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U.S. Labor Markets: Imbalance, Wage Growth, and Productivity in the 1970s

DURING THE 1970s there was a marked increase in both the turnover and perceived shortages in U.S. labor markets that were associated with a given rate of unemployment. In those years a given unemployment rate became linked with much faster wage growth and much slower productivity growth than it was before. This paper presents evidence that relates the apparent increasing difficulty employers have had in satisfying their labor demands at given rates of unemployment to the U.S. record of wage and productivity growth. Throughout the discussion the extent of labor turnover (measured in terms of discharge and quit rates for the manufacturing sector) and the degree of apparent shortages (reflected primarily in help-wanted advertising per employee) associated with particular unemployment rates are referred to as labor market imbalance.

In the 1970s the average annual growth rate of the civilian labor force was much greater than it was in the preceding twenty years: 2.5 percent a year in the 1970s, 1.7 percent a year in the 1960s, and 1.1 percent a year in the 1950s. To put the rate for the 1970s in better perspective, one should include in the picture the forecasts of labor force growth by the

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U.S. Bureau of Labor Statistics for the present and next decades: 1.4 percent a year in the 1980s and 0.5 percent a year in the 1990s.

From 1970 to 1980, although civilian employment did not grow quite as fast as the labor force, it rose by more than 20 million. After controlling for cyclical factors with the unemployment rate for prime-age males (ages twenty-five to fifty-four), between the macroeconomic watershed year, 1973, and 1981 the annual employment growth rate was 75 percent above its post-1959 trend; even within the ailing manufacturing sector, after controlling for cycle in the same way, the new hires rate was 19 percent above its trend value. Also, since 1973 (without controlling for cycle or trend) the cross-state dispersion of employment growth, as measured by the variance of the distribution of weighted employment growth rates that have been weighted by the state's share of national employment, has been 49 percent above its 1959–72 mean value.[1]

Because an employer's difficulty in satisfying labor demands is likely to depend on how fast those demand rates are growing, a more rapid and uneven growth of employment should be expected to increase the imbalance in individual labor markets. This occurs, in part, because it is harder to find applicants with the right attributes as the number of positions to be filled increases. In addition, the employer's discharge (fire) and quit rates are likely to rise with the new hires rate. Thus the mean and variance of employers' employment growth rates are likely to condition the extent to which labor markets are in imbalance and hence have an impact on the correlates of this imbalance.[2]

Virtually all studies that have tried to explain the disappointing wage and productivity developments of the 1970s and other characteristics of

1. A related analysis by David Lilien focuses on shifts in the locus of employment across industries. Lilien does not deal with the geographic location of the employment growth. See David M. Lilien, "Sectoral Shifts and Cyclical Unemployment," *Journal of Political Economy,* vol. 90 (August 1982), pp. 777–93.

2. For related discussions of the operation of labor markets see Robert M. Solow, "The Nature and Sources of Unemployment in the United States," *International Trade and Finance: A Collected Volume of Wicksell Lectures, 1958–1964* (Stockholm: Almquist and Wicksell, 1965), pp. 251–91; Edmund S. Phelps and others, *Microeconomic Foundations of Employment and Inflation Theory* (Norton, 1970); Charles C. Holt and others, "Manpower Proposals for Phase III," *BPEA, 3:1971,* pp. 703–22; Robert E. Hall, "Prospects for Shifting the Phillips Curve through Manpower Policy," *BPEA, 3:1971,* pp. 659–701, and "A Theory of the Natural Unemployment Rate and the Duration of Employment," *Journal of Monetary Economics,* vol. 5 (April 1979), pp. 153–69; and Lilien, "Sectoral Shifts."

the labor market have used aggregate time-series data. While this paper examines aggregate data, it also analyzes data on labor market imbalance, wage growth, and productivity growth across geographic areas. This permits a comparison of results based on variation in labor market imbalance over time and across areas.

To be more specific, the difference in labor market imbalance between the pre- and post-1973 periods resembles the difference in the 1970s between imbalance in the declining Northeast and Middle Atlantic states and in the booming Southwest and Pacific states (see census regions in appendix A). Thus if labor market imbalance played a role in the outward shift of the U.S. Phillips curve and the downward spiral of U.S. productivity growth, wage growth should have been lower and productivity growth higher in the Northeast and Middle Atlantic regions with low imbalance than in the Southwest and Pacific states with high imbalance, once the effects of other important factors have been removed. The sharp increase in turnover and apparent shortages in U.S. labor markets after 1973, and the wide differences in the degree of imbalance across geographic areas, make it possible to use both time-series and cross-sectional data to get a clear idea of the relations among labor market conditions, wage growth, and productivity growth.

The first part of this paper presents time-series evidence that strongly supports the idea that imbalance in U.S. labor markets grew substantially in the 1970s, particularly in a spurt around 1973.[3] Also presented is cross-area evidence of wide differences in the degree to which imbalance grew across regions during that decade. Cross-area variation in the extent of labor market imbalance is at the heart of the ensuing discussion because it permits cross-area analyses of the effect of imbalance on wage and productivity growth. Although cross-area labor market developments were *not* a major cause of aggregate changes, because more imbalance

3. Shifts in the Beveridge curve for the United States are explored in Malcom S. Cohen and Robert M. Solow, "The Behavior of Help-Wanted Advertising," *Review of Economics and Statistics*, vol. 49 (February 1967), pp. 108–10; Charles L. Schultze, "Has the Phillips Curve Shifted? Some Additional Evidence," *BPEA, 2:1971*, pp. 452–67; Robert M. Solow, "Down the Phillips' Curve with Gun and Camera," in David A. Belsley and others, eds., *Inflation, Trade and Taxes* (Ohio State University Press, 1976), pp. 3–22; James L. Medoff and Katharine G. Abraham, "Unemployment, Unsatisfied Demand for Labor, and Compensation Growth, 1956–80," in Martin Neil Baily, ed., *Workers, Jobs, and Inflation* (Brookings Institution, 1982), pp. 49–88; and Katharine G. Abraham, "Vacancies, Unemployment and Wage Growth" (Ph.D. dissertation, Harvard University, May 1982).

in one region was matched by less imbalance in another, the cross-area analysis provides important insights into the macroeconomic relations.

The second part of the paper uses both cross-area and aggregate data to identify the possible causes of the observed growth in labor market imbalance. The principal new finding of this investigation is that the sharp increase in the growth rate of employment at a given rate of unemployment contributed to the growth of imbalance in U.S. labor markets.[4]

In the third part of the paper both cross-area and time-series data are used to assess the effect of the growth in labor market imbalance on the key macroeconomic phenomena of the past decade. The evidence derived from these two distinct types of data implies that the spurt of imbalance in U.S. labor markets during the 1970s played a role in both the outward shift of the Phillips curve for the United States and the reduction in this country's rate of total factor productivity growth.

The last part of the paper summarizes the primary results about the degree, location, causes, and effects of labor market imbalance during the past decade.

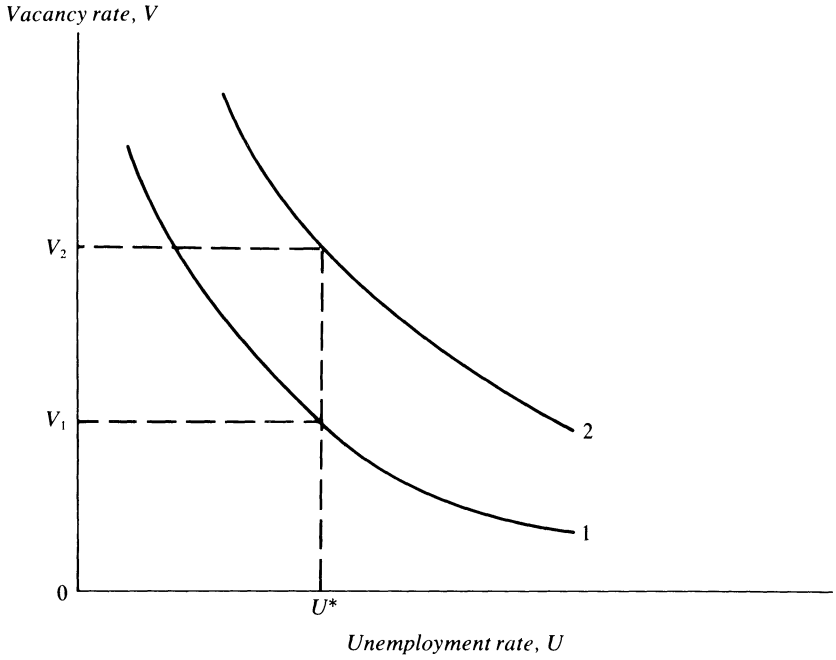
Labor Market Imbalance over Time and across Areas

In this section I describe growth in labor market imbalance by using Beveridge curves, which portray the relation between employers' difficulty in satisfying their labor demands (because of high turnover or shortages of workers with particular qualifications) and the degree of unutilized labor supply. I also present evidence on imbalance in the United States as a whole and in the individual regions.

THE IMBALANCE CONCEPT

Beveridge curves are shown in the diagram below relating employers' difficulty in retaining and hiring the requisite work force, as reflected in

4. Although there have been sizable positive trends over the past decade in the growth rate of the labor force and in the fraction of the labor force that is female and aged sixteen to nineteen, none of these trends exhibit what might be described as a circa-1973 discontinuity. Also, there is no evidence of a spurt circa 1973 in the liberalness of the unemployment insurance program. For more detail on the apparent recent growth in structural unemployment, see *Economic Report of the President, February 1983,* pp. 41–49.



a job vacancy rate, V, to the relevant rate of unemployment, U. It is assumed that V is a function of the amount of turnover (fires and quits) and shortages per employed worker. The downward slopes of these curves indicate that, all else the same, the higher (lower) is the rate of unemployment, the easier (harder) it is for employers to satisfy their labor demands. Beveridge curves 1 and 2 describe the relation under consideration for two periods when all else was *not* the same. As the diagram indicates, for a given U (say, U^*), employers' difficulty in satisfying their labor demands is greater in period 2 (V_2) than it was at the same U in period 1 (V_1). The outward shift in the relevant Beveridge curve between periods 1 and 2 indicates that labor market imbalance, as defined in this study, is greater in period 2 than it was in 1.

What factors cause an outward shift in a Beveridge curve? On the supply side of the labor market, anything that makes labor force members less able or less willing to fill the existing set of jobs would lead to an outward shift. Many observers have pointed to the decline in the portion of the labor force made up of prime-age males as one key determinant of

the outward shifts in Beveridge curves in the 1970s.[5] On the demand side, a faster rate of employment growth—for reasons such as substitution away from some factor such as energy whose price suddenly skyrockets, a more rapidly changing skill mix, or a changing geographic locus of jobs—can cause outward shifts in the V/U curve by increasing job turnover and labor shortages at a given rate of unemployment. Thus faster employment growth and, possibly, greater variability of growth rates across industries or areas could cause an outward shift in the Beveridge curve.[6]

IMBALANCE SPURTS IN THE 1970s

In the discussion below, U is measured by the unemployment rate of prime-age males. This choice follows the Phillips curve literature, which has moved from using the total unemployment rate to a rate that controls for the growing importance of women and young workers in the labor force. The Beveridge curve shifts to be documented are even more pronounced if expressed in terms of the total unemployment rate.

Employers' difficulty in satisfying their labor demands, V, is proxied by help-wanted advertising per employee in all sectors and by the discharge (fire) and quit rates in manufacturing. The help-wanted index can be expected to reflect the difficulty of filling vacancies. Discharge and quit rates are taken as indicators of employers' ability to retain needed labor once secured. Although none of these variables is ideal, taken together they offer a reasonable picture of the problems employers are having in filling vacant jobs and keeping them filled.

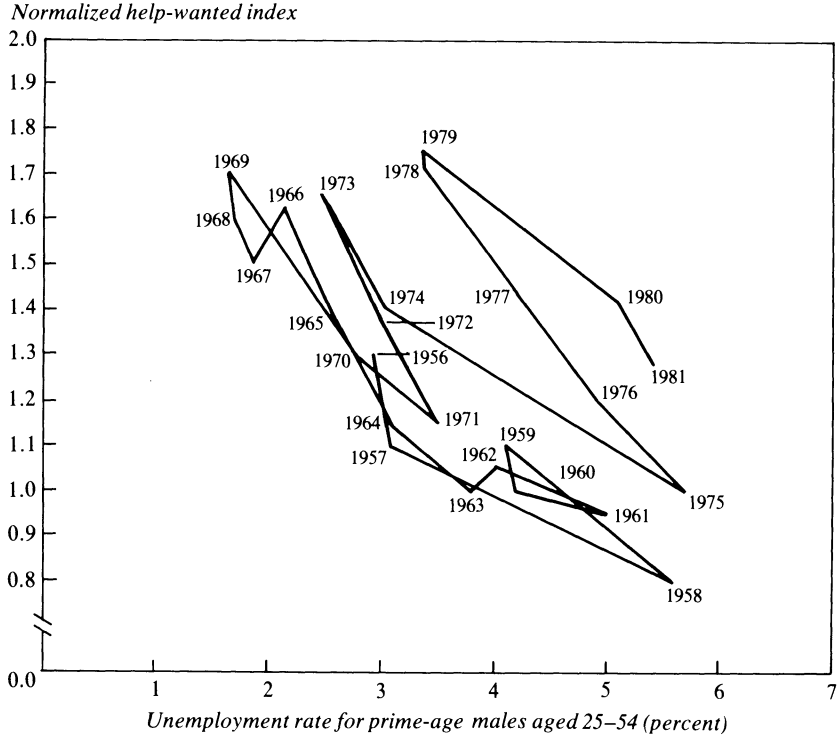
Figure 1 shows the relation between the normalized help-wanted index—the Conference Board's index of help-wanted advertising divided by nonagricultural employment—and the unemployment rate for prime-age males.[7] Between the end of the 1960s and the mid-1970s, this Beveridge curve shifted outward by a sizable amount—a claim supported econometrically by tabular data below. The shift implies that employers had to devote more resources to meeting their labor needs, presumably

5. The origins of this line of thought can be traced to George L. Perry, "Changing Labor Markets and Inflation," *BPEA, 3:1970,* pp. 411–41.

6. See Lilien, "Sectoral Shifts," for a related discussion.

7. More detail on the procedure followed in creating the index can be found in Noreen L. Preston, *The Help Wanted Index: Technical Descriptions and Behavioral Trends,* Report 716 (New York: Conference Board, 1977).

Figure 1. The Normalized Help-Wanted Index and Unemployment, 1956–81[a]



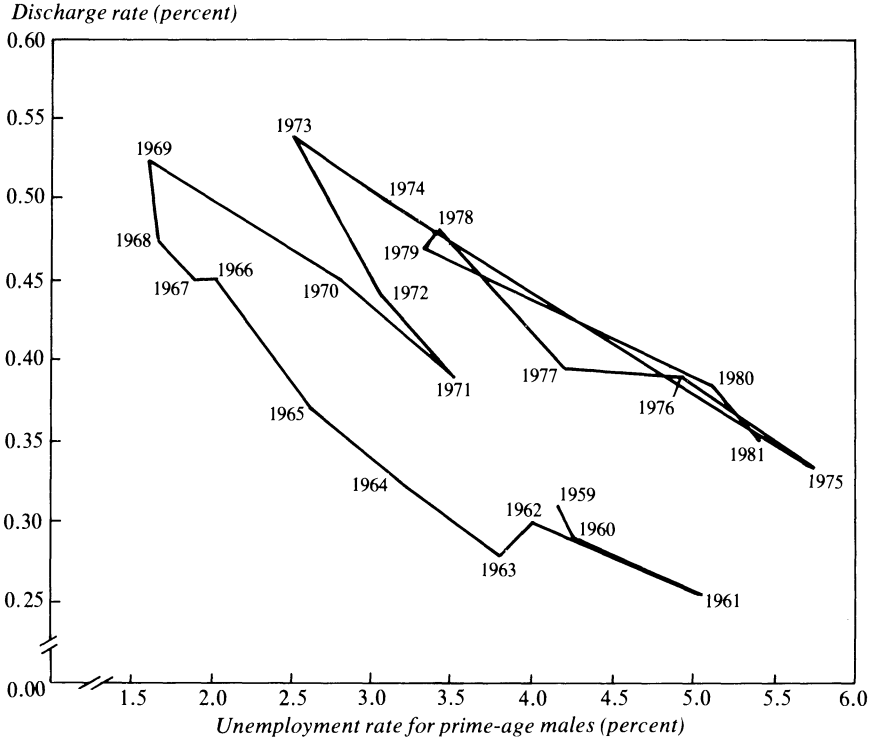
Sources: The normalized help-wanted index is from the Conference Board; employment data are from the U.S. Bureau of Labor Statistics.

a. The index was constructed by taking the average of the monthly help-wanted index figures for each year (1967 = 100) and dividing by the number of employees on nonagricultural payrolls (in millions).

because of a greater inability to attract certain kinds of labor or because of greater rates of employee turnover.

Some have argued that trends in the normalized help-wanted index are distorted by developments such as a declining relative cost of help-wanted advertising, the growth of advertising in certain newspapers in the index because of the closing of other papers, an increase in the importance of occupations that rely relatively heavily on help-wanted advertising, or an increase in affirmative action pressure to advertise job openings. Below I report on cross-sectional results based on the help-wanted index that support the aggregate time-series evidence of figure 1. In addition, the data on discharges and quits, shown in figures 2 and

Figure 2. The Discharge Rate and Unemployment, 1959–81



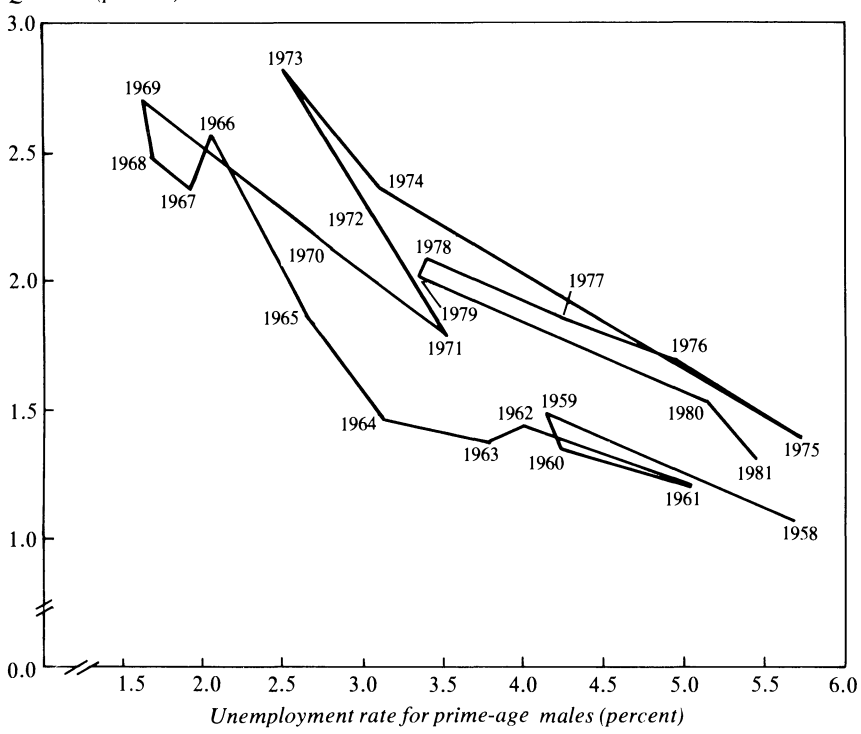
Source: Bureau of Labor Statistics.

3, are consistent with the type of shift indicated by the aggregate help-wanted data.

The Bureau of Labor Statistics gathered data on the turnover in manufacturing industries until December 1981. The BLS collected, but never published, information on discharges, defined as "terminations of employment initiated by the employer for such reasons as incompetence, violation of rules, dishonesty, laziness, absenteeism, insubordination, failure to pass probationary period, etc."[8] Figure 2 displays the relation between these discharge rates in manufacturing for 1959–81 (the only years for which discharge rates were available) and the unemployment rate for prime-age males in the economy as a whole. The figure reveals

8. U.S. Bureau of Labor Statistics, *Handbook of Methods*, Bulletin 1910 (Government Printing Office, 1976), p. 44.

Figure 3. The Quit Rate and Unemployment, 1958–81



Source: Bureau of Labor Statistics.

a sharp outward shift in this Beveridge curve between 1969 and 1973; for a given rate of unemployment of prime-age males the discharge rate, and presumably associated costs, were substantially higher by 1973 than they had been until 1969.

Quit rates provide another indicator of the difficulty employers in the manufacturing sector have in retaining workers; these were derived by the BLS in the same survey of turnover that produced the discharge rates. Figure 3 presents Beveridge curves for the relation between quit rates and the unemployment rate of prime-age males for 1958–81. This figure, like the preceding one, implies that employers' difficulty in retaining a work force at a given rate of unemployment grew sharply between 1969 and 1973.

Table 1. Labor Market Imbalance at the Beginning and End of the 1970s, by Region[a]

Percent unless otherwise specified

Period and measure	*Northeast*	*Middle Atlantic*	*Southeast*	*Midwest*	*Pacific*	*Southwest*
1970–72						
Estimated job vacancy rate, *V* proxy[b]	0.7	0.6	0.9	0.4	0.5	0.7
Regional unemployment rate, *U*	5.8	4.2	4.3	4.5	7.2	4.3
Product of *V* proxy and *U*	4.1	2.5	3.9	1.8	3.6	3.0
1977						
Fraction of employers reporting shortages, *V* proxy	0.52	0.53	0.48	0.57	0.61	0.78
Regional unemployment rate, *U*	8.7	7.3	5.9	4.7	9.4	6.5
Product of *V* proxy and *U*	4.5	3.9	2.8	2.7	5.7	5.1

Sources: Job vacancy rates are from U.S. Bureau of Labor Statistics, *Employment and Earnings*, vol. 19 (May 1973), p. 146; regional unemployment rates for 1970–72 are estimated with data on individuals from BLS, *Current Population Surveys;* unemployment rates and fraction of employers reporting shortages in a 1977 survey of employers in the manufacturing sector are from Daniel D. Cook and John S. McClenahan, "Skill Shortage," *Industry Week*, vol. 194 (August 29, 1977), pp. 39–48.

a. The states in each region are listed in appendix A.

b. Rates for 77 SMSAs were weighted by employment in the manufacturing sector (see appendix C for a list of SMSAs).

CHANGING LABOR MARKET CONDITIONS ACROSS AREAS

Table 1 provides indicators of labor market conditions for manufacturing in the six geographic census regions at the beginning and end of the 1970s. It suggests that the largest increases in labor market imbalance during the 1970s occurred in the Southwest and, to a lesser extent, in the Pacific states.

The top half of the table uses data on the job vacancies collected by the BLS from 1969 to 1973 in its survey on job openings and labor turnover. Annual averages of monthly vacancy rates were derived from these data for selected standard metropolitan statistical areas (SMSAs) and were published in *Employment and Earnings*. These published rates were used to generate the 1970–72 weighted average job vacancy rates (by total employment) for each region, which are presented in the first row. The second row gives unemployment rates derived from the 1970–72 May *Current Population Survey*. The product of each area's vacancy

rate proxy, V, and its unemployment rate, U, for this period is given in the third row; this product gives an estimate of the position of the area's Beveridge curve. Assuming these measures are comparable across regions, the data imply that, at the start of the 1970s, the Southwest and Pacific were in the middle of the six regions arranged by their extent of labor market imbalance.

The job vacancy statistics are not available for years after 1973. In their absence, the bottom half of the table presents data based on a survey of employers concerning labor shortages conducted by *Industry Week* magazine in 1977. The fourth row presents the fraction of employers in 1977 in each region reporting shortages in the *Industry Week* survey as a proxy for V; the fifth row, each region's rate of unemployment in that year; and the last row, the product of the V proxy and U. By this measure, labor market imbalance in the Southwest and, to a lesser extent, in the Pacific states appears to have become substantially greater than in the rest of the United States by 1977.

The changes by region indicated by the V proxies of table 1 are supported by the available help-wanted advertising indexes for states derived from information published by the Conference Board. Because each state's level of help-wanted advertising depends on the newspapers the Conference Board selected, the state indexes cannot capture cross-area differences in V. However, under reasonable assumptions, the percentage changes in these indexes can be used to estimate cross-area differences in the percentage growth of V.

The model designed to capture regional percentage growth rates in the normalized help-wanted index takes, as the dependent variable, the ratio of the help-wanted index to total employment divided by the same ratio for 1973 for each of twenty-five states in each year from 1970 to 1980. The independent variables are twenty-five state dummy variables that reflect the number of states with SMSA help-wanted advertising data and interactions between a simple time trend and dummy variables for the six census regions. The model was fit using weighted (by employment) least squares.

The percentage growth rates of the normalized help-wanted index in each region are presented in the first column of table 2 (with standard errors in parentheses here and throughout this paper). During this period the normalized help-wanted index grew at 6.2 percent and 4.9 percent a

Table 2. Regional Growth in Normalized Help-Wanted Index and Change in the *V* Ranking of Table 1 during the 1970s

Region	*Annual percentage change in normalized help-wanted index,*[a] *1970–80*	V *ranking*[b] *Early 1970s*	*Late 1970s*	*Change*
Northeast	−1.3 (0.8)	2.5	5.0	2.5
Middle Atlantic	−3.4 (1.1)	4.0	4.0	0.0
Southeast	−1.1 (1.1)	1.0	6.0	5.0
Midwest	1.2 (0.6)	6.0	3.0	−3.0
Pacific	4.9 (0.7)	5.0	2.0	−3.0
Southwest	6.2 (1.0)	2.5	1.0	−1.5

Source: The data used for estimates of the percentage change in the normalized help-wanted index were provided by the Conference Board. For a discussion of the help-wanted index see Noreen L. Preston, *The Help Wanted Index: Technical Description and Behavioral Trends*, Report 716 (New York: Conference Board, 1977).

a. Estimated percentage changes are based on a weighted (by employment) least squares regression of the help-wanted index divided by total employment in a given state in a given year divided by the same ratio in 1973 on twenty-five state dummy variables and the interaction of a time trend with six regional dummy variables; the estimated coefficients of the interaction between time and region were divided by the area means of the dependent variable and multiplied by 100 to generate percentage changes. The sample size was 275. The numbers in parentheses are standard errors.

b. Ranking order from table 1. The highest ranking is 1; the lowest, 6.

year in the Southwest and Pacific regions, respectively; it declined at an annual rate of 3.4 percent in the Middle Atlantic states.[9]

The last three columns of table 2 provide evidence on the change in the *V* ranking of each region from the early to the late 1970s based on the third and sixth rows of table 1. The apparent direction of this change is much the same with either the *V* proxies of table 1 or the 1970–80 growth rate of the normalized help-wanted index in the regions. One can infer from this that both the table 1 proxies and the help-wanted index provide useful information about the relative behavior of "true" *V* across regions. In sum, tables 1 and 2 show that something happened in the 1970s

9. Estimates for 1960–70 indicate that results for the 1970s were not the continuation of trends that could be discerned in the previous ten years. For 1960–70 the annual percentage changes comparable to those presented in table 2 are Northeast, 2.2 (0.5); Middle Atlantic, 6.0 (0.8); Southeast, 5.8 (1.2); Midwest, 4.7 (0.5); Pacific, 3.3 (0.8); and Southwest, 8.1 (1.7).

that caused V and $V \cdot U$ to grow much more in some regions of the United States than in others.

The Determinants of Growth in Labor Market Imbalance

The next task is to investigate why labor market imbalance grew when and where it did. As stated earlier, it is very likely that the difficulty employers face in meeting their labor demands will increase the faster their demands grow. With rapid growth, it will be more difficult to satisfy skill requirements as the old sources of labor supply become inadequate to fully keep up with the new demand. In addition, employers with high employment growth rates are likely to confront high rates of turnover as high rates of new hires are accompanied by high discharge and quit rates. The discharge rate will be high because many workers will be passing through an explicit or implicit probationary period, and because employers will hire with less care when struggling to expand their work force rapidly. The quit rate will be high because the quit probability is generally greatest among employees with short job tenure.

THE CHANGING REGIONAL LOCUS OF EMPLOYMENT

Table 3 presents annual percentage growth rates of employment for U.S. regions in the 1950s, 1960s, and 1970s; it also presents each region's share of national employment at the beginning of these decades. The most striking fact in this table is the very fast rate of growth in the Southwest during the 1970s (5.0 percent a year); during this decade the share of national employment in the Southwest rose from 7.2 to 9.1 percent. The only two regions in which employment growth accelerated in the 1970s were the Pacific and Southwest, the same two regions that showed the highest imbalance growth in table 2 as measured either with the vacancy proxies or the change in the help-wanted index.

The relation between the difficulty employers have in satisfying their labor demands and the level and change in the growth rate of their work forces can be addressed by assuming that the percentage change in the normalized help-wanted index is a good surrogate for the percentage change in the job vacancy rate. Making this assumption, I used 1961–80 data for the twenty-five states for which help-wanted advertising data

Table 3. Changing Regional Distribution of U.S. Employment, 1951–80
Percent

Measure and period or year	*Northeast*	*Middle Atlantic*	*Southeast*	*Midwest*	*Pacific*	*Southwest*
Annual growth in nonagricultural employment						
1951–60	0.7	0.5	2.5	0.9	3.6	2.8
1960–70	1.7	2.5	3.9	2.4	3.5	3.8
1970–80	0.8	1.7	3.7	2.1	3.7	5.0
Regional shares of nonagricultural employment						
1951	19.6	16.8	12.6	35.3	10.0	5.8
1960	18.5	15.4	13.8	33.7	12.1	6.5
1970	16.7	15.1	15.4	32.7	13.0	7.2
1980	14.1	13.9	17.2	31.3	14.5	9.1

Source: *Employment and Training Report of the President, 1981*, table D-1.

exist to fit a weighted (with employment) regression of the growth rate of the normalized help-wanted index, $\Delta H/H$; on employment growth, $\Delta E/E$; the change in employment growth, $\Delta(\Delta E/E)$; a time trend ($T = 1, \ldots, 23$); and twenty-five state dummy variables shown in a vector, $\tilde{S}$). The results of this analysis are

$$(1) \quad \Delta H/H = \underset{(0.24)}{3.80}\Delta E/E + \underset{(0.20)}{3.22}\Delta(\Delta E/E) - \underset{(0.001)}{0.002}T + \tilde{d}\tilde{S}, \quad N = 500,$$

where the mean and standard deviation of $\Delta H/H$ are 0.028 and 0.185, respectively; the mean and standard deviation of $\Delta E/E$, 0.029 and 0.025; and of $\Delta(\Delta E/E)$, -0.0007 and 0.027.

Thus the percentage growth rate of employment and the change in this growth rate both appear to have significant and sizable effects on the difficulty employers have in satisfying their labor demands.

WHY THE AGGREGATE BEVERIDGE CURVE HAS SHIFTED

The importance of employment growth as a determinant of labor market imbalance can also be gauged with aggregate data. If employer i's difficulty in satisfying labor demand is denoted by D_i and employer i's employment growth by G_i, then it is reasonable to assume that

$$D_i = a + bG_i + cG_i^2. \tag{2}$$

For the purpose of discussion, I take the expectation of equation 1, which yields

$$\overline{D} = a + b\overline{G} + c(\sigma_G^2 + \overline{G}^2), \tag{3}$$

where $\overline{D}$ is the mean level of difficulty and $\overline{G}$ and σ_G^2 are the mean and variance, respectively, of employment growth across employers; and the expression $(\sigma_G^2 + \overline{G}^2)$ is the second moment of the G distribution.

The relation in equation 3 was used, together with some widely discussed supply-side factors and cyclical and trend variables, in explaining the aggregate help-wanted index. The basic equation estimated was

$$H = a + bU + cT + dD_{73} + e\tilde{X}, \tag{4}$$

where H is the normalized help-wanted index, as defined above; U is the unemployment rate for prime-age males; T is a time trend ($T = 1, \ldots, 23$); D_{73} is a dummy variable indicating whether the year is 1973 or later (yes = 1); and $\tilde{X}$ is a vector of potential determinants of imbalance: the weighted mean and weighted second moment (sum of the variance and mean squared) of employment growth rates across states and across 30 one- and two-digit (SIC) industries (with employment shares used as weights), the percent of the labor force that is female, the percent aged sixteen to nineteen, the percent over age fifty-four, and the percent of employment covered by unemployment insurance.

Equation 4-1 in table 4 includes none of the elements of the $\tilde{X}$ vector. It reveals that, starting in 1973, the trend-corrected normalized help-wanted index has shifted upward by an average of 13 percent—$(0.163/1.29) \cdot 100$—for any level of the prime-age male unemployment rate (with the figure 1.29 being the mean of H in the 1959–72 period). That is, since 1973, labor market imbalance, as defined here, has been 13 percent higher than what would have been expected given previous trends.

Equation 4-2 is the same as 4-1, except that it includes the weighted mean and weighted second moment of employment growth rates across states. The addition of these two variables accounts for 39 percent of the growth in the normalized help-wanted index; it reduces the estimated coefficient of the dummy denoting 1973 or later from 0.163 to 0.100.

To gain some understanding of the relative importance of the weighted mean and weighted variance of the state employment growth figures, I

Table 4. Regressions for Growth of Help-Wanted Advertising per Employee in the United States, 1959–81[a]

	Independent variable													
								Labor force characteristic					*Summary statistic*	
Equation	*Time*	*1973 or later (yes = 1)*	*Unemployment rate for prime-age males (ages 25–54)*	*Mean of weighted employment growth rates*		*Sum of variance and mean square of weighted employment growth rates*		*Percent female*	*Percent age 16–19*	*Percent over age 54*	*Percent covered by unemployment insurance*	*Constant*	*Standard error of estimate*	*Durbin-Watson*
				State	*Industry*	*State*	*Industry*							
4-1	0.015	0.163	−0.190	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	1.78	0.094	1.81
	(0.008)	(0.100)	(0.023)									(0.107)		
4-2	0.017	0.100	−0.182	−1.66	. . .	104.9	. . .	. . .	. . .	. . .	. . .	1.69	0.069	1.54
	(0.008)	(0.077)	(0.029)	(1.68)		(28.4)						(0.154)		
4-3	0.018	0.075	−0.165	. . .	2.23	. . .	48.7	. . .	. . .	. . .	. . .	1.55	0.074	1.60
	(0.007)	(0.084)	(0.027)		(1.04)		(16.0)					(0.135)		
4-4	0.018	0.077	−0.173	−6.10	3.64	112.2	8.13	. . .	. . .	. . .	. . .	1.67	0.076	1.50
	(0.008)	(0.087)	(0.032)	(10.5)	(6.33)	(102.2)	(39.0)					(0.204)		
4-5	−0.106	0.124	−0.166	−0.468	. . .	77.3	. . .	24.5	−3.93	2.32	1.43	−7.32	0.045	2.53
	(0.019)	(0.056)	(0.020)	(2.04)		(49.4)		(3.97)	(3.89)	(2.18)	(0.59)	(1.48)		
Mean	12.0	0.39	3.56	0.02	0.02	0.001	0.002	0.38	0.08	0.17	0.75	1.00	. . .	. . .
Standard deviation	6.6	0.49	1.18	0.02	0.02	0.001	0.001	0.03	0.01	0.02	0.09	0.00	. . .	. . .

Source: Author's estimates of text equation 3, based on data from Data Resources Inc.

a. The dependent variable is the normalized help-wanted index. All regressions were fitted with annual data and were estimated using a maximum likelihood correction for first-order serial correlation. The sample size is 23. Numbers in parentheses are standard errors. The mean of the normalized help-wanted index is 1.35; the standard deviation, 0.25.

fit equations containing permutations of the mean, mean squared, and variance of the state employment growth rate. The estimated coefficients from these regressions imply that the geographic variability in growth rates had only a minute effect on the national level of labor market imbalance. This is most likely because the high imbalance in regions with rapid employment growth was approximately cancelled out by the low imbalance in regions with slow growth.

Equation 4-3 drops the two cross-state summary statistics and adds comparable variables derived from employment growth in one- and two-digit SIC industries.[10] The results are similar; the cross-industry variables reduce the estimated coefficient on the dummy for 1973 or later from 0.163 to 0.075. As was the case for the cross-state variables, the mean of the growth rates of employment across industries appears to be much more important than the variance in these rates.

The moments of the cross-state and cross-industry distributions of employment growth rates are highly correlated. Hence, even if growth in only one set caused increased imbalance, growth in either set might appear to have done so when the statistics are examined independently. When equation 4-4 includes both first and second moments of the cross-state and cross-industry data, it explains roughly the same amount of the imbalance spurt around 1973 as does equation 4-3. But now the distribution of employment growth rates across industries has no effect whatsoever on the normalized help-wanted index.

Equation 4-5 in table 4 includes other elements of the $\tilde{X}$ vector—the percent of employment covered by unemployment insurance, the percent of the labor force that is female, the percent aged sixteen to nineteen, and the percent over age fifty-four. These variables permit one to ascertain, albeit crudely, whether the effect of employment growth on labor is likely to be due primarily to the omission of variables describing the characteristics of the work force. The estimated effect of employment growth in equation 4-5 is reduced to some extent by the inclusion of the controls, but remains sizable. Coefficients with expected signs were

10. Unbroken time series from 1959 to 1981 could be obtained for 30 one- and two-digit SIC industries from the "790" data series of the Bureau of Labor Statistics; these industries covered all employment in the private sector. Comparable variables could also be derived with information for 91 three-digit SIC industries. The choice between summary statistics based on the more detailed, but less inclusive, three-digit industry series or the less detailed, but fully inclusive, one- and two-digit series did not have a qualitative effect on the conclusions of the paper.

obtained on all supply variables with the exception of the proportion of the labor force aged sixteen to nineteen. However, the estimated coefficient on this variable is insignificant and its negative sign may be an indication that youths are in the types of jobs for which employers do not advertise heavily. Finally, results from equation 4-5 strongly suggest that the history of labor market imbalance over the entire 1959–81 period has to do with much more than the history of employment growth.

Shedding a Micro Light on Macro Findings

What happened to wage growth and total factor productivity growth in the 1970s across U.S. regions? Did the regions with greater labor market imbalance experience higher growth in wages and lower growth in productivity? Can the cross-regional findings contribute to a better understanding of the comparable aggregate relations?

WAGE GROWTH ACROSS REGIONS IN THE 1960S AND 1970S

Wage measures for different regions were developed to help answer some of these questions. Average hourly or weekly pay for men and women in detailed occupational categories (appendix B) in selected SMSAs (appendix C) were taken from the BLS area wage surveys for 1960, 1970, and 1980. The detailed occupational categories were grouped by the BLS into two large categories, "Maintenance, Tool Room, and Power Plant Jobs" and "Office and Clerical Jobs." To develop wage indexes corrected for variation in occupational mix, the area wage survey data were fitted to equations of the form

$$\Delta W = b\tilde{R} + c\tilde{O}, \tag{5}$$

where ΔW = decadal percentage change in wages in a detailed occupational category in a given SMSA
$\tilde{R}$ = vector of six regional dummies
$\tilde{O}$ = vector of occupation dummies (ranging from 14 to 30).

The estimated values of the b vector in different analyses are presented in table 5. If labor market imbalance affects wage growth, one would expect to find a noticeable difference in the growth of wages in the 1970s

Table 5. Regional Growth of Average Hourly or Weekly Pay, 1960–70 and 1970–80[a]

Decadal percentage change

Period and job classification	*Northeast*	*Middle Atlantic*	*Southeast*	*Midwest*	*Pacific*	*Southwest*
1960–70						
Maintenance, tool room, and power plant jobs[b]						
All	55.9	53.7	70.4	59.2	56.6	56.3
	(2.4)	(2.4)	(2.2)	(2.1)	(2.7)	(2.6)
Male	56.4	54.5	70.0	59.3	57.5	55.9
	(2.3)	(2.3)	(2.1)	(2.1)	(2.6)	(2.5)
Office and clerical jobs[c]						
All	49.9	43.6	53.1	43.8	40.6	44.0
	(2.9)	(2.9)	(2.7)	(2.6)	(3.3)	(3.1)
Female	49.0	42.8	52.2	42.4	40.6	43.2
	(3.1)	(3.0)	(2.8)	(2.7)	(3.5)	(3.3)
1970–80						
Maintenance, tool room, and power plant jobs[b]						
All	125.0	127.1	129.0	134.1	133.5	134.9
	(4.5)	(4.5)	(4.2)	(3.9)	(4.9)	(4.9)
Male	123.4	126.9	129.2	133.2	133.4	134.5
	(4.5)	(4.5)	(4.2)	(3.9)	(4.9)	(4.9)
Office and clerical jobs[c]						
All	103.5	110.7	119.8	115.0	121.8	124.0
	(5.6)	(5.4)	(5.3)	(4.9)	(6.1)	(6.0)
Female	102.6	107.0	118.0	114.3	117.0	120.8
	(5.4)	(5.2)	(5.0)	(4.7)	(6.0)	(5.8)

Source: Based on work in process by the author and Linda A. Bell. Data used to derive the table's estimates are from the Bureau of Labor Statistics, "Area Wage Survey." Bulletins are published annually for selected metropolitan areas. The occupational groupings are those adopted by the BLS for this survey; these groups are described in BLS, *Area Wage Surveys: Selected Metropolitan Areas, 1981,* 3010–72 (BLS, 1982), appendix B. See respective issues for the occupational groups in specific years.

a. Sample sizes are as follows for both periods: maintenance, tool room, and power plant jobs, 1,170; of this, 1,111 were male; office and clerical jobs, 539; of this, 453 were female. Numbers in parentheses are standard errors.

b. Estimates of hourly or weekly pay are based on a model that includes occupation dummies (twenty-eight in the regression for males, thirty in the regression for all), twenty-two dummies for the beginning and ending months in which a state's survey was administered, and six regional dummies. The sample is constrained to be the same in both periods.

c. Estimates for hourly or weekly pay are based on a model that includes occupation dummies (fourteen in the regression for females, twenty-one in the regression for all), twenty-two dummies for the beginning and ending months in which a state's survey was administered, and six regional dummies. The sample is constrained to be the same in both periods.

between the high-imbalance (Southwest and Pacific) and low-imbalance (Northeast and Middle Atlantic) regions. However, one would expect much smaller differences in wage growth across these four regions during the 1960s because there were much smaller differences among them in labor market imbalance during that decade.

The results presented in table 5 confirm these expectations. During

the 1970–80 period wages rose more in the Southwest and Pacific states than in the Northeast and Middle Atlantic states. The 1970–80 pattern of wage behavior is not found in the 1960–70 period when the Southwest and Pacific regions were right in the middle of the extremes of the imbalance spectrum. In an average year during the 1970s, these cross-area differences in wage growth were not minute; wages of blue-collar workers grew from 0.3 to 0.5 percentage point faster, and wages of clerical employees grew from 0.6 to 1.0 percentage point faster, in the regions with high imbalance than in the ones with low imbalance.

The data in tables 1 and 5 can be used to fit the following model to give cross-sectional estimates of the relative importance of vacancies, shortages, and unemployment for wage growth:

$$\Delta W = a + bV + cU + dO, \tag{6}$$

where ΔW and V are as defined above; U is a regional unemployment rate; and O is a dummy indicating the broad occupational grouping of concern. (For O note that only the rows labeled "All" in table 5 and not those headed "Male" or "Female" are used in the analysis.)

The results of this estimation for the 1960–70 period, for which V_J denotes job vacancy rate in manufacturing (mean, 0.63; standard deviation, 0.17), and U is the first regional unemployment rate given in table 1 (mean, 5.0; standard deviation, 1.2), are

$$\Delta W = \underset{}{35.2} + \underset{(9.1)}{20.1}V_J - \underset{(1.18)}{0.43}U + \underset{(2.5)}{12.9}O, \qquad N = 12; R^2 = 0.81, \tag{7}$$
$$\qquad\quad (8.2)$$

where the mean of ΔW is 52.3 and the standard deviation, 8.4. For the 1970–80 period, for which V_S denotes percent of manufacturers reporting skill shortage (mean, 58.2; standard deviation, 10.2), and U is the second regional unemployment rate in table 1 (mean, 7.0; standard deviation, 1.6), the results are

$$\Delta W = \underset{(11.5)}{101.4} + \underset{(0.16)}{0.35}V_S - \underset{(0.94)}{0.84}U + \underset{(3.0)}{14.8}O, \qquad N = 12; R^2 = 0.79, \tag{8}$$

where the mean of ΔW is 123.2 and the standard deviation, 9.7.

Thus the cross-regional V, U, and ΔW data strongly imply that the key information coming from a labor market about the likely wage pressure is the degree to which employers are having difficulty in satisfying their labor demands. To the extent that an unemployment rate

is correlated with employers' difficulty in fulfilling their labor needs, unemployment will be related to wage growth. But to the extent that the unemployment rate varies independently of the employers' difficulty in obtaining the labor they desire, it is unlikely to have a meaningful effect on the wage-adjustment process. To predict wage growth, it appears that the analyst will do much better knowing about employers rather than about the unemployed.

To say that vacancies matter more than unemployment for wage growth is not to say that wage growth is very responsive to V; in fact, it is not. In equations 7 and 8 the elasticities of ΔW with respect to V calculated at the means are 0.17 and 0.24, respectively. These estimates may be biased downward due to measurement errors in the V proxies. However, the cross-area findings imply that wage growth is not very responsive to labor market imbalance, even when allowing for a sizable bias and when viewing the imbalance from the perspective of employers.

The requisite time-series data are not available for determining the change in the V proxies used in equations 7 and 8 at a given U before and after 1973. However, one can derive a rough estimate of the percentage change in V from an analysis of the aggregate normalized help-wanted advertising index used in table 4. To do this, I fit a regression with data for the 1959–81 period of H on a constant; on a dummy for 1973 or later, $D73$; and on the unemployment rate for prime-age males. From this I obtained an estimated coefficient and standard error of $D73$ equal to 0.29 and 0.08. Given that the mean value of H during 1959–72 was 1.29, this regression implies that the percentage change for 1973 and later was 22 percent—$(0.29/1.29) \cdot 100$.

This crude estimate of the percentage change in V implies a 4 to 5 percent increase in the ΔW associated with a given U for prime-age males from 1973 on. Although I believe the estimate is likely to be a lower bound, it does underscore a key conclusion of this study: even large increases in labor market imbalance are likely to have small effects on ΔW because the elasticity of the wage growth imbalance is small.

Does the percentage change in the normalized help-wanted index give a reasonable approximation to the percentage change in the vacancy rate? Are the percentage changes in this index significantly related to changes in the rate of wage growth? To address these queries, I did a cross-sectional analysis using data on wages and help-wanted advertising by state. A variable equal to the 1970–80 ΔW minus the 1960–70 ΔW was

Table 6. Regressions for Growth of Hourly Compensation in the United States, 1956:1 through 1981:4[a]

Equation	Independent variable: Time/100	1973 or later (yes = 1)/100	Inverse of unemployment rate for prime-age males	Normalized help-wanted index	Total effect of lagged inflation	Constant	Summary statistic: Standard error of estimate	Summary statistic: Durbin-Watson
Four lagged inflation terms								
6-1	0.004	1.850	0.049	. . .	0.440	0.020	0.0164	1.94
	(0.012)	(0.745)	(0.016)		(0.128)	(0.006)		
6-2	−0.004	1.301	0.009	0.022	0.484	0.007	0.0162	1.96
	(0.012)	(0.785)	(0.028)	(0.014)	(0.126)	(0.009)		
Sixteen lagged inflation terms								
6-3	−0.002	1.724	0.054	. . .	0.564	0.017	0.0172	1.95
	(0.016)	(0.818)	(0.019)		(0.253)	(0.008)		
6-4	−0.011	1.155	−0.005	0.032	0.530	0.000	0.0169	1.98
	(0.016)	(0.817)	(0.034)	(0.016)	(0.241)	(0.011)		
Mean	0.525	0.0035	0.317	1.316	. . .	1.00	. . .	. . .
Standard deviation	0.300	0.0048	0.122	0.270	. . .	0.00	. . .	. . .

Source: Author's estimates of text equation 10, based on data from Data Resources Inc.

a. The dependent variable is the annualized growth rate of hourly compensation. All regressions were fitted with seasonally adjusted quarterly data and were estimated using a maximum likelihood correction for first-order serial correlation. Estimated coefficients (standard errors) were multiplied by four where appropriate to put them on an annualized basis. The mean of the annualized growth rate of hourly compensation is 0.063; the standard deviation, 0.025.

regressed on O and the percentage difference in the mean normalized help-wanted indexes for 1970–80 and 1960–70 ($\Delta H/H$, where Δ indicates the 1970s value minus the 1960s value). The results of this analysis were

$$(9)\quad \Delta(\Delta W) = \underset{}{0.46} + \underset{(0.03)}{0.19}\Delta H/H + \underset{(0.07)}{0.11}O, \quad N = 50; \quad R^2 = 0.24, \qquad \underset{(0.04)}{}$$

where the mean of $\Delta(\Delta W)$ is 0.53, standard deviation, 0.16; and the mean of $\Delta H/H$ is 0.10, standard deviation, 0.27. The coefficients estimated cross-sectionally in equation 9 imply that a 22 percent change in aggregate H would be associated with an increase of 8 percent—$(0.22 \cdot 0.19/0.53) \cdot 100$—in the wage growth for the nation. I next compare this prediction based on cross-sectional parameter estimates with the macro wage-growth evidence.

CONSISTENCY WITH MACROECONOMIC EVIDENCE ON WAGE GROWTH

To conduct a macroeconomic time-series analysis of why the Phillips curve for the United States from 1973 to 1981 was outside the curve for the preceding twenty-five years, I estimated modified-augmented Phillips models using the basic equation,[11]

$$(10)\qquad w = a + bT + cD_{73} + d\frac{1}{U} + \sum_i e_i p_i + fH,$$

where w = percentage change in average hourly compensation
T = time trend ($T = 1, \ldots, 92$)
U = unemployment rate for prime-age males
p_i = percentage change in the GNP price deflator in quarter i (four or sixteen lagged values used in the estimation).

In some analyses, V is excluded from equation 10; in others, it is included. As this variable is added into the regression equation, the estimated coefficient on the dummy for 1973 or later reveals the likely effect of growth in labor market imbalance on the recent outward shift in the expected-inflation augmented Phillips curve.

The augmented Phillips curve equation with four lagged inflation terms presented in equation 6-1 of table 6 implies that the curve for the

11. For a related investigation see Medoff and Abraham, "Unemployment."

period from 1973:1 onward lies 36 percent—(0.0185/0.051) · 100—outside the curve for the pre-1973:1 period (where 0.051 is the mean of w for 1956:1 to 1972:4). The comparable equation with sixteen lagged inflation terms, presented in equation 6-3, reveals an augmented Phillips curve after 1973:1 that has an intercept 34 percent—(0.0172/0.051) · 100—greater than the pre-1973:1 curve.[12]

How does one account for these large shifts in the Phillips curve that cannot be explained by factors related to the pattern of inflation in the past?[13] Equations 6-2 and 6-4 include the normalized help-wanted index in addition to the variables in equations 6-1 and 6-3. When this variable is included, the point estimates of the outward shift of the Phillips curve in 1973 decrease by about 0.55 percentage point, or about 30 percent, regardless of the lags used on inflation—[(1.850 − 1.301)/1.850] · 100 = 30 with four lagged inflation terms and [(1.724 − 1.155)/1.724] · 100 = 33 with sixteen.[14]

The shift of 0.163 points, or 13 percent, in the Beveridge curve for the relation between the help-wanted index and unemployment was associated with an upward shift in the Phillips curve, indicating a 0.4 to 0.5 percentage point increase in wage inflation—0.163 · (help-wanted coefficient of 0.022 or 0.032) · 100—in the 1973–81 period. Allowing for price-

12. The results presented in table 6 are consistent with earlier findings reported by Martin Neil Baily and James Tobin. They estimated several equations for aggregate wage growth using quarterly data for 1958:1 through 1976:4 that included both an inverse unemployment rate variable and the help-wanted index deflated by total employment; their model specification is otherwise different from mine, but they also generally obtain insignificant wrong-signed unemployment coefficients and significant right-signed help-wanted index coefficients. Baily and Tobin also present wage-growth equations for different sectors of the economy; these findings are not relevant for the present discussion, however, since information on help-wanted advertising does not exist at the sectoral level. See their "Macroeconomic Effects of Selective Public Employment and Wage Subsidies," *BPEA, 2:1977*, pp. 511–41.

13. Instability in the Phillips curve may take the form of shifts in the intercept or changes in the slope. Here I consider shifts in the intercept. For analyses suggesting that the Phillips curve for the United States has been much flatter since World War II than it was earlier, see Philip Cagan, "Changes in the Recession Behavior of Wholesale Prices in the 1920's and Post-World War II," *Explorations in Economic Research*, vol. 2 (Winter 1975), pp. 54–104; and Jeffrey Sachs, "The Changing Cyclical Behavior of Wages and Prices: 1890–1976," *American Economic Review*, vol. 70 (March 1980), pp. 78–90. Any flattening in the Phillips curve that may have occurred during the period of concern appears to have been substantially less pronounced.

14. Inclusion of the square of the normalized help-wanted index had virtually no effect on this conclusion.

wage feedbacks, the added inflation would be about twice this large. Moreover, in the table 6 equations that include both the inverse of the unemployment rate for prime-age males and the normalized help-wanted index, only the latter has a meaningful effect on wage growth.[15]

The time-series results presented in table 6 are much more credible in light of the cross-area analyses presented above. Given the role of V in explaining cross-area differences in wage growth, after controlling for U, it makes very good sense that the marked outward shift in the national Beveridge curve around 1973 would have caused some outward shift in the Phillips curve for the nation. Note that the cross-sectional and the time-series wage-growth equations imply a similar effect of help-wanted advertising on wage growth, and hence a similar shift in the Phillips curve, allowing for the fact that equation 9 measures wage growth over a decade. Moreover, across regions the main determinant of wage growth appears to be employers' difficulty in satisfying their labor demands and not the rate of unemployment for the area. This observation gives cross-sectional support to the idea that in an augmented Phillips equation including both V and U, only V really matters.

IMPACT ON TOTAL FACTOR PRODUCTIVITY GROWTH: CROSS-REGION EVIDENCE

An important analysis of total factor productivity growth in manufacturing across U.S. regions has recently been completed by Hulten and Schwab.[16] In their investigation of the 1951–78 period they used information on value added and labor hours from *Census of Manufactures* and *Annual Survey of Manufactures* for both production and nonproduction workers and data from other sources on plant, equipment, inventories, and land. Each of the series used was deflated with aggregate price data. In light of some sharp recent movements in industrial relative prices, I redeflated their original value-added figures to reflect each region's two-digit SIC industry mix.

Regional data based on the Hulten and Schwab study are presented in table 7 for three periods: 1951–65, 1965–73, and 1973–78. The first

15. For more evidence in support of this result, see Medoff and Abraham, "Unemployment."

16. See Charles R. Hulten and Robert M. Schwab, "Regional Productivity Growth in U.S. Manufacturing: 1951–78" (Washington, D.C.: The Urban Institute, 1982).

Table 7. Regional Growth of Total Factor Productivity, Output per Labor Hour, and Labor Hours in the Manufacturing Sector, Selected Periods, 1951–78[a]

Average annual percentage change

Measure and period	*Northeast*	*Middle Atlantic*	*Southeast*	*Midwest*	*Pacific*	*Southwest*	*Total United States*
Total factor productivity							
1951–65	1.8	1.9	2.6	1.5	1.9	1.8	1.7
1965–73	1.8	1.9	1.8	1.8	2.2	1.1	1.8
1973–78	1.0	0.8	0.9	0.4	0.1	0.7	0.6
Output per labor hour							
1951–65	2.3	2.4	3.1	2.1	2.2	2.5	2.2
1965–73	2.4	2.5	2.7	2.4	3.1	2.3	2.5
1973–78	1.5	1.7	1.9	1.1	0.3	1.8	1.4
Labor hours							
1951–65	−0.3	0.3	2.3	0.4	2.7	2.6	0.8
1965–73	−0.6	0.2	3.0	1.2	1.8	4.0	1.2
1973–78	−0.8	−1.3	0.6	0.0	2.7	3.2	0.3

Source: The author acknowledges the generous assistance of Robert M. Schwab in preparing this table. See Charles R. Hulten and Robert M. Schwab, "Regional Productivity Growth in U.S. Manufacturing: 1951–78" (The Urban Institute, 1982), esp. p. 34.

a. The original value-added figures of Hulten and Schwab were redeflated to reflect each region's two-digit SIC industry mix and the set of two-digit SIC value-added deflators.

three rows show average annual percentage changes in total factor productivity. These figures were derived by subtracting the product of capital's share of value added and the growth rate of the capital-labor ratio from the growth rate in output per labor hour (given in the fourth through sixth rows). The last three rows give the growth rates of paid labor hours.

Table 7 reveals some surprising facts about regional productivity developments. If productivity growth has been dominated by new capital, implying better capital and hence higher productivity, or by faster output growth, implying reduced slack or unutilized capacity and hence higher productivity, then total factor productivity growth would have been faster in the expanding Southwest and Pacific areas than in the declining Northeast and Middle Atlantic regions. However, table 7 indicates that the slowdown of total factor productivity growth during the three periods was at least as high in the Southwest and Pacific areas as in the Northeast and Middle Atlantic regions.

The results of table 7 are consistent with the idea that large spurts in labor demand are associated with high start-up costs. As discussed above, a rapid increase in labor demand is likely to be correlated with sharp growth in employers' difficulty in securing and retaining desired work forces; all else the same, this will be reflected in lower total factor productivity growth.

A pooled time-series cross-sectional regression of total factor productivity data on labor hours, both from table 7, yields

$$(11)\quad \underset{\cdot}{tfp} = \underset{(0.16)}{1.9} - \underset{(0.055)}{0.109}l - \underset{(0.19)}{1.19}D_{73\text{–}78}, \qquad N = 12;\ \underset{\cdot}{R^2} = 0.82,$$

where tfp = annual percentage growth in total factor productivity in an area in a given period (mean, 1.2; standard deviation, 0.66)

l = annual percentage change in labor hours (mean, 1.2; standard deviation, 1.8)

D_{73-78} = dummy variable indicating that the observation is for 1973–78.

The estimated coefficient of l in equation 11 indicates that the faster that manufacturers in an area were expanding their labor input, the lower was their total factor productivity growth; to be more specific, an area

with labor growth that was one standard deviation above the mean had total factor productivity growth 16 percent below average. Apparently the rapid growth of labor in an area had strong positive relations with phenomena that reduce productivity—such as quits, discharges, shortages, and vacancies, as discussed above.

To examine one of these relations, the data from table 1 on vacancy rates and skill shortages were regressed on the labor hours entry of table 7. For each of the six regions, V_J (from 1970–72) was explained by labor-hours growth, l, for 1965–73; and V_S (from 1977) was explained by l for 1973–78. The D_{73-78} dummy was included because V_J and V_S are not in the same units. The results were

$$(12) \quad V = \underset{(0.07)}{0.57} + \underset{(0.02)}{0.04}l - \underset{(0.08)}{0.02}D_{73-78}, \qquad N = 12; R^2 = 0.27.$$

Thus the job vacancy rate or skill shortage indicator in a region was closely associated with the growth of labor input from 1965 to 1978; areas with l of one standard deviation above average had V of 12 percent above average.

IMPACT ON TOTAL FACTOR PRODUCTIVITY GROWTH: NATIONAL EVIDENCE

Given the support from the area analysis, the idea that employers' difficulty in satisfying their labor demands adversely affects total factor productivity growth was applied to aggregate data. The variable to be explained was total factor productivity growth calculated by the American Productivity Center using government statistics on output, hours, plant, equipment, land, and inventories. The growth rate of employment and the new hires rate within manufacturing were taken as indicators of employers' potential problems with their labor input. The year-to-year difference in the logarithm of the Federal Reserve Board's capacity utilization rate and the prime-age male unemployment rate were used to account for cyclical effects on productivity.

Equation 8-1 of table 8 shows that, after controlling for trend factors and the rate of unemployment, total factor productivity growth in the manufacturing sector was about 0.9 percentage point lower starting in 1973. Equation 8-2 adds the change in the log of the capacity utilization

rate, which has a very significant estimated coefficient of 0.6. Inclusion of the utilization variable reduces in absolute value the coefficient on the dummy for 1973 and later from 0.9 to 0.7.

Once cyclical and trend factors have been allowed for, the coefficient estimates for equation 8-3 indicate that employment growth per se has a substantial effect on total factor productivity growth. Adding the change in the log of employment variable changes the dummy for 1973 or later from -0.7 to -0.2. This decline in the unexplained drop-off in productivity growth since 1973 reflects two facts about the manufacturing sector. First, after controlling for trend, unemployment, and utilization changes, the faster growth of employment is associated with a slower growth of total factor productivity, as the cross-sectional results suggest. Second, with the same factors held constant, there has been a sharp increase in the growth rate of employment in the years from 1973 on.

The final equation, 8-4, in table 8 includes the new hires rate, which, all else the same, was much higher from 1973 to 1981 than in the preceding twenty-five years. Including new hires data brings the estimated coefficient of the dummy for 1973 and later to zero. The estimated coefficient of the employment change variable is reduced in absolute value but retains its negative significant effect on total factor productivity growth. This result has two implications: a higher new hires rate means lower productivity growth, presumably because of increased turnover, training, and so on; and other factors that reduce the productivity growth associated with employment growth are unrelated to new hires, such as shortages and retraining.

The cross-sectional and time-series results are both consistent with the basic idea that the growth of the labor input involves important adjustment costs. Hence the rapid growth of labor input from 1973 to the end of the decade seems to have contributed to the disappointing growth of total factor productivity.

Conclusions

Imbalance in U.S. labor markets appears to have grown markedly from 1973 onward. At a given rate of prime-age male unemployment, employers did much more advertising per employee to obtain the work

Table 8. Growth of Total Factor Productivity in U.S. Manufacturing, 1959:1 through 1981:4[a]

		Independent variable						*Summary statistic*	
Equation	*Time/100*	*1973 or later (yes = 1)/100*	*Unemployment rate for prime-age males*	*Change in log of capacity utilization*	*Change in log of employment*	*New hires rate*	*Constant*	*Standard error of estimate*	*Durbin-Watson*
8-1	0.0004	−0.852	0.002	. . .	. . .	. . .	0.001	0.016	1.80
	(0.014)	(0.847)	(0.002)				(0.008)		
8-2	0.0050	−0.696	0.003	0.598	. . .	. . .	−0.005	0.007	1.74
	(0.0098)	(0.535)	(0.001)	(0.028)			(0.006)		
8-3	0.0023	−0.190	0.000	0.866	−0.738	. . .	0.009	0.005	1.87
	(0.0066)	(0.382)	(0.001)	(0.047)	(0.105)		(0.004)		
8-4	−0.0027	0.022	−0.002	0.863	−0.673	−0.005	0.032	0.005	1.86
	(0.0069)	(0.417)	(0.002)	(0.046)	(0.112)	(0.004)	(0.016)		
Mean	0.465	0.0039	3.56	−0.0005	0.0023	2.84	1.00	. . .	. . .
Standard deviation	0.266	0.0049	1.21	0.026	0.0135	0.600	0.00	. . .	. . .

Sources: Author's estimates based on data from the American Productivity Center for productivity, the Board of Governors of the Federal Reserve System for capacity utilization rate, and the Bureau of Labor Statistics for the prime-age unemployment rate, employment growth rate, and new hires rate.

a. The dependent variable is the annualized growth rate of total factor productivity. All regressions were fitted with seasonally adjusted quarterly data and were estimated using a maximum likelihood correction for first-order serial correlation. The sample size is 92. The mean of the annualized quarterly growth rate of total factor productivity is 0.0048; the standard deviation is 0.0159. Numbers in parentheses are standard errors.

forces they needed after 1973 than before. Moreover, if one holds the unemployment rate for prime-age males constant, the probability rose sharply that an employee, at least in the manufacturing sector, would be fired or quit. Thus employers' difficulty in satisfying their labor demands at a given level of unutilized labor supply appears to have increased substantially.

This potentially important development was reflected by the business press. Between 1972 and 1981, when the rate of unemployment for prime-age males *rose* from 3.1 to 5.4, the lines of print in business periodicals discussing skill shortages *rose* by a factor greater than two (as reflected in a review of seventy-one periodicals).[17] In 1981 the number of lines of business press discussing skill shortages was almost double the annual average between 1965 and 1969, when the unemployment rate for those workers averaged 2.0 percent.

What factors caused this increase in labor market imbalance? Heretofore, most analysts have emphasized supply-side structural changes.[18] To date, however, little attention has been given to the fact that, since 1973, U.S. employment growth, adjusted for the cycle, has been much more rapid than would have been predicted from historical trends. It has been argued here that this rapid employment growth added to the job vacancies, new hires, and quit and discharge rates with which employers were confronted.

The extent of labor market imbalance is important in and of itself because it reflects the amount of unemployment that is "structural." Results developed here indicate that imbalance in the 1970s also contributed to an outward shift in the Phillips curve for the United States and its cycle-corrected rate of total factor productivity growth. As a result, for a given level of unemployment, inflationary pressure was greater and productivity growth was slower than they would have been otherwise.

On the basis of demographic trends, labor market imbalance should lessen in future years. The annual growth rate of the U.S. labor force is forecast to decline from 2.5 percent in the 1970s to 1.4 percent in the 1980s, and to 0.5 percent in the 1990s. Moreover, imbalance might become less of a problem as the work force matures, with the percentage

17. For more detail on this analysis of the business press see James L. Medoff with the assistance of Jonathan B. Wiener, "Labor Markets in Imbalance: Review of Qualitative Evidence" (Harvard University, Department of Economics, 1982).

18. Lilien, "Sectoral Shifts," is a notable exception.

share of the population aged eighteen to twenty-four declining from 19 percent to 14 percent between 1980 and 1990 and to about 12 percent by the year 2000.

However, there are many other important issues that may affect the degree of imbalance. What are the ramifications of having a work force that has larger numbers of female and black workers than in the past? How will a technology based on microprocessors, robots, telecommunications, computer services, and other elements of electronic automation affect labor markets? What trade policies will be adopted by the United States and other countries? The operation of U.S. labor markets in the future will also depend on the answers to these questions.

APPENDIX A

States in Each Census Region

Region	*States*
Northeast	Connecticut, Maine, Massachusetts, New Hampshire, New York, Rhode Island, Vermont
Southeast	Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee
Pacific	Alaska, California, Hawaii, Oregon, Washington
Middle Atlantic	Delaware, Maryland, New Jersey, Pennsylvania, Virginia, West Virginia
Midwest	Colorado, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Michigan, Minnesota, Missouri, Montana, Nebraska, North Dakota, Ohio, Oklahoma, South Dakota, Wisconsin, Wyoming
Southwest	Arizona, Nevada, New Mexico, Texas, Utah

APPENDIX B

Occupations in Each of the Two Major Job Categories

Category	*Occupation*	
Maintenance, tool room, and power plant	Auto mechanic	Pipefitter
	Boiler tender	Power truck operator
	Carpenter	Receiver
	Electrician	Sheet metal worker
	Forklift operator	Shipper
	Guard	Shipper and receiver
	Janitor (male; female)	Shipping packer (male; female)
	Machine tool operator	Stationary engineer
	Machinist	Tool and die worker
	Material laborer	Tractor trailer driver
	Mechanic	Trades helper
	Millwright	Truck driver: heavy
	Order filler	Truck driver: light
	Painter	Truck driver: medium
Office and clerical	Accounting clerk I (male; female)	Order clerk
	Accounting clerk II (male; female)	Payroll clerk
	Bookkeeping machine operator I (male; female)	Secretary
	Bookkeeping machine operator II (male; female)	Stenographer: general
	File clerk I	Stenographer: senior and technical
	File clerk II	Switchboard operator
	File clerk III	Switchboard operator: receptionist
		Transcribing machine operator
		Typist I
		Typist II

APPENDIX C

Standard Metropolitan Statistical Areas (SMSAs) in Each State

State	*SMSA*
California	Los Angeles, San Francisco
Colorado	Denver
Florida	Jacksonville, Miami
Georgia	Atlanta
Illinois	Chicago
Indiana	Indianapolis
Kentucky	Louisville
Louisiana	New Orleans
Maryland	Baltimore
Massachusetts	Boston
Michigan	Detroit
Minnesota	Minneapolis
Missouri	Kansas City, St. Louis
Nebraska	Omaha
New Jersey	Newark
New York	Albany, New York
Ohio	Cincinnati, Cleveland, Columbus, Dayton, Toledo
Oklahoma	Oklahoma City
Pennsylvania	Philadelphia, Pittsburgh
Rhode Island	Providence
Tennessee	Memphis
Texas	Dallas, Houston, San Antonio
Utah	Salt Lake City
Virginia	Richmond
Washington	Seattle
Wisconsin	Milwaukee

Comments and Discussion

Robert E. Hall: Medoff presents an impressive array of evidence that unemployment is much higher now for given values of other labor market indicators, in comparison to the situation in the 1960s and earlier. His interpretation of the disagreement among the indicators stresses the idea of imbalance. According to Medoff, the labor market has been called upon to match a larger flow of new and displaced workers in the past ten years than it was before. His evidence is that help-wanted advertising has been indicating tight markets despite rising unemployment; discharges have indicated moderate conditions when unemployment has been high in the past few years; quits have been high even with high unemployment (historically, quits have been associated with strong labor markets); and wage inflation advanced during the 1970s even though unemployment was high.

Other research has confirmed the divergence between measures of conditions in the labor market. The paper by Gary Burtless in this volume shows that unemployment has grown tremendously relative to claims for unemployment insurance. George Akerlof and Janet Yellen have found that unemployment as officially measured has risen dramatically relative to the annual retrospective measure of unemployment in the March survey of the work experience of the population. Charles Schultze showed in a report in the *BPEA* in 1971 that layoffs were unusually low relative to unemployment, a trend that became much more prominent later in the 1970s. Finally, my own work on the tenure of the work force has shown that the basic turnover rate in the labor force has been constant over the past few decades despite rising unemployment.

One thread runs through all this work. The divergence is not among labor market indicators in general. Rather, the unemployment rate has

been signaling much slacker markets than all the other indicators. It is worth thinking about a hypothesis for explaining the findings of Medoff and others that does not stress imbalance, but rather the changing problem of measuring unemployment. Could it be that an important source of divergence is simply that our method for measuring unemployment picks up a larger fraction of the population as unemployed than it did in earlier decades? I should mention that none of the evidence I have cited comes from Barro, Kochin, or others who want to prove that recessions are a figment of Keynesian imagination.

I see some confirming evidence that much of what Medoff reports can be traced to changes in the population that make the measure of unemployment from the Current Population Survey (CPS) rise relative to the amount of joblessness.

The basic technique in the CPS for measuring unemployment is to ask someone in the household two key questions about each adult. The first question is "What did X do most of last week?" Possible answers include worked, looked for work, kept house, was on layoff, was retired, and was in school. The other question, raised only for people who did not work at all last week, is "Did X do anything to try to find work in the past four weeks?"

As it actually works, only the second question matters. With a handful of exceptions, everyone who has done anything in the past four weeks to look for work is counted as unemployed. What is most remarkable is that only *half* the people who are eventually counted as unemployed are reported as looking for work or on layoff in the week before the survey. The others are keeping house, retired, in school, or ill. All these categories have probably contributed to the upsurge in unemployment as measured by the CPS in the following ways. Fewer people are keeping house, but those who are keeping house are probably more likely to consider the possibility of looking into a job in any four-week period. The fraction of the population that is retired has skyrocketed, mainly because of decreasing mortality rates. Many of the retired, especially those under age sixty-five, are sufficiently interested in the possibility of working that they will look into a job at least once every four weeks. The fraction of young adults in school has grown manyfold in the past two decades. Unemployment has particularly increased for this age group. Young adults in school are especially likely to consider working during the periods when they are not in fact working. The

fraction of the population that is not working because of poor health has grown, especially among older people. This group contains many people who look into work at least once every four weeks.

More generally, what has happened to the U.S. population in the past few decades has put a much larger fraction of the population on the economic margin between working and not working. Consequently, the fraction of the population that is not working at one moment, but has looked for work in the past few weeks, has grown. The measurement of unemployment in the CPI has picked up this trend. Other measures of conditions in the labor market have not been affected.

What should one conclude if it is indeed true that Medoff's findings say more about the technical issue of measuring unemployment than they do about labor market imbalance? First, CPS unemployment as measured is an interesting number and analysts should continue to look at it. It is worth knowing what fraction of the population is looking for work, even if some of the job-seeking activity is not the result of joblessness as it is normally conceived. Second, it is important to be aware that unemployment has diverged from every other labor market indicator. One should be cautious about recommending macro policies that focus on the CPS unemployment rate without being aware of what that rate measures. Third, as far as diagnosing the tone of the labor market for predicting wage inflation and the like, we can do a lot better than the CPS unemployment rate. Medoff amply documents the superiority of other labor market indicators in this respect. Fourth, as far as diagnosing hardship, the important changes that have occurred in American life should be kept in mind, such as better medical care, equality of roles and opportunities for women and men, and higher real incomes. Some of the signals from the CPS unemployment rate are telling us about these changes, not about joblessness. Of course, cyclical changes in CPS unemployment are dominated by joblessness—the forces I have been discussing operate slowly over decades, not in single years. All labor market indicators, the CPS unemployment rate among them, are in agreement that the past few years have been a period of extraordinarily poor conditions for job seekers in the labor market.

Robert M. Solow: The belief that there is more "structural unemployment" than there used to be—or that there will soon be more structural unemployment than there is now—is a hardy perennial. It surfaces

without fail every time there is a stretch of high unemployment. The belief has several distinct sources, which no doubt explains why it is so popular: naive people of good will who simply cannot see unemployment as reflecting anything more complex than the characteristics of the unemployed; apocalyptic people who like to think that the economic system as we know it has exhausted its adaptive power and requires, at last, some fundamental reform; conservative people who really do not care much about unemployment but want to resist the tendency toward expansionary policy activism that prolonged unemployment might bring. All convex combinations of these three possibilities are conceivable. There is also a fourth: it might be true. The fact that, so far, the structural unemployment argument has proved false time after time does not foreclose a future success. There is nothing illogical about the idea: the adaptive capacity of the economy is not unlimited, and there might come shocks to demand or supply to which it could adjust only very slowly, or only with drastic changes in relative prices and relative incomes, so drastic as to be intolerable by many.

It is clear that Medoff does not fall into any of the first three categories I mentioned. I thought the paper presented an interesting argument—suggesting a modest increase in structural unemployment in the 1970s, probably reversible in due course. The two findings I would like to discuss are, first, that the Beveridge curve for the United States shifted outward during the early part of the decade, perhaps to the tune of a couple of percentage points of prime-age male unemployment; and second, that the vacancy rate, or the best available proxy for the vacancy rate, is a better measure of labor-market pressure than the unemployment rate for use in Phillips-curve estimation.

One inevitable weakness of the paper is the necessity to use the normalized help-wanted index as a surrogate for the vacancy rate. Medoff had no choice, of course. I think he was quite right to do as he did. It is a slight weakness, nevertheless, because his scatter diagrams seem to show a discrete shift of the Beveridge curve sometime around 1973, rather than a slow back-and-forth movement along a higher-dimensional surface. Then there is always the danger, as Medoff is perfectly aware, that this apparent shift reflects something that happened to the relation between the help-wanted index and the vacancy rate rather than between the vacancy rate and the unemployment rate. Medoff's cross-sectional regression, in which the acceleration of wage

inflation between the 1960s and the 1970s across different regions is explained by the change in the help-wanted index across the regions, does indicate that there is something to the time-series regressions. But I would feel more comfortable if he had made a more determined effort to purify the help-wanted index of other influences that might have caused it to move to a higher level at about that time. Some of the obvious possibilities are: a drop in the relative price of newspaper advertising; the shift toward female employment, which might lead to more help-wanted advertising because women are less clued in to the informal job network; the shift toward service occupations, computer-type occupations, and perhaps other things. It is possible that there are regional differences in help-wanted advertising, so that the regional shift in employment discussed by Medoff could have something to do with it. If, as this paper strongly suggests, the help-wanted index is a very useful indicator of labor-market conditions, that is all the more reason why we should want to understand it as thoroughly as we can.

It occurred to me when reading this paper that it would be very interesting to see what has happened to the Beveridge curve in other industrial countries during the same interval of time. This would have two advantages. First, some countries do have vacancy statistics, so the detour through the help-wanted index can be avoided. (By the way, Canada appears to have both some vacancy data and a help-wanted index, so one might be able to learn something about their interconnection.) Second, international differences in the behavior of the Beveridge curve might suggest explanations of the forces moving it where it has moved. I dug a few figures out of the OECD's *Main Economic Indicators* and then discovered that my colleague Katherine Abraham had already been looking into the question, so she was able to help. Here is a crude impression. The Beveridge curve does appear to have shifted outward in the early 1970s in Canada, Japan, France, Finland, and the United Kingdom, but not in Germany or the Netherlands. There are some cases that are not so easy to classify. I would guess that there has been no shift in Sweden, but there probably has been one in Norway. Australia and Belgium are also moot: more likely yes for Australia, perhaps also for Belgium. For all these countries I presume the unemployment rate is the total rate, which might make a small difference. Anyway, I think there is an interesting research project here. For instance, it may be significant that the Netherlands and Belgium, which are probably too small for

regional shifts to be very important, experienced no shift in one case and a small one at best in the other. (But it occurs to me that I may be naive; religious and linguistic differences could make even small countries exhibit strong regional effects.) West Germany, however, is certainly regionalized, but its Beveridge curve has been quite stable. I wonder whether employment has grown more uniformly across regions there than in the United States or other countries. Besides, I take it that Medoff's emphasis on uneven growth of employment across regions could easily be converted into differences across industries if the data were cut that way. These things are certainly worth looking into.

I have one or two comments to make on the use of the help-wanted index in the estimation of Phillips curves. There is nothing counterintuitive in the notion that V is a better variable than U in wage equations. We tend to think of $U - V$ as a measure of the excess supply of labor, which would suggest that both variables would contribute statistically. But there is nothing shocking in the notion that the threat to employed workers—especially those with seniority, communicated by a high unemployment rate—might be fairly weak, whereas an employer who was trying to fill vacancies might be tempted to bid aggressively for workers, especially if there were a chance of creaming better trained or more experienced workers from nearby firms. It will take more experience with using vacancy rates and proxies for them as independent variables before we will know best how to handle this. The work of Medoff and Abraham is certainly an important contribution.

I revert to the general structural-unemployment argument for a concluding remark. I have a notion that ordinary cyclical unemployment, if it is prolonged, can transform itself into structural unemployment. An economy that remains for too long at the high-unemployment end of its Beveridge curve may find the curve shifting adversely. The sort of thing I have in mind is that anyone who has been out of work for a long time loses touch with the informal job network, so the degree of friction in the labor market increases. It may also be that skills deteriorate with disuse just enough to make a visible difference in the match between jobs and unemployed workers when the demand for labor revives. I am not suggesting that this sort of thing—if it is real, which I do not know—is what happened in the United States during Medoff's sample period. In fact, in his figure 1 the beginnings of the adverse shift seem to occur in 1971–73, when the unemployment rate was not so very high. However,

the Beveridge curve worsened more drastically after 1975 (suspiciously mirroring the 1958–59 track) when the unemployment rate was very high. It is possible that there is less here than meets the eye; but I hope this interesting paper is the start of a research program and not the finish.

General Discussion

Martin Neil Baily observed that a vacancy rate should be thought of as measuring a different dimension of tightness in the labor market from the unemployment rate. The unemployment rate describes the level of tightness in the labor market while the vacancy rate (or its proxy, the help-wanted index) is related to the rate at which jobs are expanding and hence describes the change in labor market tightness. After a prolonged period of slack, the two might appear to be sending out contradictory signals if the labor market tightens but still retains a great deal of slack. Baily also reported that there was an increased dispersion of unemployment rates across geographic regions in the 1970s in comparison to the 1960s, paralleling Medoff's finding of greater vacancy dispersion. But he could find no evidence that higher structural unemployment was due to industrial shifts.

Several discussants questioned the reliability of the help-wanted data used in the paper. Thomas Juster argued that only a small fraction of job openings is formally advertised, which makes the connection between help-wanted ads and true vacancies highly uncertain and possibly unstable over time. Albert Rees observed that his own research on the Chicago labor market with George Shultz showed that jobs for blue-collar workers are especially underrepresented in the help-wanted ads. Thus the trend in the help-wanted index might be biased upward relative to the trend in total vacancies because the ratio of blue-collar to white-collar job openings has declined over time. He also noted that the turnover data for manufacturing represent a declining fraction of all workers as the share of manufacturing in total employment declines over time. William Nordhaus suggested that equal employment opportunity legislation may have contributed to a rise in help-wanted advertising relative to true vacancies as employers sought to demonstrate that their hiring methods were nondiscriminatory. Steven Braun reported that the number of major newspapers in the fifty-one cities from which the

Conference Board calculated help-wanted ads declined from 134 in 1960 to 117 in 1970 and to 105 in 1980. Because the Conference Board does not adjust for it, the demise of competitive papers might bias upward the help-wanted index as more advertising went to the surviving papers.

Medoff responded that the cross-sectional results from the help-wanted index supported the usefulness of the index in explaining wage changes. Although the time series could be subject to some of the biases mentioned, these should not affect the results that depend on the relative change in advertising across geographic regions.

Alan Blinder took issue with Medoff's view that Beveridge curve movements occurred as surges around 1973. He thought figures 1 through 3 show a movement in the relation of unemployment and other measures of conditions in the labor market between the late 1960s and the mid-1970s, but not a sudden shift in 1973. Similarly, Blinder believed table 3 shows a movement in jobs from the Snow Belt to the Sun Belt over the entire 1950–80 period, not a discontinuous shift in the 1970s.

Jeffrey Shafer endorsed Medoff's use of several measures to gauge tightness in the labor market and the use of Beveridge curves, rather than unemployment alone, as a useful way to summarize changing conditions in the labor market. He noted that all the large Western European countries except Germany experienced the same kind of Beveridge curve shift observed in the United States. This common development supports Medoff's interpretation that the explanation for the U.S. shift is not to be found in the geographic concentration of U.S. employment growth.

Lawrence Summers noted that the paper did not really provide a satisfactory explanation for the differing patterns of regional employment growth during the 1970s. One possible explanation involves the pattern of demand for the products of different regions. An alternative explanation would emphasize increasing wage rigidity. This is certainly suggested by the sharp relative increase in union wages observed during the decade. More generally, the problems of explaining regional differences in labor market behavior are worthy of further research.