural rate than when the opposite case arises.

Solow (1990) has analyzed in some detail the possible reasons

for slow wage adjustment in the face of excess supply in the labor market. He writes:

> When there are a lot of unemployed workers, you might expect employers actively to solicit competitive wage cutting on their part. It rarely happens. The cases when it does happen, usually in deep recessions or when there is a serious threat from imported substitutes for the firm's product, are striking enough to call attention to the fact that it does not happen in run-of-the-mill recessions, although the unemployment rate might rise by two or three percentage points and even in average times there appears to be some excess supply of labor. (p. 37)

He also argues that unemployed workers do not offer to replace existing workers at lower wages because

> ...there is some sort of social norm or behavioral injunction that forbids undercutting the going wage as a strategy for unemployed workers. ... The fact that the norm against wage cutting seems to break down in extreme circumstances may only testify to its reality in run-of-the-mill cases. (pp. 38–9)

Solow is aware that this self-imposed constraint on behavior by unemployed workers may not be optimal from their perspective. He states:

> An injunction not to engage in wage cutting puts a major strain on unemployed workers. ... At most times and in most places, the margin of advantage of employment over unemployment remains substantial. ... But then the belief that there is a stable and effective social norm against wage competition for jobs needs some reinforcement of a kind that might come from showing that obeying such a norm is individually rational, besides performing a social function. (pp. 39–40)

What Solow essentially argues is that "the margin of advantage of employment", while possibly large at a moment in time, is eliminated over a lifetime of labor-force participation. The crucial assumptions in the Solow model are: (1) "All workers in the firm's labor pool are alike." This applies to their reservation wage and to their discount factor. (p. 53). (2) "Jobs are allocated to workers at random, independently in each period." (p. 54) Although the calendar time for a period is not specified, a rational unemployed worker may see no reason to rock the boat by offering to work for less, when in a short while he has a 90-95% chance of getting a job with the higher wage. However, if workers differ significantly in these attributes, it is highly likely that a person with an unusually low reservation wage will compete for an existing job even though

a person with a reservation wage just below the going wage would resist this temptation. Also, one would expect that a person who has been unemployed for many periods to be more hungry for a job than a person who has experienced very little unemployment in the past. Despite these potential conflicts in the labor market, Solow's model leads to the conclusion that *ex ante* all workers will have practically the same job-market experience, being involuntarily unemployed about 5-10% of the time and getting the same rewards for their sacrifice of leisure when they do work. For such a homogeneous group it is much easier to make a convincing case that "social norms" govern their activities than for a heterogeneous group that faces divisive issues in the work place.

This paper is concerned with competitive forces — or their absence — in the labor market. Without minimizing the contribution of contracts — both explicit union agreements and implicit "handshake" arrangements[1] — to restricting competitive behavior, the analysis here will feature two other conditions that make it difficult for unemployed workers to find and keep jobs: (1) relatively large fixed costs of adjusting the workforce, and (2) the conflict between "secure" workers and "marginal" workers over real wages, with the former outnumbering the latter by a wide margin. At various stages of the argument, empirical evidence will be presented from the postwar U.S. experience.

2. A Model of Heterogeneous Workers

Workers have a utility function summarized by $U(T-H, wH+I_0)$ where T represents total hours available, H is the number of hours spent working, at a wage rate of w, and I_0 is income independent of working. Since $U_1, U_2 > 0$, there are the usual ambiguities about the relationship between w and H. To overcome this uncertainty, it will be argued that individuals do not control the hours that they work and that they accept or reject a job offer that prespecifies $\bar{H}$ hours per period. This means that a worker must find the reservation wage, w_r, by solving the following equal-utility constraint.

$$U(T-\bar{H}, w_r\bar{H}+I_0) = U(T, I_0). \tag{1}$$

This reservation wage rises with $\bar{H}$, and with I_0 if the marginal utility of income declines. Different individuals will have different

[1] The classic exposition of this argument is by Okun (1981).

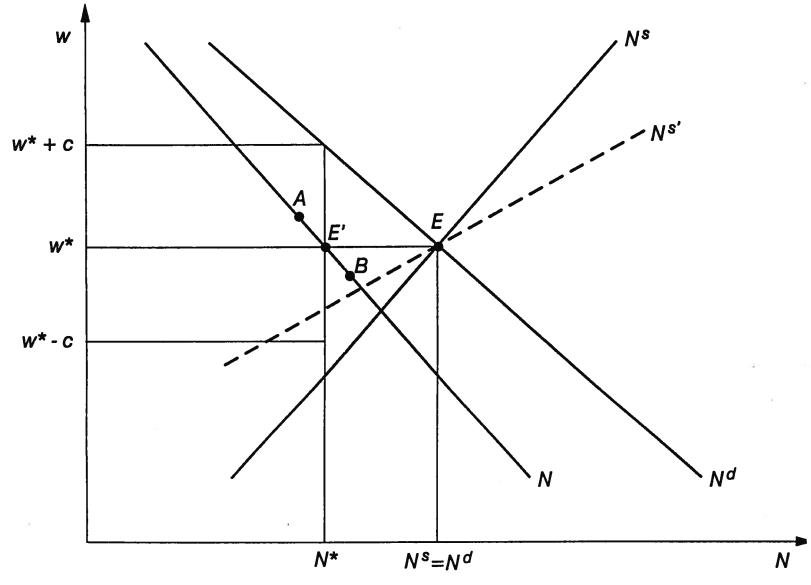

Fig. 1: A Model of the Labor Market

reservation wages, not only because $\bar{H}$ and I_0 are not the same for all persons, but also because U_1 and U_2 differ: persons with a strong preference for leisure will have high reservation wages. As the actual wage rises, more and more persons will find their reservation wage exceeded and they will offer $\bar{H}$ hours of work. Therefore, the supply of workers is a uniformly positively-sloped line as shown in Fig. 1 by N^s. Individuals can be ranked along this line, with low reservation-wage persons at the bottom left and high reservation-wage persons at the top right. The slope of the supply curve depends on the number of persons who enter the labor market at every wage. The dashed line $N^{s'}$ shows a greater response than N^s. At some wage rate that is high enough, all eligible persons will be in the labor force and the supply curve becomes vertical.

The demand for workers is derived from the following profit-maximization condition:

$$\Pi = Y(N, \bar{K}) - wN - \alpha_1(N - N_{-1} + Q)^2 - \alpha_2(N^d - N)^2, \quad (2)$$

where $Y(\,)$ is the production function, with the capital stock taken as fixed, α_1 and α_2 measure the importance of adjustment costs

and disequilibrium costs to the labor input, respectively. The former involves hiring or training costs for new employees, either as new additions when $N > N_{-1}$ or as replacements for quits, Q. The latter indicates that a firm will have extra costs when it is not possible to have the optimal number of workers, N^d.[2] In both cases, these cost functions are quadratic which provides them with two reasonable properties: symmetry and nonnegativity. The latter means that when the firm has too many workers, it also faces termination costs (i.e., when $N > N_{-1}+Q$) and congestion costs (i.e., when $N^d < N$). Moreover, these costs, although paid only once for each worker are incurred in each period as long as adjustment takes place and disequilibrium is not eliminated. In the absence of these costs, the firm would set $Y_N(N) = w$ which provides a downward-sloping demand curve for labor because the marginal product of a factor declines when more is used and co-operating factors are fixed. This is shown as N^d in Fig. 1. Once the firm faces both adjustment and disequilibrium costs, it will have an optimal number of vacancies dictated by

$$V^* \equiv N^d - N = \frac{\alpha_1(N^d - N_{-1} + Q)}{\alpha_1 + \alpha_2}. \quad (3)$$

Only if $\alpha_1 = 0$ would vacancies disappear. In equilibrium, $N = N_{-1}$ and the vacancy rate becomes

$$v \equiv \frac{V}{N^d} = \frac{\alpha_1}{\alpha_2} q, \quad (4)$$

where $q \equiv Q/N^d$ is the quit rate. In the absence of continuing quits, the vacancy rate would also be zero. Because firms find it optimal to leave some jobs vacant, a labor-use curve, N, is drawn in Fig. 1 to the left of the N^d curve, since at any given wage rate, actual employment will be less than the "demand" for labor by the number of vacancies that are allowed to exist. Assume that the demand curve takes the form: $N^d = \beta_0 - \beta_1 w$. Then the labor-use curve is written as

$$N = \beta_0(1 - \frac{\alpha_1}{\alpha_2} q) - \beta_1(1 - \frac{\alpha_1}{\alpha_2} q)w, \quad (5)$$

[2] For comparison, Blanchard and Diamond (1989) use a matching function for new hires, analagous to a production function for "jobs". The role of nonwage, fixed costs of labor was first made prominent by Oi (1962). A useful summary of the role and size of these costs is given by Ehrenberg and Smith (1994, Ch. 5.)

which makes it steeper than N^d, but with the same vertical intercept. The vacancy rate also becomes the natural rate of unemployment; in Fig. 1, the "equilibrium" number of people who are unemployed is EE'. In situations of excess supply, the actual unemployment rate is above the natural rate and vice versa for excess demand. The vertical distance between N^d and N indicates the adjustment and disequilibrium costs that the firm does incur. Thus, in addition to paying w to each worker, the firm also pays c per worker and the sum of $w + c$ is the profit-maximizing payment for N workers because that equals the value of the marginal product of these workers. The value of c is determined by

$$\begin{aligned} c &= [\alpha_1(N^* - N_{-1} + Q)^2 + \alpha_2(N^d - N^*)^2]/N^* \\ &= \frac{\alpha_1\alpha_2(N^d - N_{-1} + Q)^2}{\alpha_2 N^d + \alpha_1 N_{-1} - \alpha_1 Q}. \end{aligned} \tag{6}$$

A more transparent assessment of the factors determining the value of c can be obtained by rewriting the labor-demand equation as $N^d = \beta_0 - \beta_1(w + c)$ because profit-maximization dictates that $Y_N(N) = w + c$ and then solving for c produces:

$$c = \frac{\alpha_1}{\alpha_2} q\left(\frac{\beta_0}{\beta_1} - w\right), \tag{7}$$

which must be a positive expression since β_0/β_1 is the vertical intercept. Any factor that increases the vacancy rate also increases the value of c as the N curve shifts further away from N^d. For example, an increase in α_1 raises vacancies according to equation (4) and raises c according to equation (7). In other words, both a higher natural rate of unemployment and larger adjustment costs are the result.

3. Empirical Justification for Adjustment and Disequilibrium Costs

The adjustment and disequilibrium costs that are a vital element in the labor-market analysis are difficult to illustrate and quantify. Nevertheless, there are indirect indications of their existence. First, vacancies exist under almost all circumstances and in all industries. The CITIBASE index LHELX is a ratio of help-wanted ads to the number of unemployed. In a homogeneous labor market where all workers are interchangeable, there would be either vacancies to be

filled or unemployed persons, but not both. The index would then take on values of zero or infinity, with nothing in between. Instead, the index has a mean annual value of 0.611 for the period 1948-91, with a standard deviation of 0.264. The highest value was 1.273 and the lowest value was 0.241. Despite some uncertainty whether help-wanted ads truly represent vacancies, the lack of volatility of this index is evidence that vacancies and unemployment coexist because of adjustment and disequilibrium costs.

Second, it would be virtually impossible to justify overtime hours at a premium of "time-and-a-half" or "double-time" if there were no semi-fixed costs of labor. No firm would pay $1.5w$ or $2w$ per hour after $\bar{H}$ hours if it could obtain extra workers at w per hour. The overtime premium makes sense because the firm saves c per worker. Because data for overtime hours are available for U.S. manufacturing industries, it is possible to use this sector of the economy to obtain numerical estimates of the vacancy rate, $\hat{v}$, and the cost of having a less-than-desired work force, $\hat{c}$, and in the process show that these factors can have important effects on a firm's decision about its labor input.

The "standard" hourly wage, W, is first calculated from the following identity:

$$\tilde{W}H \equiv W\bar{H} + 1.5W(H - \bar{H}), \tag{8}$$

where H are total weekly hours and $H - \bar{H}$ are overtime hours, $\tilde{W}$ are average hourly earnings, which are a weighted average of standard hourly earnings and overtime earnings. The data assume that overtime is paid at "time-and-a-half" the standard rate. Then, "nominal" demand for labor in manufacturing industries, N^d, is derived from the assumption that total actual labor costs are equal to the cost of employing those workers actually demanded, each working standard hours at the standard wage. Hence,

$$\tilde{W}HN = W\bar{H}\hat{N}^d \tag{9}$$

allows us to solve for $\hat{N}^d$ relative to N, which is actual employment. In fact, actual labor costs are likely to be less than the alternative costs of hiring, training and paying additional workers or firms would not have made the decision to use overtime; therefore, the calculation of $\hat{N}^d$ is at the upper limit of a range of estimates. The vacancy rate is then defined to be $\hat{v} = (\hat{N}^d - N)/\hat{N}^d$ expressed as

a percent. This estimate will also be at the upper limit because of the upward bias in $\hat{N}^d$.

The annual real cost of this overtime is estimated from the following formula:

$$\hat{c} = 1.5W(H - \bar{H})/P \times 52, \tag{10}$$

where P is a price deflator. This amount could have been spent on acquiring and training new workers, but presumably firms deemed it more efficient to use overtime hours from existing employees instead. The estimated $\hat{c}$ is likely to be at the lower bound of the true value of c for the same reason that $\hat{v}$ is likely to be biased upward.

The results of these calculations are shown in Table 1 in the Data Appendix. The calculated vacancy rate in U.S. manufacturing industries, despite the admitted upward bias mentioned above, is both surprisingly high and volatile. Its mean value for 1956-92 is 11.3%, with a standard deviation of 1.6%. If these vacancies could have been reduced to 5%, an average of 1.2 million extra workers would have been hired in the manufacturing industries. The vacancy rate also tends to move procyclically; it is at its lowest levels during recessions such as in 1959-61 and in 1982. However, the correlation coefficient with the unemployment rate is only −0.275 and with LHELX, mentioned above, it is 0.512; also during the 1991-92 recession, the rate was still climbing.

The annual cost of overtime per worker is also fairly substantial: the mean value for 1956-92 is $2,279. The cost of finding and assimilating an extra worker, who is expected to stay with the firm for one year, must therefore be at least this large or firms would not have relied on overtime hours to the extent that they did. We cannot know what expectations firms have of the duration of attachment of a worker to the firm, but the shorter this period, the lower is the relative cost of overtime or the higher is the cost of acquiring the new worker.

The third piece of evidence supporting the existence of adjustment and disequilibrium costs is based on a direct test of the hypothesis that the U.S. economy operates on the labor-use curve in Fig. 1, both in equilibrium and in disequilibrium, implying that the relationship between employment and the real wage should always be negative. In the absence of these costs, the short side of the market would prevail whenever the real wage was at a non-market-clearing level. This would require a positive relationship between

employment and the real wage along the N^s curve when the labor market exhibited excess demand. Such a labor-use curve was estimated and reported in Prachowny (1984, Ch. 3); the only changes here are to replace the GNP data used in the earlier study with GDP figures and to increase the time period from 1954-90 to 1954-92. The specification for this equation is taken from Hamermesh (1986, eq. 48), based on the derivation of the marginal product of labor in a CES production function. Using a two-stage least squares regression with first-differenced annual data, the results are the following:

$$\begin{array}{lll} \Delta \ln N = 0.637\ \Delta \ln Y - 0.349\ \Delta \ln\ w & \bar{R}^2 = 0.607, \\ \qquad\quad (.056) \qquad\quad (.101) & F = 11.414 \end{array} \tag{11}$$

where N is total civilian employment, Y is real output, and w is average weekly earnings in private nonagricultural industries in 1982 dollars.[3] The instruments were a trend, its square, the growth rate of M1, μ1,Gordon's (1993) natural rate of unemployment, u^*, a dummy variable for the oil-price shocks in 1974 and 1979 and government employment, N_g. Serial correlation of the residual based on an LM test and a structural shift in the relationship in 1974 (when real wages started to decline) based on a Chow test, could be rejected at the 95% confidence level. Despite the robust negative coefficient for real wages in equation (11), we need to test formally whether this equation could be confused for a supply-of-labor relationship. Several such tests were performed. First, there is a simple test for mis-specification of equation (11). If the actual value for employment were on the N^s curve in excess-demand situations and the predicted value on the N^d curve, there would be a tendency for negative residuals under these conditions; therefore, the correlation between the residuals and a dummy variable that took on unitary values when Gordon's data indicated excess demand in the labor market, should be negative. The correlation coefficient was 0.317, which is contrary to expectations. Second, multiplying this dummy variable times w and adding it as a regressor would allow the wage coefficient to change signs when excess demand prevails. This additional regressor had a t-value of 0.105,

[3] The numbers in parentheses are standard errors. The fact that both coefficients are significantly different from one means that a constant-returns-to-scale Cobb-Douglas production function can be rejected.

which means that it contributed virtually nothing to the explanation of $\Delta \ln N$. Finally, estimating directly a supply curve such as

$$\begin{array}{lll} \Delta \ln N = 0.017 - 0.087\, \Delta \ln\ w & \bar{R}^2 = -0.136, \\ \quad (.003)\quad (.161) & F = 0.290 \end{array} \qquad (12)$$

where the constant has to absorb the effects of any changes in the unknown reservation wage and other influences on the supply decision, gave results that still had a negative, but not significant, coefficient on the real wage.

While it has been impossible to test directly the hypothesis that adjustment and disequilibrium costs create vacancies, several pieces of indirect evidence suggest strongly that the specification of the labor market in the previous section is a sensible approach for analyzing labor-market behavior.

4. Competing for Existing Jobs

The stage is now set for an examination of unemployed workers competing for existing jobs by undercutting the existing wage. The analysis will take place at equilibrium in the labor market, but that is not strictly necessary as any other point on the labor-use curve could be used as the starting point. At w^*, there are involuntarily unemployed persons equal to EE' in Fig. 1 who would offer their services at that wage. However, firms cannot costlessly exchange current workers for new ones even if the wage is lowered to some extent. In fact, firms would require that the wage fall to $w^* - c$ before they would be interested in such a swap. Essentially, they would force the new workers to absorb the adjustment costs equal to c. Would there be any workers who would offer their services at a wage rate of $w^* - c$? The answer depends on the slope of the labor-supply curve. If the relatively steep curve depicted by N^s is used, there are still persons who would want to work at that wage rate, but if $N^{s'}$ is relevant, $w^* - c$ is below the reservation wage of all unemployed workers and the wage offer would be refused. In other words, the adjustment and disequilibrium costs perform the function of a buffer protecting existing workers, for whom these costs have been paid, against outsiders. The size of c plays a critical role in protecting existing workers. In industries where hiring and training costs are low, the protection may appear to be low, but these industries also tend to have a high quit rate which then raises c.

The existence of quits in the labor market presents both a barrier to unemployed workers in raising the semi-fixed costs of

employment and an opportunity for a job in the near future. However, the chances of finding a job depend on the relative importance of adjustment costs to disequilibrium costs. According to equation (4) the vacancy rate, which also represents the unemployment rate in equilibrium, will be larger or smaller than the quit rate depending on whether α_1 is greater or smaller than α_2. The evidence on the relative size of v and q is not conclusive. Blanchard and Diamond (1989, Fig. 5) show that vacancies fluctuated countercyclically around 2 million against a mean value of the labor force of 92.3 million. Ehrenberg and Smith (1994, Fig. 10.1) report a quit rate of 1-3% per month, but according to Akerlof, Rose and Yellen (1988), about 40% of quits lead directly to another job, which in the aggregate labor market does not provide an opportunity for an unemployed person to secure a job.

The data in Table 1 may be used to obtain some estimates of the wage reduction faced by unemployed workers seeking to replace an existing worker. Let us take the year 1987 as an example because it is fairly close to having equilibrium in the labor market, according to the data from Gordon (1993). In that year, the nominal hourly wage in manufacturing was \$9.48 or \$18,880 per year if the person worked the standard number of hours equal to 38.3 per week. The annual real and nominal cost of overtime per worker that the firm faced was \$2,737, which in turn represented 14.5% of the annual wage. Therefore, the new worker would have to be willing to accept \$8.11 per hour to make it worthwhile for a manufacturing firm to eliminate overtime hours from its existing workforce and hire new workers instead. Whether the reservation wage for the unemployed worker is above or below that amount is very difficult to predict; two clues that the reservation wage is lower are that the average weekly unemployment insurance benefit in 1987 was \$140.55, which works out to only \$3.43 per hour and that the wage in retail trade, the industry with the lowest wage that still attracts workers, was \$6.12. Nevertheless, it is dangerous to generalize from this specific example: not all unemployed workers can compete for jobs in the high-wage manufacturing industries. Furthermore, other industries, with the possible exception of construction, rely much less on paid overtime hours and therefore estimates of v and c for these industries and for the economy as a whole would have to be based on other considerations.

The conclusion to be reached from this analysis is that unemployed workers may not have self-discipline imposed on them by

a rational social norm; instead they may be shut out of existing jobs by the cost of making them fit into the work place, a cost already paid by existing workers who are then protected from the competitive ravages of market discipline. Furthermore, currently unemployed workers are at an additional disadvantage in finding and keeping "new" jobs that are available when excess demand appears in the labor market: secure workers, who outnumber them by a ratio of 10 to 1 or more, are better off when there is excess supply. To show this conflict in the labor market requires an analysis of welfare changes arising from different levels of employment and unemployment, using a technique pioneered by McDonald and Solow (1981).

5. Asymmetrical Adjustment to Excess Supply and Demand

At this point we must allow the labor market to operate in disequilibrium along the labor-use curve. Contracts that were made previously will still be honored because most participants in the market will want to offer or accept jobs that require $\bar{H}$ hours of work. Even if the real wage is not a market-clearing price, both workers and firms would find the alternative of withdrawing from the market entirely to be much worse.

Consider a shock to the labor market that drives it away from equilibrium in either direction and then evaluate the effects on individual participants in the labor market. More specifically, let the inflation rate rise or fall by a given amount because of unpredictable changes in the demand for goods and services. If this happens after wage contracts have been signed, the real wage will rise if the inflation rate falls and vice versa. In both cases, firms will adjust their labor input, to A in Fig. 1 if the wage has risen and to B if it has fallen. It should be noted that firms will have extra costs associated with these adjustments, incorporated in the variable c, and $w + c$ is measured on the N^d curve. Also, the symmetry of A and B around E' would be prevented if B were below the intersection of N and N^s because that would make the unemployment rate negative and involve involuntary exchange in the labor market.

It is now possible to assess the situation at A, E', and B for different groups who operate in the labor market and find their welfare rankings of these possibilities. First, let us consider the owners of firms. At B, firms have higher profits than at E' or at

A and therefore they would like to delay the equilibrating upward pressure on wages; but at A they would want to see more speedy downward adjustment of wages. In other words, firms prefer excess demand to excess supply in the labor market as long as they are allowed to operate along the labor-use curve. Second, there are those workers whose employment is secure enough that they continue to have jobs even if the wage rises and employment falls to A. They prefer A to E' and to B because they have a higher real wage and still work $\bar{H}$ hours. In effect, workers with job security prefer excess supply in the labor market to equilibrium or excess demand. Third, there are those marginal workers who have jobs only when the labor market exhibits excess demand. They will, of course, prefer B to A and even to E' because the going wage exceeds their reservation wage. These welfare rankings create a conflict among workers: those with jobs want high wages, while those looking for jobs want low wages.

In other markets operating with spot transactions, it is essentially irrelevant to list the preferences of various groups concerning disequilibrium, but if, as Solow argues, the labor market is also a social institution with inhibitions about unacceptable actions or behavior, then it is at least possible that excess demand is eliminated at a faster pace than excess supply. This would require that "secure" workers have greater influence on the wage determination process than "insecure" workers allied with the interests of firm owners.

What do secure workers have to gain from being the dominant force in the determination of wages? What is the size of their real-wage improvement from being able to reduce employment by, say, 1%? Put another way, what is the trade-off between employment for those looking for work and wage gains for those who have secure jobs? The estimated labor-use curve of equation (11) can be adapted to examine these questions. By re-arranging this equation to:

$$\Delta \ln w = \frac{0.637}{0.349}\Delta \ln Y - \frac{1}{0.349}\Delta \ln N \qquad (11')$$

and then adding and subtracting $1.825\Delta N$, we obtain

$$\Delta \ln w = 1.825\rho - 1.040\Delta \ln N, \qquad (11'')$$

where $\rho = \Delta \ln Y - \Delta \ln N$ is a measure of the growth rate of labor productivity. It is now seen that the trade-off between higher

employment and higher real wages has an elasticity of one. In 1987, a reduction of employment by 1%, or about 1.1 million workers, would have meant an extra $140 per year for each of the other 111.3 million workers.

It is not being argued that secure workers can choose an optimal point on the labor-use curve because security itself depends on what point is chosen; the long-run position must be consistent with equilibrium. Instead, the proposition is that a large group of workers gain from delaying a fall in real wages and only a small group benefit from postponing increases in real wages when the labor market is in disequilibrium. Sooner or later competitive pressures will be brought to bear, but rather sooner in situations of excess demand than in conditions of excess supply.

This asymmetry in wage adjustments can be illustrated by analyzing the data for 1979-89, a trough-to-trough cycle in the unemployment gap, measured by $u - u^*$, using Gordon's (1993) data. From 1979, when $u - u^* = -0.1\%$, it took three years to reach its peak in 1982 at 3.5%, where it remained in 1983. Then it took six years to move to a new low in 1989 at -0.7%. For the period 1980-89, the mean value of the unemployment gap was 1.19%. The real wage fell by an annual average value of 0.988%, but during 1983, when the unemployment rate was at its highest, the real wage actually rose by 2%. If the real wage had fallen every year exactly by the average value of its decline, it would have ended in 1989 at its actual value, but employment would have been cumulatively higher. Moreover, the resulting unemployment gap, without adjusting the supply of labor, now has five years each of excess supply and of excess demand and the mean value has fallen to 0.393%.[4] The evidence for this time period is clear: without changing the average real wage over a cycle but speeding its adjustment in the economic downturn and slowing its adjustment in the upturn, the cycle becomes more symmetrical with respect to the unemployment rate.

6. Conclusions

The analysis of competitive forces in the labor market is not new; however, most of the previous studies have looked at union power

[4] The data for all these variables are shown in Table 2 in the Appendix.

as the source of monopsony power. Here, all workers are atomistic, equally-able, individual competitors, but they differ in two important respects: reservation wages and security of employment. Both of these factors play a role in the difficulty that involuntarily unemployed persons have in finding jobs. Workers gain security just by having cleared the hurdle of the firm's cost of hiring them; unemployed persons may not be willing to absorb these costs if the resulting wage is below their reservation wage. Hence the larger are the fixed costs of employment, the greater is the security of workers with jobs and the lower is the reservation wage of unemployed persons still seeking work.

Moreover, once it is recognized that a vast majority of workers are not obsessed with equilibrium but are in fact better off when there is excess supply in the labor market, then wage determination, at least in the short run, becomes a power struggle between "secure" and "insecure" workers. Given the relative size and strength of these two contending groups, it is not surprising to find that excess supply prevails longer than excess demand.

Data Appendix

Table 1: Data for Wage Rates, Weekly Hours, Employment, Vacancy Rates and Overtime Costs in Manufacturing Industries, 1956-92

Year	$\tilde{W}$	W	H	$H-\bar{H}$	N	$\hat{N}^d$	$\hat{v}$	$\hat{c}$
1956	1.95	1.88	40.4	2.8	17243	19169	10.05	1742
1957	2.04	1.98	39.8	2.3	17174	18754	8.42	1458
1958	2.10	2.05	39.2	2.0	15945	17231	7.46	1285
1959	2.19	2.12	40.3	2.7	16675	18471	9.72	1742
1960	2.26	2.19	39.7	2.5	16796	18489	9.16	1640
1961	2.32	2.25	39.8	2.4	16326	17897	8.78	1604
1962	2.39	2.31	40.4	2.8	16853	18736	10.05	1878
1963	2.45	2.37	40.5	2.8	16995	18888	10.02	1900
1964	2.53	2.44	40.7	3.1	17274	19410	11.01	2129
1965	2.61	2.50	41.2	3.6	18062	20656	12.56	2469
1966	2.71	2.59	41.4	3.9	19214	22211	13.49	2676
1967	2.82	2.71	40.6	3.4	19447	22113	12.06	2367
1968	3.01	2.88	40.7	3.6	19781	22660	12.71	2546
1969	3.19	3.05	40.6	3.6	20167	23110	12.74	2568
1970	3.35	3.23	39.8	3.0	19367	21735	10.90	2148
1971	3.57	3.44	39.9	2.9	18623	20812	10.52	2099
1972	3.82	3.66	40.5	3.5	19151	21868	12.43	2573
1973	4.09	3.91	40.7	3.8	20154	23267	13.38	2805
1974	4.42	4.24	40.0	3.3	20077	22785	11.88	2433
1975	4.83	4.68	39.5	2.6	18323	20260	9.56	1926
1976	5.22	5.03	40.1	3.1	18997	21384	11.16	2323
1977	5.68	5.44	40.3	3.5	19682	22490	12.49	2660
1978	6.17	5.91	40.4	3.6	20505	23514	12.80	2751
1979	6.70	6.44	40.2	3.3	21040	23862	11.83	2527
1980	7.27	7.02	39.7	2.8	20285	22594	10.22	2139
1981	7.99	7.72	39.8	2.8	20170	22460	10.19	2138
1982	8.49	8.25	38.9	2.3	18781	20551	8.61	1766
1983	8.83	8.51	40.1	3.0	18434	20670	10.82	2285
1984	9.19	8.82	40.7	3.4	19378	22028	12.03	2569
1985	9.54	9.17	40.5	3.3	19260	21823	11.74	2500
1986	9.73	9.34	40.7	3.4	18965	21558	12.03	2556
1987	9.91	9.48	41.0	3.7	19024	21855	12.95	2737
1988	10.19	9.73	41.1	3.9	19350	22393	13.59	2850
1989	10.48	10.02	41.0	3.8	19442	22421	13.29	2735
1990	10.83	10.37	40.8	3.6	19117	21892	12.68	2572
1991	11.18	10.71	40.7	3.6	18455	21141	12.71	2554
1992	11.45	10.94	41.0	3.8	18192	20979	13.29	2678

Table 2: Actual and Adjusted Data for the Unemployment Cycle, 1979-89

Year	Actual $\ln w$	Adj. $\ln w$†	Actual $\ln N$	Adj. $\ln N$‡	Actual u	Adj. u§	Actual $u-u^*$	Adj. $u-u^*$
1979	5.676	5.676	11.501	11.501	5.8		-0.1	
1980	5.615	5.666	11.506	11.501	7.0	7.6	1.1	1.7
1981	5.601	5.656	11.517	11.516	7.5	7.7	1.5	1.7
1982	5.588	5.646	11.508	11.505	9.5	9.9	3.5	3.9
1983	5.608	5.636	11.521	11.533	9.5	8.5	3.5	2.5
1984	5.616	5.626	11.562	11.575	7.4	6.3	1.4	0.3
1985	5.603	5.616	11.582	11.598	7.1	5.7	1.1	-0.3
1986	5.606	5.606	11.605	11.620	6.9	5.6	0.9	-0.4
1987	5.595	5.596	11.630	11.642	6.1	5.0	0.1	-1.0
1988	5.586	5.587	11.652	11.670	5.5	3.8	-0.5	-2.2
1989	5.577	5.577	11.673	11.690	5.3	3.6	-0.7	-2.4

† Same value as actual $\ln w$ in 1979 with subsequent years calculated by subtracting 0.00988 (i.e., the mean of the decline between 1980 and 1989) from the previous level.

‡ Calculated from equation (11) with actual changes in output but with adjusted changes in the real wage.

§ Calculated from $100(N^s - N)/N^s$ with N^s unchanged from its actual value and N from the adjusted value.

Data Sources

Manufacturing industries

$\tilde{W}$ average hourly earnings, dollars. Source: *ERP*, 1983, Table B-38 and 1993, Table B-42.

H average weekly hours. Source: *ibid.*

$H-\bar{H}$ overtime hours per week. Source: *ibid.*

N total employees, thousands. Source: *ERP*, 1993, Table B-41.

Economy-wide data

u unemployment rate, all civilian workers, percent. Source: *ERP*, 1993, Table B-38.

u^* natural unemployment rate, percent. Source: Gordon (1993, Appendix A).

Y GDP in billion of 1987 dollars. Source: *Survey of Current Business*, September 1993, p. 50.

P GDP implicit price deflator, 1987 = 1, obtained by dividing nominal GDP by GDP in 1987 dollars. Source: *Survey of Current Business*, September 1993, pp. 47 and 50.

N civilian employees, 16 year of age and over, thousands. Source: *ERP*, 1993, Table B-31.

w average weekly earnings in private nonagricultural industries, in 1982 dollars. Source: *ERP*, 1991, Table B-44 and 1993, Table B-42.

$\mu 1$ growth rate of M1 monetary aggregate, percent. Source: *ERP*, 1974, Table C-52 and 1993, Table B-65.

N_g total government employees, thousands. Source: *ERP*, 1993, Table B-41.

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