

# Employment in the first half: robust recovery continues

*Employment surpasses the levels posted before 1981-82 recession as rebound completes sixth quarter; June jobless rate of 7.1 percent is 3.6 points below recession high*

RICHARD M. DEVENS, JR.

Employment grew throughout the first half of 1984, as a very strong cyclical recovery continued through its fifth and sixth quarters. Unemployment, after posting declines in January and February, was essentially unchanged through April before dropping sharply in May and June. In June, the overall unemployment rate (including the resident military in the labor force) was 7.0 percent, and the unemployment rate for civilian workers was 7.1 percent.

By June, total employment, as measured by the household survey,<sup>1</sup> and nonfarm payroll employment, as measured the establishment survey,<sup>2</sup> had surpassed the levels registered before the recession began in July 1981.<sup>3</sup> The unemployment rates had returned to prerecession levels, having fallen 3.6 percentage points from their highest point.

This article will briefly describe seasonally adjusted labor force data for the first 6 months of 1984, examine the recovery in employment in comparison to earlier cycles, and discuss those industries where lingering problems of unemployment and slow recovery are concentrated.

## Women lead in job gains

Total civilian employment grew strongly in the first quarter of the year gaining about one-and-a-quarter million. The

second quarter's gain was even stronger—nearly one-and-a-half-million. (See table 1.)

The job gains in the first half occurred disproportionately among women:

	<i>Percent of December employment</i>	<i>Percent of change December—June</i>
Total .....	100.0	100.0
Men .....	53.1	46.7
Women .....	40.7	46.4
Teenagers .....	6.3	6.8

This was in contrast to the first year of recovery, when men accounted for 55 percent of the employment growth. The proportion of men with jobs (the employment-population ratio) rose about one-and-a-half points to 72.5 percent during the first year of recovery and increased an additional full percentage point in the next 6 months. Women had a somewhat smaller increase in their employment-population ratio in 1983, but in the first half of 1984 their ratio rose by more than a full percentage point to 50.5 percent.

Employment among blacks grew nearly three times as quickly as among whites during the first half of the year—6.1 versus 2.1 percent—but the employment-population ratio for black workers, 52.6 percent, was still more than 8 percentage points lower than that for whites. Employment gains among blacks were confined almost entirely among women, as employment of black men grew only intermittently over the first half.

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**Table 1. Selected quarterly labor force indicators, seasonally adjusted, 1982 to date**

[Numbers in thousands]

Characteristic	1982	1983				1984	
	IV	I	II	III	IV	I	II
<b>Total</b>							
Civilian labor force	110,829	110,700	111,277	112,057	112,012	112,607	113,642
Participation rate	64.0	63.6	64.0	64.2	64.0	64.1	64.5
Employed	99,054	99,214	100,037	101,528	102,506	103,740	105,146
Employment-population ratio	57.2	57.2	57.5	58.2	58.6	59.1	59.7
Unemployed	11,775	11,486	11,240	10,529	9,507	8,866	8,496
Unemployment rate	10.6	10.4	10.1	9.4	8.5	7.9	7.5
<b>Men, 20 years and over</b>							
Civilian labor force	58,335	58,208	58,634	58,983	59,017	59,360	59,584
Participation rate	78.7	78.2	78.5	78.6	78.4	78.3	78.3
Employed	52,537	52,563	53,095	53,839	54,418	55,211	55,680
Employment-population ratio	70.9	70.6	71.1	71.8	72.2	72.9	73.2
Unemployed	5,798	5,645	5,539	5,144	4,599	4,149	3,904
Unemployment rate	9.9	9.7	9.4	8.7	7.8	7.0	6.6
<b>Women, 20 years and over</b>							
Civilian labor force	44,053	44,247	44,442	44,868	44,971	45,232	46,009
Participation rate	52.9	52.9	53.0	53.3	53.2	53.2	54.0
Employed	40,108	40,313	40,654	41,324	41,717	42,084	42,920
Employment-population ratio	48.1	48.2	48.5	49.1	49.3	49.5	50.3
Unemployed	3,945	3,934	3,788	3,545	3,254	3,149	3,088
Unemployment rate	9.0	8.9	8.5	7.9	7.2	7.0	6.7
<b>Teenagers, 16-19 years</b>							
Civilian labor force	8,441	8,245	8,201	8,206	8,024	8,014	8,049
Participation rate	54.1	53.3	53.4	54.0	53.2	53.7	54.5
Employed	6,409	6,338	6,288	6,366	6,370	6,446	6,545
Employment-population ratio	41.1	41.0	41.0	41.9	42.3	43.2	44.3
Unemployed	2,032	1,907	1,912	1,840	1,654	1,568	1,503
Unemployment rate	24.1	23.1	23.3	22.2	20.6	19.6	18.7
<b>White</b>							
Civilian labor force	96,521	96,263	96,719	97,420	97,541	98,135	98,706
Participation rate	64.4	64.1	64.2	64.5	64.5	64.5	64.8
Employed	87,388	87,459	88,231	89,485	90,353	91,478	92,378
Employment-population ratio	58.3	58.2	58.6	59.3	59.7	60.1	60.7
Unemployed	9,153	8,804	8,488	7,935	7,187	6,657	6,328
Unemployment rate	9.5	9.1	8.8	8.1	7.4	6.8	6.4
<b>Black</b>							
Civilian labor force	11,498	11,559	11,671	11,728	11,613	11,803	11,968
Participation rate	61.4	61.5	61.8	61.8	60.9	61.4	62.0
Employed	9,133	9,226	9,287	9,452	9,531	9,854	10,065
Employment-population ratio	48.8	49.1	49.2	49.8	50.0	51.3	52.1
Unemployed	2,364	2,333	2,384	2,277	2,081	1,949	1,903
Unemployment rate	20.6	20.2	20.4	19.4	17.9	16.5	15.9
<b>Hispanic</b>							
Civilian labor force	5,968	6,019	6,167	6,146	6,221	6,371	6,336
Participation rate	63.6	63.9	63.5	63.5	64.0	64.2	63.5
Employed	5,052	5,083	5,293	5,360	5,467	5,677	5,660
Employment-population ratio	53.9	54.0	54.5	55.4	56.3	57.2	56.7
Unemployed	916	936	874	785	754	694	676
Unemployment rate	15.3	15.6	14.2	12.8	12.1	10.9	10.7

Hispanic workers experienced a 2.3-percent rise in employment during the first half, but, because their population was rising faster than the average, their employment-to-population ratio showed little improvement.

The civilian worker unemployment rate fell in January and February and then held at 7.8 percent before dropping sharply in May and June. The rate stood at 7.1 percent in June. (See chart 1.) The unemployment rate for men, which had been higher, on average, than that for women during 1982 and 1983, dipped under the women's rate in March 1984, and in June stood at 6.3 percent, 0.1 point below the rate for women. The rate for men typically has been somewhat below that for women; one result of the recession was

a reversal of this pattern because of the disproportionate impact of the downturn on industries and occupations with higher concentrations of male employees.

### Minority jobless rates remain high

The black unemployment rate, which averaged 16.2 percent, was more than twice the rate for whites throughout the 6-month period. The rate for black teenagers averaged 43.4 percent during the first half. Hispanic unemployment did fall below double digit levels and averaged 10.8 percent.

The median duration of unemployment dropped by more than a week, as the number of long-term (27 weeks or more) jobless was reduced by 475,000. The number unemployed

less than 5 weeks was little changed, presumably reflecting the increased number of new entrants and reentrants in the labor force. The two entrant categories made up about 40 percent of total unemployment in June, while workers on layoff were about 14 percent.

The labor force, which had grown more slowly during the first year of the latest recovery than in the upturns of the 1970's and 1980-81, started to pick up the pace of its growth in February. Over-the-year labor force growth spurted over the 2-million-a-year mark at that time and had risen to 2.5 million by the second quarter. Increases in the labor force were driven by the resurgence of the labor force participation rate of women, which had dipped in late 1983. By March 1984, the rate for women regained its previous high of 53.4 percent and continued to rise in subsequent months to 54.2 percent. By contrast, labor force participation by men stayed within a tenth of a percentage point of the 78.3 percent it stood at the beginning of the year. Among teenagers, a slight rise in the participation rate was offset by a decline in population, yielding virtually no net change in the teenage labor force.

### Discouraged workers decline in number

Discouraged workers—persons not in the labor force who want to work but do not think they can get a job—numbered 1.3 million in the second quarter of 1984, down by 160,000 from the fourth quarter of 1983 and 520,000 from the fourth quarter of 1982, when the recession was at its worst. Persons at work on nonfarm part-time schedules for economic reasons, another supplemental measure of labor market problems, fell slightly over the course of the first half to 5.5 million. The number of these workers, sometimes called involuntary part-timers, has fallen by more than a million over the course of the recovery.

Nonfarm payroll employment, as measured by the establishment survey, rose 2.0 million between December 1983 and June 1984. The goods-producing sector generated about 40 percent of the new payroll slots—a proportion somewhat above the roughly 30 percent of total nonagricultural jobs accounted for by the sector at the end of 1983. Goods-producing employment had been most severely affected by the 1981-82 recession, and its high share of job growth reflected continued recovery from those very low levels. Construction and durable goods manufacturing were the growth leaders through midyear in the goods sector. The service-producing sector, which grew rapidly during the half, was paced by the services industry, particularly such industries as business and health services.

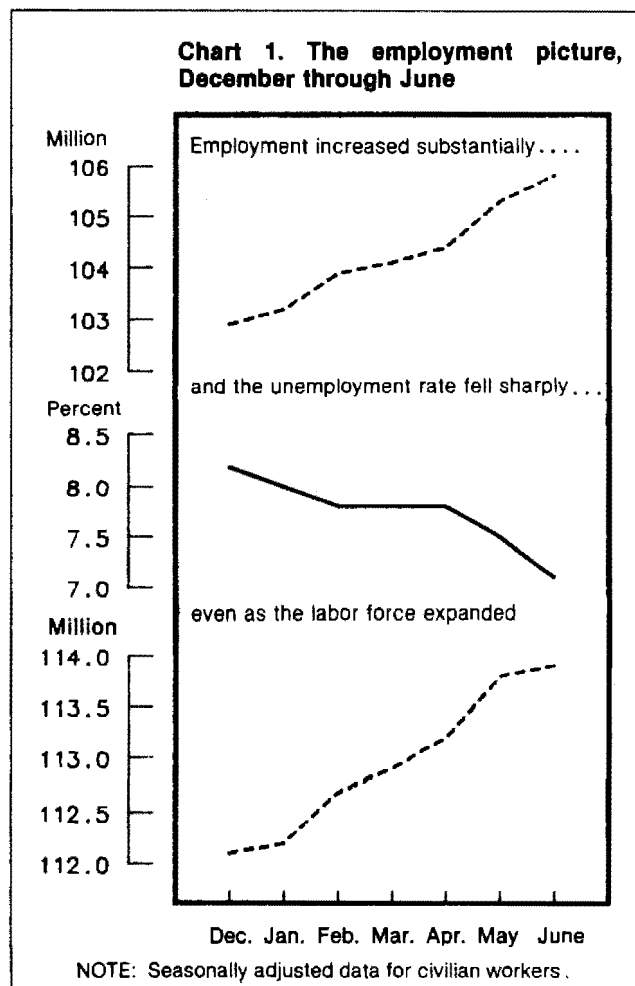
Average weekly hours for production or nonsupervisory workers in private nonagricultural establishments reached 35.4 in April, the longest average workweek recorded since early 1981. The manufacturing workweek, which is in some ways a more sensitive indicator of the labor market, averaged 40.8 hours in the first half. This indicator, which has been on a long-run downtrend, thus approached levels that

prevailed in the mid-1960s. At midyear, the manufacturing workweek was 40.6 hours, still quite high by recent standards.

### Recovery unusually strong

In many ways the current business recovery has been the strongest since the cycles of the mid- and late 1950's. In terms of absolute growth in employment, the recovery was a record setter as early as its second quarter (the second 3 months of 1983). By the second quarter of 1984, total employment growth, as measured by the household survey, had reached a phenomenal 6.1 million. The reduction in unemployment, again in absolute terms, was almost as dramatic as the rise in employment. It took four quarters—until the last quarter of 1983—for the cumulative reduction in joblessness to exceed previous declines, but by the end of the first half of 1984 the number of unemployed had dropped by nearly 3.3 million.

When these developments are more properly analyzed in terms of percentage changes, the narrative is almost as impressive, reflecting an employment recovery stronger than any in 30 years. The quarterly percent change in employment has been at or above the average for all previous post-



World War II upturns. (See table 2.) During the fifth and sixth quarters of recovery, the cumulative percent change in employment firmly established this as the strongest cyclical upswing in the series since the recovery from the 1953-54 recession.

On the unemployment side, there was a slower start. It was not until the fourth quarter of the recovery that quarterly changes were measurably higher than the average of previous recoveries, and it was not until the fifth quarter of recovery (the first quarter of 1984) that cumulative percent declines in unemployment approached the drops that occurred in the 1958 recovery. With continued strength in the economy, however, unemployment had declined by nearly 32 percent by the end of the first half of 1984. This was the strongest cyclical decline in this series for any post-1950 recovery. Moreover, the rate of unemployment has had the largest cumulative drop recorded over a similar period since the recovery from the recession of 1948-49.

Nonagricultural payroll employment followed a different growth pattern than total employment in the household survey. Payroll job growth was less than the postwar recovery's average for the first three quarters of the latest upturn and drew level with the average during the last quarter of 1983 and the first half of 1984.

### Sectoral imbalances in cycle

As the recovery from the 1981-82 recession completed its fifth and sixth quarters by mid-1984, a clearer perspective on the intersectoral imbalances that marked the cyclical

episode could be obtained. At the most aggregate level, the goods-producing sector accounted for about 28 percent of payroll employment at the beginning of the recession, fell to 26 percent at the trough, and by June 1984 was back to 27 percent, reflecting the sector's higher rate of job gain in recovery. Rates of unemployment in the broad categories have also reflected uneven experiences of economic fluctuations. The rate of unemployment for wage and salary workers in the private nonfarm goods sector rose from 8.8 percent at the prerecession peak to 16.0 percent at the trough before recovering to the starting point at 8.7 percent in mid-1984. In the service-producing sector, there was less cyclical volatility, as the unemployment rate was 6.4 percent at its trough, reached a high of 9.2 percent and by the first half of 1984 had fallen to 6.1 percent.

It is intuitive, and to some extent correct, to interpret these developments in terms of a "the-farther-they-fall-the-higher-they-bounce" analogy. Such an analogy, however, masks severe problems of intrasectoral imbalance that become visible at the next finer level of statistical detail. Confining analysis to the level of detail that is published monthly under the Bureau of Labor Statistics quality standards for seasonally adjusted data, one finds only two industries appearing on both lists of the 10 industries with the largest percentage reductions in employment during the recession and the 10 with the largest percentage increases from the trough through June 1984. (See table 3.)

The motor vehicles industry suffered substantial declines in employment and followed the "bounce" analogy quite

**Table 2. Quarterly changes in employment and unemployment during business cycle recoveries**

(In percent)

Recession (trough)	1st Quarter		2nd Quarter		3rd Quarter		4th Quarter		5th Quarter		6th Quarter	
	Change	Cumulative	Change	Cumulative	Change	Cumulative	Change	Cumulative	Change	Cumulative	Change	Cumulative
<b>Employment<sup>1</sup></b>												
1948-49 (July 1949)	0.6	0.6	0.0	0.5	1.8	2.4	1.2	3.6	0.3	3.9	0.4	4.4
1953-54 (July 1954)	.5	.5	.9	1.5	1.4	2.9	1.8	4.7	.9	5.6	.4	6.1
1957-58 (Apr. 1958)	.4	.4	.8	1.2	.7	1.9	1.3	3.2	.2	3.4	.1	3.5
1960-61 (Apr. 1961)	.1	.1	.5	.6	.6	1.2	.3	1.5	.5	1.9	.1	2.1
1969-70 (Sep. 1970)	0	0	.1	.1	.3	.4	.7	1.1	.9	2.1	1.2	3.3
1973-75 (Mar. 1975)	0	0	.9	.9	.4	1.3	1.4	2.7	1.0	3.8	.6	4.5
1981-82 (Dec. 1982)	.2	.2	.8	1.0	1.5	2.5	1.0	3.5	1.2	4.7	1.4	6.2
<b>Unemployment<sup>1</sup></b>												
1948-49 (Oct. 1949)	-8.7	-8.7	-12.3	-20.0	-16.2	-33.0	-9.7	-39.5	-16.6	-49.5	-11.9	-55.5
1953-54 (Sep. 1954)	-10.3	-10.3	-11.9	-20.9	-6.1	-25.7	-4.7	-29.5	3.4	-26.8	4.0	-29.7
1957-58 (July 1958)	-.4	-.4	-13.2	-13.6	-8.6	-21.0	-11.4	-30.1	3.9	-27.3	6.2	-22.8
1960-61 (May 1961)	-3.3	-3.3	-8.7	-5	-9.0	-19.7	-2.2	-21.4	1.5	-19.1	-.5	-20.6
1969-70 (Dec. 1970)	2.1	2.1	.2	2.3	2.1	4.4	.4	4.8	-1.9	2.9	-1.2	16.3
1973-75 (June 1975)	-3.6	-3.6	-2.3	-5.7	-5.7	-11.2	-1.7	-12.7	3.2	-10.0	.9	-9.1
1981-82 (Dec. 1982)	-2.5	-2.5	-2.1	-4.5	-6.3	-10.6	-9.7	-19.3	-6.7	-24.7	-4.2	-27.8
<b>Nonfarm employment<sup>2</sup></b>												
1948-49 (Oct. 1949)	0.8	0.8	2.5	3.3	2.9	6.4	1.6	8.1	1.8	10.0	0.8	10.9
1953-54 (Aug. 1954)	.7	.7	1.1	1.8	1.7	3.5	1.0	4.6	1.1	5.8	1.0	6.9
1957-58 (June 1958)	.7	.7	1.2	1.8	1.7	3.6	1.5	5.1	0	5.1	.4	5.5
1960-61 (Feb. 1961)	.4	.4	.9	1.4	.7	2.1	.8	2.8	1.0	3.8	.5	4.3
1969-70 (Nov. 1970)	.4	.4	.5	.9	.3	1.2	.6	1.8	1.2	3.0	1.1	4.1
1973-75 (Apr. 1975)	.7	.7	.9	1.6	1.2	2.9	1.8	3.7	.6	4.2	.6	4.8
1981-82 (Dec. 1982)	.1	.1	.8	1.0	.9	1.9	1.4	3.4	1.2	4.6	1.0	5.7

<sup>1</sup>Current Population Survey (household survey).

<sup>2</sup>Current Employment Statistics (establishment survey).

NOTE: Troughs are series specific.

**Table 3. Industries with large losses in employment, large increases, and high rebounds, November 1982 through June 1984**

Industry <sup>1</sup>	Percent loss in recession	Percent gain in recovery	Ratio of jobs gained to jobs lost
<b>Job reductions</b>			
Oil and gas extraction	-12.4	-4.9	( <sup>2</sup> )
Stone, clay, and glass	-13.1	9.0	.60
Primary metals	-27.6	8.5	.22
Blast furnace and basic steel	-33.1	1.5	.03
Fabricated metals	-16.3	9.9	.51
Machinery, except electrical	-18.6	8.5	.37
Transportation equipment	-14.4	17.1	1.01
Motor vehicles and equipment	-20.3	34.1	1.34
Textile mill products	-13.1	4.7	.31
Leather and leather products	-15.0	-2.4	( <sup>2</sup> )
<b>Job gains</b>			
Construction	-8.5	13.9	1.50
General building contractors	-12.0	18.8	1.38
Lumber and wood products	-12.2	19.0	1.36
Furniture and fixtures	-10.4	14.4	1.25
Electrical and electronic equipment	-7.2	14.8	1.90
Transportation equipment	-14.4	17.1	1.01
Motor vehicles and equipment	-20.3	34.1	1.34
Rubber and miscellaneous plastics	-9.4	17.6	1.70
Business services	0.8	21.0	( <sup>3</sup> )
<b>Job resiliency</b>			
General building contractors	-12.0	18.8	1.38
Lumber and wood products	-12.2	19.0	1.36
Furniture and fixtures	-10.4	14.4	1.25
Electrical and electronic	-7.2	14.8	1.90
Motor vehicles	-20.3	34.1	1.34
Rubber and miscellaneous plastics	-9.4	17.6	1.70
Wholesale trade (nondurable)	-0.6	3.5	5.85
General merchandise stores	-4.2	5.7	1.28
Auto dealers and service stations	-1.6	7.2	4.36
Real estate	-2.8	8.1	2.82

<sup>1</sup>Ranked by Standard Industrial Classification.

<sup>2</sup>Industry showed no employment gain following the recession.

<sup>3</sup>Industry incurred no employment loss during the recession.

well by having the strongest recovery among heavy losers. The industry's cyclical pattern also made it the sole large loser on the list of high rebounders—industries whose re-

coveries, measured as a percent of jobs lost in the recession, were strongest. However, it should be noted that employment in the auto industry is still lower than in early 1979, the time of record employment in that industry.

The figures also indicate that the blast furnace and basic steel industry was the most seriously affected by the recession and that it had regained less than 2 percent of its lost jobs by June. The primary metals industry—which includes basic steel—joins seven other goods-producing industries and two service-producing in a "low rebounders" group. Five of these—mining, petroleum and coal products, leather goods, public utilities, and local government—are industries that actually lost jobs between the end of the recession and midyear 1984.

One characteristic that distinguished the low-rebound from the high-rebound groups was the timing of job gains. Two of the low-rebound industries—tobacco and chemicals—had job losses as of December 1983, measured from the November 1982 trough. Instruments and nonelectrical machines had achieved barely half of their eventual rebound in the first 13 months. (Primary metals, the group's exception, had made virtually all of its weak rebound by December.) By contrast, the high-rebound group tended to have about two-thirds of its rebound completed by the 13th month.

The first half of 1984 saw the Nation complete two more quarters of recovery from a severe recession. The gains in employment were substantial; indeed, they set records for postwar upturns. The number of unemployed had dropped from a recession high of 11.9 million to 8.1 million at the end of the first half. The rate of unemployment in June was high by historical standards. There were also industries that had not seen as full a recovery as the overall economy. Thus, while the preponderance of the news was good during the first half of the year, there was still basis for continued concern. □

—FOOTNOTES—

<sup>1</sup>The Current Population Survey (CPS) is conducted monthly by the Census Bureau on behalf of the Bureau of Labor Statistics. The survey is conducted among a scientifically selected sample of about 60,000 households and provides information on labor force, employment, and unemployment by a variety of demographic and economic characteristics.

<sup>2</sup>Data from the Current Employment Statistics (CES) program are collected from the payroll records of nearly 200,000 nonagricultural estab-

lishments by the Bureau of Labor Statistics in cooperation with State agencies. This survey provides estimates of the number of persons on payrolls of businesses, their average hours, and their average hourly and weekly earnings.

<sup>3</sup>The identification of turning points in the business cycle is, by general consensus of the economics profession, carried out by the National Bureau of Economic Research, a private institution based in Cambridge, Mass.

# Discouraged workers: how strong are their links to the job market?

*More than half of the discouraged workers have not looked for work in more than a year; while some of them return to work or resume job search, the majority seldom test the job market*

PAUL O. FLAIM

In line with the cyclical ups and downs in the number of unemployed, the number of discouraged workers, that is, persons who report they want to work but are not looking for a job because they think they could not find one, has also exhibited large swings over the last decade and a half. For example, during the early 1970's, when the number of unemployed fluctuated in the 4- to 5-million range, the number of discouraged workers oscillated between 600,000 and 800,000. When the number of unemployed climbed past the 10-million mark, as it did in the 1982-83 period, the number of discouraged workers rose to the 1.6- to 1.8-million range.

Given the fairly strong cyclical sensitivity in the number of discouraged workers,<sup>1</sup> one might conclude that they have strong links to the job market, that they test it periodically, and that they are ready to jump back into it if they believe jobs are available. However, an indepth look at available data on the behavior of discouraged workers leads to a quite different conclusion. While some of them may, indeed, keep

a close eye on the job market, the majority appear to have few, if any, concrete contacts with it. For example, of the discouraged workers interviewed over the late 1970's and early 1980's, two-thirds or more reported that generally more than a year had gone by since they last held a job. And special surveys conducted over this period showed that less than half of them had made any jobseeking efforts during the year preceding their interview. More importantly, according to a special study of data for the 1976-77 and the 1982-83 periods, only a minority of these persons reentered the job market in the 1-year period following their original classification as discouraged.

## **Little recent work experience**

Discouraged workers can be divided into three roughly equal groups in terms of their recent work history. As shown in table 1, about one-third reported, for the 1979-83 period, that they have either never worked at all or that more than 5 years have gone by since they last held a job. Another one-third report that their last job dates back from 1 to 5 years. Thus, only one-third are found to have held a job in the 1-year period preceding the interview in which they are identified as discouraged workers.

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Another surprising finding emerges when one examines the cyclical changes in these three groups of the discouraged worker population over the 1979–83 period. Given the sharp cutbacks in employment in various industries over this period, one would expect that most of the increase in the number of discouraged workers would have been accounted for by persons with fairly recent work experience—that is, persons who lost jobs and quickly lost hope of finding new ones. However, such was not the case. The largest increases were posted by the two groups of discouraged with the least or most remote work experience. And among the discouraged with the most recent experience (those who had worked during the previous 12 months) only a little more than half cited economic problems as the main reason for leaving the last job.

Of course, even if certain discouraged workers have no recent work experience, they can still be sincere in reporting that they want a job and in perceiving that their search for one would be futile. For example, a detailed breakdown of the data in table 1 shows that a majority of the discouraged with no previous work experience whatsoever are youths who would apparently like to land their first job. Given the very high rates of unemployment among youths in recent years, it is not surprising that some, although desirous of work, were not confident enough of their prospects to initiate (or resume) the job search process.

The same detailed data also show a large concentration of women 25 to 55 years among the discouraged whose last job dates back more than 5 years earlier. Although we know little about the work history of these women, we suspect they may have left the labor force during their childbearing and childrearing years. They would “now” like to rejoin the labor force but may be deterred by their belief that they could not find a suitable job.

So, by itself, the fact that many discouraged workers have little or no recent work experience does not allow us to question their desire to work. But there is other evidence—namely, the fact that they seldom test the job market—which leads us to question at least the “intensity” of their desire for jobs.

**Table 1. Discouraged workers by when last worked and, for those who worked the previous year, reasons for leaving last job, 1979–83**  
[Numbers in thousands]

When last worked and reason for leaving last job	1979	1980	1981	1982	1983
Total	766	993	1,103	1,567	1,641
Never worked	101	155	141	223	229
Last worked more than 5 years ago	158	217	221	339	332
Last worked 1 to 5 years ago	251	288	366	536	625
Worked last year	255	334	375	469	454
Left job because of:					
School, family	40	54	63	62	57
Health	16	10	15	12	10
Retirement	8	8	11	17	16
Economic problems	125	180	202	268	280
Other reasons	67	82	83	109	92

## Few job search efforts

It is generally assumed that a worker becomes discouraged over job prospects after failing in repeated efforts to find work. Indeed, discouraged workers are popularly described as persons who “have simply given up the search for work.” But, again, the data do not conform to such description.

While discouraged workers are not questioned regularly as to when they last looked for work, such questions are asked in special surveys. In these surveys, less than half of the discouraged report having tested the job market over the preceding year.

For example, in a special supplement to the Current Population Survey conducted both in September and October of 1978,<sup>2</sup> the persons identified as discouraged workers were asked, among other things, when they had last looked for work. The findings are summarized in the following tabulation which shows the percent of discouraged workers interviewed in September and October 1978 who had recently searched for work:

	Searched for work during previous—		
	3 months	6 months	12 months
Total discouraged	34.2	39.8	44.2
Reason:			
Job-market factors	40.4	48.3	52.4
Personal factors	18.3	18.3	23.7

Of all discouraged workers, one-third reported that they had tested the job market over the previous 3 months; 40 percent had done so over the previous 6 months, and 44 percent had looked for work at anytime during the previous year.<sup>3</sup> The proportion with any job search efforts was particularly low—about one-fifth—among those persons citing “personal factors” (age problems, skill or education deficiencies, or other personal handicaps) as the reason for their discouragement.

Roughly the same results were obtained from the Methods Development Survey, a small experimental survey conducted over several years by the Bureau of the Census.<sup>4</sup> This survey also revealed that about two-fifths of the discouraged workers had tested the job market in the 6-month period preceding their interview.

## Post-interview behavior

Given the structure of the Current Population Survey—in which the households falling in the sample are interviewed in the same calendar months for 2 consecutive years—it is possible, through computer matching of individual reports, to determine what the persons who were classified as discouraged workers in the initial year of interviewing were doing 1 year later, and whether they had worked during the intervening 1-year period. Such matching, which had pre-

viously been done with data for the 1976–77 period, when both unemployment and the number of discouraged workers were relatively low, was recently repeated with data for the 1982–83 period, when the ranks of unemployed and discouraged were much greater. Both sets of data indicate little labor force activity over these periods among persons who, in the initial year, were classified as discouraged workers.

As shown in table 2, of the roughly 1.7 million persons classified as discouraged in the second half of 1982, about one-fifth were employed 1 year later, nearly one-fifth were looking for work, while the remainder were still out of the labor force. And of those not in the labor force, only about one-fourth still reported themselves as discouraged.

Persons who, in the second half of 1982, attributed their discouragement to job-market factors ("could not find job" or "think no job available") were somewhat more likely to be either employed or still discouraged 1 year later than were those who had attributed their discouragement to personal factors (skill problems, age problems, or other personal handicaps). Likewise, among those who had been discouraged in 1982, the men were more likely to be in the labor force 1 year later than were the women. But even among these men, more than one-half were still out of the labor force when interviewed in 1983.

Some of the persons who were discouraged in the second half of 1982 and still inactive in the second half of 1983 did have temporary employment in between. But the proportions were small—one-tenth for those still out of the labor force the following year, and less than one-fourth for those who were then looking for work.

These findings are in line with those obtained from the tracking of discouraged workers over the 1976–77 period. Although the economic situation was then more favorable than over the 1982–83 period, it did not result in many discouraged workers returning to the job market. Only 20 percent of those who had been discouraged in 1976 were employed 1 year later and only 15 percent were looking for work. The balance, about two-thirds, were still out of the labor force, although a small fraction of them reported they had worked during the 1-year period between the two interviews.<sup>5</sup>

### Factors affecting reentry

Recent work experience appears to be the main factor affecting the probability of reentry into the labor force among discouraged workers. Although only a small proportion of the discouraged return to the job market, those who report in the initial interview that they had worked during the previous 12 months—and who generally make up about one-third of the total—are far more likely to be employed 1 year later than are those with more remote work experience.

For example, of all persons classified as discouraged in the second half of 1982, the proportion employed in the second half of 1983 was 33 percent for those who had held

**Table 2. Discouraged workers in the second half of 1982 distributed by their labor force status in the second half of 1983, and by original reason for discouragement**

Reason for discouragement	Number (thousands)	Status in second half of 1983					
		Total	Em- ployed	Un- employed	Not in labor force		
					Total	Dis- couraged	Other
Total .....	1,693	100.0	19.9	17.8	62.3	17.0	45.4
Personal factors .....	442	100.0	12.6	19.7	67.7	10.6	57.2
Job-market factors .....	1,251	100.0	22.8	17.0	60.1	19.5	40.6
Men .....	577	100.0	25.2	20.7	54.1	18.6	35.5
Personal factors .....	161	100.0	21.7	20.9	57.4	13.0	44.4
Job-market factors .....	416	100.0	26.7	20.6	52.7	21.0	31.7
Women .....	1,116	100.0	17.4	16.4	66.1	16.2	49.9
Personal factors .....	281	100.0	7.5	19.0	73.5	9.3	63.7
Job-market factors .....	835	100.0	21.1	15.4	63.5	18.9	44.6

a job in the 12-month period preceding their initial interview. For those with more remote work experience (or none at all), the proportion who actually had a job in 1983 was only 15 percent.

Relative to the dominant role of recent employment, other variables on which data are gathered through the Current Population Survey appear to have much less influence on the probability of labor force reentry for discouraged workers. For example, among those who had been discouraged in 1982 but were found to be employed in 1983, 87 percent had reported in their initial interview that they planned to seek work over the next 12 months. But even among those still out of the labor force in 1983, the proportion that had reported in 1982 that they were planning to seek work was also quite high—73 percent. So, it appears that the alleged intention of a discouraged worker to enter the labor force is a very weak indicator of his or her future labor force status.

### Weak link to job market

In conclusion, several sets of data—covering periods of relatively low as well as very high unemployment—show that a large proportion of persons classified as discouraged workers in the Current Population Survey have rare contacts with the job market. For many, the last job dates back many years. More than half report no jobseeking efforts in the year preceding the interview. And those without any recent work experience when first identified as discouraged appear quite unlikely to make any subsequent forays into the job market. This indicates that many of the discouraged, although expressing their desire for a job and their intention to look for one, find it very difficult to translate their sentiments into concrete and productive jobseeking efforts.

The evidence presented here supports the present practice of not including discouraged workers in the labor force. It also supports the recommendation made by the National Commission on Employment and Unemployment Statistics that the measurement of discouraged workers should be limited to those who have made some efforts to find a job during the preceding 6-month period.<sup>6</sup> □



<sup>1</sup>The cyclical sensitivity of the discouraged workers' series has been examined by Paul O. Flaim in "Discouraged workers and changes in unemployment," *Monthly Labor Review*, March 1973, pp. 95-103, as well as by Carol M. Ondeck, "Discouraged workers' link to jobless rate reaffirmed," *Monthly Labor Review*, October 1978, pp. 40-42.

<sup>2</sup>The Current Population Survey has a sample of about 60,000 households, and is conducted monthly by the Bureau of the Census for the Bureau of Labor Statistics.

<sup>3</sup>For a more detailed description of these numbers, see Harvey R. Hamel, "Two-fifths of discouraged sought work during prior 6-month period," *Monthly Labor Review*, March 1979, pp. 58-60.

<sup>4</sup>The experimental survey is the "Methods Development Survey" con-

ducted by the Census Bureau to test new approaches that might be introduced into the Current Population Survey. The experimental survey was begun in May 1978, but the special questions on discouraged workers were introduced in "Phase II," which began in December 1979.

<sup>5</sup>See Barbara Cottman Job, "How likely are individuals to enter the labor force?" *Monthly Labor Review*, September 1979, pp. 28-34.

<sup>6</sup>National Commission on Employment and Unemployment Statistics, *Counting the Labor Force* (Washington, Government Printing Office, 1979). For a summary of the commission's recommendations, see Robert L. Stein, "National Commission recommends changes in labor force statistics," *Monthly Labor Review*, April 1980, pp. 11-21.

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### Stress and satisfaction

It has been shown that man has to contend both with a physical component of his working environment and a psychosocial component; that conditions in either or both may be unacceptably stressful; and that work, whether physical or skilled, may itself constitute an unacceptable stress. One must also recognize that, in the terms defined, stress is always present to a greater or lesser degree and that, paradoxically, the total absence of apparent stress becomes in itself a stress. Thus, on the one hand, stress can be considered as a load, increasing to an overload, arising from addition to the man-machine-environment complex of qualities which are undesirable from the human point of view, such as intolerable working conditions, harsh supervision, or unreasonable working hours. On the other hand, removal of desirable attributes by, for example, the creation of a stultifying environment, with reduced stimulation and inherently boring work, can act as a kind of negative loading which can be equally stressful. The stress experienced by an individual lies somewhere on the continuum between that arising from removal of desirable qualities and that arising from the addition of undesirable qualities. Thus, there is some point where his stress level can be optimum.

—T. M. FRASER

*Human Stress, Work and Job Satisfaction:  
A Critical Approach* (Washington, International  
Labor Office, 1983), p. 55.

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# An evaluation of BLS' projections of 1980 industry employment

*Employment was underestimated in projections made in 1970, 1973, and 1976; estimates of labor force growth and unemployment turned out to be offsetting factors*

JOHN TSCHETTER

The Bureau of Labor Statistics periodically publishes projections of gross national product (GNP) and output and employment by industry. These projections provide a framework for BLS' occupational projection program as well as for employment analysis of energy, housing, transportation, and defense issues. This article is a final step in the projection process—evaluation of the projections of the 1980 economy. Evaluation is an important part of the projection program, for only after the projected period has run its course can we quantify the limitations of our projected data.

BLS published three projections of the 1980 economy.<sup>1</sup> Those published in April 1970 underestimated employment (including military) in 1980 by 4.0 percent; those published in December 1973 underestimated employment by .9 percent; and those published in 1976 underestimated employment by 1.4 percent. These errors were kept modest by offsetting estimates: for example, an underestimate of labor force growth was offset by an underestimate of the unemployment rate. The 1980 recession slightly increased the gap between projected and actual employment.

For the three projections, the absolute difference between the projected and actual trends by industry was 1.9 percentage points per year. The absolute difference in the number of projected and actual jobs was 90,000 or 15 percent, per industry. The larger differences, for the most part, occurred among the smaller industries in terms of employment.

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BLS accurately projected one-third to one-half of the fastest-growing industries.

Among major industries, projected employment levels in State and local government and manufacturing were consistently higher than actual levels; employment in the other major industries was usually lower. The errors for manufacturing partly reflect the effect of the unanticipated 1980 recession on durable goods industries. (The projections are intended to capture longer term secular trends, rather than business cycle changes.) In addition, other factors such as trade issues and their impact on manufacturing industries were not sufficiently anticipated. As a consequence of the errors for the major industries, each of the projections slightly underestimated the long-term shift from goods- to service-producing industries.

How good were the employment projections when compared to alternative employment projections and projecting techniques? The errors in BLS' projections were the same size or magnitude as the errors of projections developed by two private organizations. And BLS' projections, which reflect models and judgments, performed better than two simpler models.

There are five components of the 1980 projections: labor force, aggregate or macroeconomic activity, industry outputs, industry employment, and occupational employment. The labor force and occupational employment projections have been evaluated.<sup>2</sup> This article evaluates the projections of 1980 aggregate economic activity and industry output and employment. It discusses errors in the employment projections and calculates the part which can be attributed to

the 1980 recession. It also examines the effects of industry employment projections on occupational employment projections. Finally, the sources of errors in the employment projections are determined.

### Evaluation complicated by revisions

The 1970 projections of the U.S. economy in 1980 estimated industry employment trends over the 1968–80 period; the 1973 projections estimated trends over the 1972–80 period; and the 1976 projections estimated trends over the 1973–80 period. Projected employment trends are based on assumptions about labor force growth, unemployment rates, and the adjustment between the number of employed persons and the number of jobs.<sup>3</sup> One assumption is that the economy will expand steadily toward full employment. In 1970, employment projections assumed a 1980 economy near full employment; in 1973 and 1976, they assumed a point on a path towards full employment by 1985. Projected trends in industry employment are based on assumptions of total employment, level and distribution of the gross national product, labor productivity by industry, and an input-output matrix.

To emphasize the uncertainty of projections, BLS has traditionally developed scenarios which cover alternative assumptions about employment and GNP levels. The projections reviewed here are the middle or base scenario. While the differences at the macro or GNP level among the scenarios were moderately broad in terms of percentage and dollar amounts, the differences in terms of trends were narrow. This also applies for industry employment.

This evaluation is complicated by revisions in the series which were projected. For example, the definitions and methods for structuring the industries have changed twice. The 1970 projections reflected the 1958 Standard Industrial Classification (SIC); the 1973 projections reflected the 1967 SIC; the 1976 projections reflect the 1972 SIC. This and other revisions mean that the projected values, as originally published, cannot be directly compared to current data. For this evaluation, the projected trends are applied to the revised historical data series to obtain projected 1980 values which are consistent across the three projections. In essence, the base for each projection has been revised to reflect data revisions. The projected trends are unchanged.

### Total employment underestimated

BLS underestimated total employment growth in each of the three projections by .2 to .4 percentage points per year. The following tabulation shows projected and actual annual growth rates in total employment for the three projections:<sup>4</sup>

Year published	Period covered	Projected	Actual	Difference
1970	1968–80	1.5	1.8	–0.3
1973	1972–80	2.0	2.2	–.2
1976	1973–80	1.8	2.2	–.4

In the 1970 projection, BLS expected total employment to grow 1.5 percent per year over the 1968–80 period; employment actually grew 1.8 percent per year, a difference of 0.3 percent.

The difference between projected and actual trends reflects some offsetting estimates. BLS consistently underestimated labor force growth during the 1970's, especially the trends in participation rates for women.<sup>5</sup> However, the low labor force estimates were offset by estimated unemployment rates which were 1.7 to 3.2 percentage points lower than actual rates. There was an upward trend in unemployment throughout the 1970's, and the rate did not return to the relatively low 1973 level following the 1973–75 recession, despite uninterrupted growth over the 1975–79 period. The labor force underestimate was further offset by an overestimate of the adjustment between the number of employed persons and the number of jobs. Because a person can have two or more jobs, the number of jobs in the economy exceeds the number of persons employed.

The 1970 projections put the number of jobs in 1980 at 101.7 million, compared with the actual number of 105.9 million, a difference of 4.2 million jobs. The 1973 projections estimated the number of jobs would be 104.9 million; the 1976 projections, 104.4 million.

One trend that has characterized employment over the past several decades is the movement from the goods-producing sector (agriculture, mining, construction, and manufacturing industries) to the service-producing sector (transportation, communication, public utilities, finance, trade, other services, and government industries excluding military). The projections slightly underestimated this shift. In the 1970 and 1973 projections, the service-producing sector was projected to account for 69.6 percent of all civilian jobs in 1980, and in 1976 projections, 69.9 percent. In 1980, 70.8 percent of all civilian jobs were in the service-producing sector. The difference for the most part can be attributed to the unanticipated 1980 recession.

### Industry differences modest

At the industry level, the differences between actual and projected trends were usually modest. (See table 1.) For the 1970 projections, industry employment was expected to grow an average of .86 percent per year over the 1968–80 period; the actual growth was 1.08 percent per year, a difference of .22 percentage points per year. The following shows the mean projected and actual employment trends and differences by industry for the private economy, except households, for the three projections:<sup>6</sup>

Year published	Pro- jected	Actual	Dif- ference	Absolute difference		
				Unweighted	Weighted	Squared
1970	1.08	0.86	–0.22	1.30	1.02	1.81
1973	2.31	2.07	–.24	2.73	2.05	3.59
1976	1.64	1.34	–.30	1.50	1.18	2.07

For the three projections, the difference between projected and actual trends was less than 2 percentage points per year

**Table 1. Employment in 1980, projected and actual trends by industry for the private economy, except households**

(Average annual rate of change)

Industry	1968-80 period			1972-80 period			1973-80 period			Absolute difference
	Projected in 1970	Actual	Difference	Projected in 1973	Actual	Difference	Projected in 1976	Actual	Difference	
Livestock and livestock products	-2.6	-1.8	0.8	-4.4	-4.8	-0.3	-3.4	-5.2	-1.8	1.0
Crops and other agricultural products	-2.6	-1.8	.8	-5.3	.5	5.8	-2.9	.1	3.0	3.2
Forestry and fishery products	1.0	3.9	3.0	1.2	1.3	.1	1.1	7.2	6.2	3.1
Agriculture, forestry, and fishery services	1.0	3.6	2.6	1.5	6.7	5.2	1.3	2.8	1.5	3.1
Iron ore mining	-0.9	-1	.8	2.6	3.0	.4	-2.3	.3	2.6	1.3
Copper ore mining	0.4	1.9	1.5	1.8	-2.8	-4.6	1.0	-3.9	-4.9	3.6
Other nonferrous metal ore mining	0.4	1.9	1.5	3.0	8.5	5.5	3.1	10.0	6.9	4.6
Coal mining	-3.0	5.7	8.7	.1	4.7	4.6	2.7	5.7	3.0	5.4
Oil and gas extraction	-0.9	3.3	4.2	-1.0	9.1	10.1	3.3	6.0	2.7	5.7
Stone and clay mining and quarrying	0.9	.7	-1	1.2	2.6	1.4	-1	.1	.3	.6
Chemical and fertilizer mining	0.9	.7	-1	1.3	5.2	4.0	.0	4.2	4.2	2.8
Construction	2.5	2.6	.1	1.4	5.3	3.9	1.0	2.8	1.8	1.9
Complete guided missiles and space vehicles	-2.7	-5.1	-2.4	3.7	9.4	5.7	.7	.7	-0	2.7
Other ordnance	-2.7	-5.1	-2.4	-2.0	2.5	4.6	-1	-2.8	-2.6	3.2
Food products	-0.1	-4	-3	.1	.0	-1	-6	.0	.6	.3
Tobacco manufacturing	-2.2	-1.6	.6	-7	-1.0	-3	-2.6	-1.5	1.1	.7
Fabric, yarn, and thread mills	-1.0	-1.5	-.5	.6	-2.2	-2.9	-0	-1.7	-1.7	1.7
Miscellaneous textiles and floor coverings	-0.8	-.5	.3	.7	-3.6	-4.3	-7	-1.1	-4	1.7
Hosiery and knit goods	-0.8	-.5	.3	.3	-2.1	-2.4	-1.3	-2.0	-7	1.1
Apparel	1.3	-1.0	-2.3	1.8	-1.5	-3.2	.8	-1.3	-2.0	2.5
Miscellaneous fabricated textile products	1.0	-4	-1.4	2.4	.2	-2.1	1.2	.9	-3	1.3
Logging, sawmills, and planing mills	.0	.9	.9	-7	.4	1.0	-7	.9	1.6	1.2
Millwork, plywood, and other wood products	.0	.9	.9	1.0	.3	-.6	.2	1.1	.9	.8
Household furniture	1.7	.0	-1.6	2.8	-1.5	-4.3	.0	-.9	-.9	2.3
Other furniture	3.0	1.5	-1.5	2.6	1.6	-1.0	.6	1.7	1.1	1.2
Paper products	1.3	.2	-1.1	2.0	.4	-1.6	.6	.5	-.1	.9
Paperboard	.8	-.8	-1.6	3.7	-.7	-4.4	2.3	-.7	-3.0	3.0
Publishing	1.2	1.3	.1	2.0	2.6	.6	1.2	1.8	.6	.4
Printing	1.2	1.3	.1	2.2	4.7	2.5	1.9	2.2	.4	1.0
Chemical products	0.4	.5	.1	2.7	1.1	1.6	.6	1.9	1.2	1.0
Agricultural chemicals	0.4	.5	.1	1.8	2.2	.3	.8	2.7	1.9	.8
Plastic materials and synthetic rubber	1.9	-1.1	-3.0	4.8	-.8	-5.6	2.8	-1.5	4.3	4.3
Synthetic fibers	1.9	-1.1	-3.0	1.5	-2.1	-3.7	1.1	-2.3	-3.4	3.4
Drugs	1.9	2.1	.2	3.6	2.7	-.9	2.1	2.7	.6	.6
Cleaning and toilet preparations	1.9	2.1	.2	3.3	2.8	-.5	1.1	1.9	.8	.5
Paint	0.5	-.6	-1.1	1.9	-.5	-2.3	1.4	-.2	-1.5	1.6
Petroleum products	-1.7	.8	2.5	-1.7	-.5	1.2	.5	.7	.2	1.3
Rubber products	2.5	2.5	-.0	2.4	-2.5	-4.9	1.8	-.9	-2.7	2.5
Plastic products	2.5	2.5	-.0	5.3	3.2	-2.1	4.1	4.3	.2	.8
Leather, footwear, and leather products	-2.3	-3.4	-1.1	-0.1	-3.7	-3.7	-2.0	-2.3	-.4	1.7
Glass	1.2	.8	-.4	2.9	-1.7	-4.7	.9	.1	-.8	2.0
Cement, clay, and concrete products	2.0	.4	-1.5	1.7	.5	-1.3	.3	-.6	-.9	1.2
Miscellaneous stone and clay products	2.0	.4	-1.5	2.1	.8	-1.3	.2	.8	.6	1.2
Blast furnaces and basic steel products	-.8	-.9	-.1	.7	-2.2	-2.9	.4	-1.2	-1.6	1.5
Iron and steel foundries and forgings	-.8	-.9	-.1	.0	-1.9	-2.0	-.3	-.3	.0	.7
Primary copper and copper products	1.8	.4	-1.5	1.3	1.2	-.0	.0	-.9	-.9	.8
Primary aluminum and aluminum products	1.8	.4	-1.5	.1	2.8	2.7	4.1	1.7	-2.4	2.2
Other primary nonferrous metals and products	1.8	.4	-1.5	2.0	2.7	.7	.7	2.5	1.7	1.3
Metal containers	.1	-1.2	-1.3	2.3	-1.1	-3.3	1.7	-1.6	-3.4	2.7
Heating apparatus and plumbing fixtures	1.6	1.5	-.0	2.0	.7	-1.3	-.4	.4	-.7	.7
Fabricated structural metal products	1.6	1.5	-.0	3.3	2.8	-.5	2.0	1.6	-.4	.3
Screw machine products	.8	-.4	-1.2	4.0	-1.5	-5.5	2.4	.2	-2.2	3.0
Other fabricated metal products	1.0	1.5	.5	4.1	.6	-3.5	2.0	1.4	-.6	1.5
Engines, turbines, and generators	.7	2.0	1.4	4.6	2.9	-1.8	2.0	2.2	.1	1.1
Farm machinery	1.4	2.4	1.0	1.2	1.4	.1	2.0	2.4	.4	.5
Construction, mining, and oilfield machinery	1.1	3.5	2.4	2.2	2.9	.7	3.8	3.7	-.2	1.1
Material handling equipment	2.8	1.1	-1.7	3.4	4.9	1.6	2.5	1.3	-1.2	1.5
Metal working machinery	.7	1.1	.4	3.4	4.6	1.2	2.6	2.7	.1	.6
Special industry machinery	1.7	.3	-1.4	2.5	3.0	.4	1.2	1.2	.1	.6
General industrial machinery	1.0	1.3	.2	4.4	3.3	-1.0	3.2	2.0	-1.2	.8
Machine shop products	4.1	3.2	-.9	2.3	8.0	5.7	3.1	4.5	1.5	2.7
Computers and peripheral equipment	4.1	3.2	-.9	10.0	12.2	2.2	5.9	6.4	.4	1.2
Typewriters and other office equipment	4.1	3.2	-.9	4.0	6.1	2.1	1.4	1.9	.5	1.2
Service industry machines	2.3	2.1	-.3	2.8	.7	-2.1	.8	1.0	.2	.8
Electric transmission equipment	1.1	.9	-.2	5.7	5.6	-.0	1.8	1.9	.1	.1
Electrical industrial apparatus	1.1	.9	-.2	2.3	1.1	-1.1	3.3	1.3	-2.0	1.1
Household appliances	1.3	-.6	-1.9	.6	-3.4	-3.9	1.6	-1.5	-3.0	3.0
Electric lighting and wiring	1.5	.6	-.9	5.2	.9	-4.3	2.5	.4	-2.1	2.4
Radio and television sets	.9	-.9	-1.7	-1.1	-4.7	-3.6	-2.6	-3.3	-.7	2.0
Telephone and telegraph apparatus	.9	-.9	-1.7	1.0	3.9	2.9	.2	-.1	-.3	1.6
Other electronic communication equipment	.9	-.9	-1.7	2.8	6.0	3.3	-.6	2.7	3.3	2.8
Electronic components	2.1	2.8	.6	3.9	10.8	6.9	.8	4.8	3.9	3.8
Other electrical machinery	.5	2.8	2.3	.6	1.2	.6	1.9	2.8	.9	1.3
Motor vehicles	.2	.5	.3	2.3	-5.6	-7.9	-1.8	.0	1.8	3.3
Aircraft	-1.0	-2.0	-1.0	1.5	10.5	9.0	1.9	2.5	.6	3.5
Ship and boat building and repair	.9	1.8	.9	7.2	-.9	-8.2	3.1	2.0	-1.1	3.4
Railroad and other transportation equipment	.9	1.8	.9	1.2	6.5	5.3	4.1	3.5	-.5	2.2
Miscellaneous transportation equipment	.9	1.8	.9	.1	-12.8	-12.9	-.4	-5.0	-4.6	6.1
Scientific and controlling instruments	1.6	1.1	-.5	3.9	3.7	-.3	2.1	2.4	.3	.4

**Table 1. Continued—Employment in 1980, projected and actual trends by industry for the private economy, except households**

[Average annual rate of change]

Industry	1968-80 period			1972-80 period			1973-80 period			Absolute difference
	Projected in 1970	Actual	Difference	Projected in 1973	Actual	Difference	Projected in 1976	Actual	Difference	
Medical and dental instruments	.9	2.7	1.7	4.2	6.5	2.4	4.2	6.4	2.2	2.1
Optical and ophthalmic equipment	.9	2.7	1.7	.7	3.6	2.9	1.3	4.1	2.8	2.5
Photographic equipment and supplies	.9	2.7	1.7	4.0	1.3	-2.7	2.0	1.4	- .5	1.7
Miscellaneous manufactured products	.9	.4	-.5	.3	-2.0	-2.3	1.1	.2	-.9	1.2
Railroad transportation	.6	1.1	.4	-2.9	-.6	2.3	-2.2	-1.1	1.2	1.3
Local transit and intercity buses	.6	1.1	.4	1.0	2.5	1.5	.4	-.2	-.6	.8
Truck transportation	.6	1.1	.4	3.1	2.2	-.8	1.1	2.3	1.2	.8
Water transportation	.6	1.1	.4	.2	2.8	2.5	-1.0	.4	1.4	1.5
Air transportation	.6	1.1	.4	4.0	5.7	1.8	1.8	3.1	1.3	1.2
Other transportation	.6	1.1	.4	1.3	9.3	7.9	2.0	6.5	4.5	4.3
Communications, except radio and television	.9	1.7	.8	1.6	4.4	2.9	1.4	1.3	-.1	1.3
Radio and television broadcasting	2.1	3.7	1.6	1.2	5.9	4.6	2.2	4.4	2.2	2.8
Electric utilities	.6	1.7	1.1	.2	5.0	4.8	2.0	2.7	.7	2.2
Gas utilities	.6	1.7	1.1	.8	1.4	.6	-.6	.1	-.7	.8
Water and sanitary services	.6	1.7	1.1	4.1	5.4	1.3	4.1	2.4	-1.7	1.4
Wholesale trade	1.7	2.8	1.2	2.0	3.9	1.9	1.8	3.1	1.3	1.4
Retail trade	1.7	2.8	1.2	2.1	2.6	.6	2.2	2.9	.7	.8
Finance	1.9	3.2	1.3	4.1	5.5	1.4	3.7	4.1	.4	1.0
Insurance	1.9	3.2	1.3	2.0	3.5	1.5	2.3	2.6	.3	1.0
Other real estate	1.2	4.2	2.9	1.3	6.5	5.2	1.8	3.8	2.1	3.4
Hotels and lodging places	1.8	1.6	-.2	2.4	2.8	.3	2.3	3.4	1.1	.6
Other personal services	1.8	1.6	-.2	1.6	1.8	.2	.1	1.1	1.0	.5
Miscellaneous business services	4.1	5.9	1.8	6.6	8.9	2.3	4.8	7.1	2.3	2.1
Advertising	4.1	5.9	1.8	2.1	5.7	3.7	.8	2.7	1.9	2.4
Miscellaneous professional services	4.1	5.9	1.8	3.6	7.3	3.7	5.0	6.0	1.0	2.2
Automobile repair	1.7	3.9	2.2	3.4	4.9	1.5	2.3	5.0	2.7	2.1
Motion pictures	2.1	3.9	1.8	.3	1.0	.7	.1	2.5	2.4	1.6
Other amusements	2.1	3.9	1.8	3.3	4.4	1.1	1.8	4.7	2.9	1.9
Health services, excluding hospitals	3.2	3.9	.7	4.9	5.5	.5	6.9	5.9	-1.1	.8
Hospitals	3.2	3.9	.7	5.3	3.6	-1.7	4.6	4.1	-.5	1.0
Educational services	3.2	3.9	.7	1.9	4.1	2.1	2.9	4.1	1.1	1.3
Nonprofit organizations	3.2	3.9	.7	2.9	3.3	.3	2.4	2.4	-.1	.4

NOTE: The actual trends are least squares growth rates; the projected trends are compound interest rates.

for two-thirds of the 293 industries (71 trends for the 1970 projections and 111 trends each for the 1973 and 1976 projections). Percentage differences, however, are not the appropriate statistic for evaluating projections because they allow positive differences to offset the negative differences. The unweighted absolute difference, which looks at the differences without regard to positive or negative signs, indicates that the projected trends differed by 1.3 percentage points per year for the 1970 projections.

Another way to evaluate the projection errors is to weight the differences between projected and actual trends by the employment size of each industry, that is, the weighted absolute difference. This procedure reveals that the larger differences occurred in the smaller industries, as the weighted differences are smaller than the unweighted differences.

A final way to evaluate the projections is to fault a projection for particularly large errors in individual industries, the root mean squared difference. The projections contain numerous large differences between actual and projected trends for individual industries. This is apparent in the preceding tabulation—the squared differences are considerably larger than the absolute differences. The largest differences between actual and projected trends occurred in copper ore mining, plastic materials, synthetic fibers, metal stamping, and other transportation equipment industries, all of which are small in terms of employment.

These data suggest that the 1970 projections were the most accurate, even though the projected levels (at least for the total economy) were off by a larger margin than the 1973 and 1976 projections. The absolute differences, whether unweighted, weighted, or squared, were smallest for the 1970 projection. In terms of employment levels, the absolute difference was 149,000 jobs, or 15.2 percent of 1980 employment per industry, for the 1970 projections; 81,000 jobs, or 17.0 percent, for the 1973 projections; and 62,000, or 12.9 percent, for the 1976 projections.

*Major industry employment.* Employment growth projections in government and manufacturing were consistently overestimated, while employment growth in the other industries was usually underestimated. (See table 2.) The overestimation of State and local government employment reflects the cutbacks in government programs in the late 1970's. The high estimates for manufacturing reflect, for the most part, overestimates of production for durable goods industries which, in turn, reflect the effects of the 1980 recession, the 1978-79 surge in oil prices, and an overestimate of domestic auto sales. These and other factors caused employment in motor vehicles alone to decline 20 percent between 1979 and 1980. Projected employment for 1980 in motor vehicles was overestimated an average of 22 percent in each of the three projections. Durable manufacturing

employment declined .6 percentage points during the 1979–80 period. Clearly, the recession increased the projections errors.

Within manufacturing, projected employment in the high-tech industries differed from actual employment by –1.7 percent for the 1970 projections, 3.6 percent for the 1973 projections, and –3.1 percent for the 1976 projections. Manufacturing high-tech industries include those with a greater proportion of technology-oriented workers than the average for manufacturing and a ratio of research and development expenditures to sales near or above the average for all industries.<sup>7</sup> The projection errors for these industries were less than the errors for manufacturing as a whole.

The low estimates of jobs in trade and services in each of the three projections reflect greater than expected declines in the average workweek and less than expected gains in labor productivity. Again, the errors for some industries are magnified by the employment shifts that occurred between 1979 and 1980.

**Industry rankings.** How well did BLS project the relative growth rates of individual industries? With each projection, BLS attempted to characterize the fastest growing industries. In terms of employment, BLS correctly ranked 7 of the 17 fastest growing industries in the 1970 projections; 11 of 27 in the 1973 projections; and 15 of 27 in the 1976 projections.

In 1970, BLS projected that employment in office computing and accounting machines, business services, and medical and educational services would grow the fastest of all industries in the private sector. These were among the fastest growing industries. As projected, employment in office machines grew 5.0 percent per year over the 1968–80 period. Optical equipment and coal mining were two of the fastest growing industries; BLS projected them to be among the slowest.

We can examine the ability to project relative growth

rates across industries by calculating the correlation between actual and projected trends. If our projections were perfect, then the projected trends would explain 100 percent of the variation in the actual trends—perfect correlation. The projected trends accounted for only 28 percent of the variation in the actual trends in the 1970 projections; 33 percent in 1973; and 15 percent in 1976.

We can also examine the ability to project relative employment levels—the correlation between actual and projected 1980 employment levels. Here, the projected levels explained more than 90 percent of the variation for each projection. These differences in the explanatory power of trends versus levels is to be expected because trends are considerably more volatile in the long run.

### Recession affects industry employment

The fact that BLS did not anticipate the 1980 recession increased the difference between projected and actual trends by 2 to 5 percentage points per industry. The projections were not intended to be forecasts of a specific year, but rather estimates of what the economy might look like as it moves along a steady medium-term growth path toward full employment. By emphasizing 1980, it appears that BLS overestimated the medium-term trends for some industries, for example, the auto industry where employment was expected to grow .4 percent per year over the 1968–80 period. Auto employment declined .8 percent per year over the 1968–80 period, but grew 1.4 percent per year over the 1968–78 period.

We illustrate the effects of the recession by calculating “projections” of the 1978 and 1979 economies. The calculation applies the projected 1968–80 industry employment trends of the 1970 projections to the 1968–78 period to obtain an estimate of 1978 employment, and to the 1968–79 period to obtain an estimate of 1979 employment. The following tabulation compares the mean absolute percent

**Table 2. Employment in 1980 in major industries, projected and actual levels**

(Numbers in thousands)

Industry	Projected in—			Actual	Percent differences		
	1970	1973	1976		1970	1973	1976
Total employment	101,725	104,944	104,399	105,920	-4.0	-0.9	-1.4
Government	19,203	18,647	18,899	17,914	7.2	4.1	5.5
Federal	5,647	4,893	5,105	5,126	10.2	-4.5	-0.4
Civilian	2,184	2,055	2,142	2,207	-1.0	-6.9	-2.9
Military	3,463	2,838	2,963	2,919	18.6	-2.8	1.5
State and local	13,556	13,754	13,794	12,788	6.0	7.6	7.9
Private	82,522	86,297	85,500	88,006	-6.2	-1.9	-2.8
Agriculture	2,664	2,186	2,589	2,860	-6.9	-23.6	-9.5
Mining	451	537	599	723	-37.6	-25.7	-17.2
Construction	5,546	5,286	5,384	5,865	-5.4	-9.9	-8.2
Durable manufacturing	13,167	13,757	13,167	12,423	6.0	10.7	6.0
Nondurable manufacturing	8,974	9,294	8,753	8,250	8.8	12.7	6.1
Transportation	3,085	3,278	3,037	3,250	-5.1	0.9	-6.6
Communication	1,116	1,304	1,318	1,362	-18.1	-4.3	-3.2
Public utilities	812	863	919	966	-15.9	-10.7	-4.9
Trade	19,594	21,156	21,541	22,493	-12.9	-5.9	-4.2
Finance and real estate	4,536	5,334	5,407	5,702	-20.4	-6.5	-5.2
Services, except households	18,491	20,048	19,867	21,097	-12.4	-5.0	-5.8
Households	2,770	1,825	1,291	1,598	73.3	14.2	-19.2
Other government enterprises	1,316	1,429	1,655	1,501	-12.3	-4.8	10.3

errors in the employment projections of the 1978 and 1979 economies with those of the 1980 economy:

<i>Year published</i>	<i>1980</i>	<i>1979</i>	<i>1978</i>
1970 .....	15.3	14.0	13.4
1973 .....	17.0	12.7	11.4
1976 .....	12.7	9.8	8.2

*Impact on occupational employment.* As noted earlier, industry employment estimates, along with a projected industry-occupation matrix, are the basis of occupational employment estimates.<sup>8</sup> However, only the industry employment projection published in 1970 was used in the occupational employment projections. The 1973 and 1976 industry employment projections were used to estimate 1985 occupational employment.

To isolate the effect of industry estimates on occupational projections, the industry estimates for 1980 are multiplied by actual 1980 industry staffing patterns. This yields a projection of occupations which is then compared to actual employment by occupation.

Industry employment estimates caused some sizable errors in the projections of occupational employment in the 1970 projections. For example, professional and technical workers' share of employment would have been overestimated by 2.8 percentage points, the hypothetical share of 19.1 percent compared with the actual share of 16.3 percent. To a large extent, the error reflected the overestimate of State and local government, especially employment of teachers. However, other elements in the occupational projections offset estimates of industry employment because the projected share of professional occupations underestimated the actual share by .8 percentage points. In the 1970 projections, the share of service occupations would have been slightly overestimated because of the industry projections.

The following tabulation shows the mean percent error in 1980 occupational employment projections attributed to 1970 industry employment estimates (1973 and 1976 estimates were not used to develop 1980 occupational employment, but are calculated here to show their implications):

<i>Year published</i>	<i>Error</i>	<i>Absolute error</i>
1970 .....	6.0	12.4
1973 .....	-0.3	4.8
1976 .....	-1.2	4.1

### Unexpected structural changes

During the 1970's, several events substantially affected the structure of the U.S. economy: the increases in energy prices in 1974 and the 1979-80 period, and the increases in food prices in response to the 1973 Russian wheat deal and to weather conditions in 1978. These events were not anticipated by BLS. They affected the performance and structure of the economy in several ways. The higher energy prices, for example, were partly the cause for a considerable deceleration in labor productivity growth. The economy was

also affected by new fiscal and monetary initiatives to control inflation.

Between 1970 and 1980, the labor force grew by 23.7 million persons, compared with 13.4 million between 1960 and 1970, a difference of 10.3 million. The magnitude of the 1970-80 increase was not fully anticipated by BLS and caused a number of problems for the projections. For example, one factor in the slowdown in labor productivity was the number of inexperienced workers entering the labor force in the 1970's. Also, demand for several industries grew more rapidly than anticipated (the fast-food restaurants component of retail trade, for example).

### Source of the errors

Were our errors caused by erroneous assumptions, by incorrectly specified models, or by other factors? In essence, were we right for the wrong reason or wrong for the right reason? Knowing the source of our errors may help improve future projections and will also highlight the imprecise nature of the projections. So far, the discussion has focused on industry employment, one of the end products of the projection process. Reaching this result involved (1) assumptions about future trends in the labor force, unemployment rate, aggregate labor productivity, and other variables and (2) a model which depicted the structure of the U.S. economy. The errors in projecting industry employment could have occurred because of incorrect assumptions, incorrectly specified models, random errors, or a combination of these factors.<sup>9</sup>

*Employment.* A first step in our projection methodology is the derivation of total employment. This begins with a projection of the labor force. The labor force, when combined with an assumed unemployment rate among civilian workers and an assumed level of Armed Forces, yields the number of employed persons. This number is then adjusted for dual jobholders and other factors to achieve a projected estimate of the number of jobs in the economy.

To determine the source of the error attributed to each component of the employment estimate, we calculated a series of hypothetical employment levels. For the error caused by the labor force assumption alone, we projected total employment as if the correct unemployment rate, Armed Forces, and other factors were known. A comparison of this hypothetical employment with actual 1980 employment gives a measure of the effect of the projected labor force estimate. For the 1970 projections, if the projected civilian labor force had been the only error, then the projected employment would have been 8,641,000 jobs below actual employment. If the projected unemployment rate had been the only error, then the projected employment would have been 3,506,000 jobs above the actual employment. Thus, for the 1970 projections as well as the other projections, these two variables were offsetting. (See table 3.)

*Supply GNP.* Another step in the projection methodology

is the estimates of supply GNP. These estimates begin with the derivation of employment from assumptions about the labor force and the number of unemployed persons for the target year. Employment was combined with projected annual hours per employee to provide an estimate of total annual hours paid. This figure, multiplied by output per hour—aggregate labor productivity—yielded an estimate of potential GNP. Because this estimate was derived from economic resources, it is called “supply GNP.” As seen in the following tabulation, BLS consistently overprojected the 1980 supply GNP:

Year published	GNP (1972 dollars in billions)	
	Projected	Percent difference
1970 .....	\$1,729.2	17.3
1973 .....	1,718.9	16.6
1976 .....	1,607.7	9.1
Actual 1980 .....	1,474.0	—

To isolate the error which would be attributed to each component of GNP, we calculated a series of hypothetical GNP's. For the error caused by the labor force assumption, we constructed a projected supply GNP as if the correct labor productivity, number of unemployed, and other factors were known. A comparison of the hypothetical and actual 1980 GNP is the measure of the effect of the projected labor force estimate.

For the 1970 projections, projected supply GNP was \$255.2 million greater than actual GNP for the year 1980. (See table 4.) If the projected labor force had been the only error, then the GNP estimate would have been \$125.4 billion below the actual figure. If the nonfarm labor productivity estimate had been the only error, then the projected GNP would have been \$250.8 billion too high. Because of offsetting errors in projections of the labor force, unemployment, average workweek, and other factors, the labor productivity error was nearly the same as the total GNP error.

The largest source of error in the three projections of GNP stemmed from overestimation of private labor productivity. The 1973 projection assumed a considerable acceleration in labor productivity, compared with its postwar growth. The 1970 and 1976 projections embodied only modest changes, compared with past trends. In fact, a large deceleration in

**Table 4. Factored errors in computation of supply gross national product**

(Billions of 1972 dollars)

Item	1970 projections		1973 projections		1976 projections	
	Billions	Percent	Billions	Percent	Billions	Percent
Total error .....	\$255.2	100.0	\$244.9	100.0	\$133.7	100.0
Error due to:						
Labor force .....	-125.4	-49.1	-100.9	-41.2	-74.2	-55.5
Unemployment level .....	56.1	22.0	53.4	22.0	42.4	31.7
Adjustment factor .....	16.8	6.6	33.7	13.8	15.6	11.7
Federal government employment .....	-6.6	-2.6	-8	-3	-1.4	-1.0
State and local government employment .....	-5.9	-2.3	-5.4	-2.2	-9.1	-6.8
Agriculture employment .....	.6	.2	-3.0	-1.2	3.3	2.5
Agriculture workweek .....	1.0	.4	-1.0	-.4	-1.6	-1.2
Nonagriculture workweek .....	72.1	28.3	27.8	11.4	28.2	21.1
Agriculture productivity .....	9.5	3.7	10.5	4.3	7.6	5.7
Nonagriculture productivity .....	250.8	98.3	226.4	92.4	130.7	97.8
Interaction .....	-14.1	-5.5	3.8	1.6	-7.8	-5.8

NOTE: Data reflect the calculation of supply GNP with the projected value of an individual variable and the actual value for all other variables in the supply GNP equation.

labor productivity trends occurred during the 1975–79 period.

*Industry outputs.* For all three projections, the absolute difference between projected and actual industry output trends was 2.68 percentage points per year per industry. In one-third of the estimates, the difference between actual and projected trends was less than 2 percentage points per year. The absolute, unweighted, weighted, and squared differences were smallest for the 1970 projections:

Year published	Pro-jected	Actual	Dif-ference	Absolute difference		
				Unweighted	Weighted	Squared
1970 ....	4.21	2.59	1.62	1.87	1.36	2.30
1973 ....	5.40	2.64	2.75	3.41	2.48	4.05
1976 ....	3.83	2.60	1.22	2.58	1.86	3.43

The largest overestimates of output usually occurred in construction and durable manufacturing industries, reflecting the effects of the 1980 recession. Residential investment expenditures dropped over the 1979–80 period and as a result, construction output was overestimated by 30 percent or more. During the 1970's, increases in the exploration for oil and investment expenditures for commercial office buildings minimized errors in estimating construction activity.

Auto production was overestimated by more than 40 percent in each projection. Problems in the auto industry affected the steel, tire, and other supplying industries. The influx of foreign steel and autos into the domestic market, the 1980 recession, and energy-related problems were not anticipated. The errors in estimating construction activity affected the estimates of the cement and heating and plumbing industries. However, these errors offset underestimates in some industries such as the optical and ophthalmic equip-

**Table 3. Factored errors in computation of total employment**

Item	1970 projections		1973 projections		1976 projections	
	Millions	Percent	Millions	Percent	Millions	Percent
Total error .....	4,195	100.0	976	100.0	1,521	100.0
Error due to:						
Civilian labor force .....	-8,641	-206.0	-6,364	-652.0	-4,752	-312.4
Unemployment level .....	3,506	83.6	3,506	359.2	2,725	179.2
Armed forces .....	581	13.8	-150	-15.4	58	3.8
Adjustment factor .....	678	16.2	2,525	258.7	699	46.0
Interaction .....	-319	-7.6	-493	-50.5	-251	-16.5

NOTE: Data reflect the calculation of total employment (jobs concept) with the projected value of an individual variable and the actual value for all other variables in the employment equation.



ment, computers and peripheral equipment, and electronic equipment industries.

Industries with the largest projection errors included other transportation equipment (motor homes, bicycles), copper ore mining, other nonferrous ore mining, tires and inner tubes, and primary copper products. These are small industries in terms of output.

*GNP components.* The components of GNP—consumption, investment, foreign trade, and government—were more indicative of 1979 than 1980. The difference, of course, is because of the 1980 recession. The share of investment in the 1980 GNP was overestimated by 1.1 percentage points in the 1970 projections and 3.0 percentage points in the 1973 projections. (See table 5.) During the 1980 recession, residential investment declined \$11.9 billion (1972 dollars) from 1979's level, or 20 percent. The change in business inventories dropped from a \$7.3-billion increase in 1979 to a \$5-billion decrease in 1980. If 1979 had been the target year of the projections, the investment errors would have only been .2 to 1.1 percentage points. Producer durable equipment's share of GNP was also overestimated in the three projections.

The errors in estimating consumption's share of 1980 GNP ranged from -1.7 to -.5 percentage points. If 1979 had been the target year, the errors would have been slightly smaller, -.1 to -1.3. For all three projections, consumption was expected to grow at about the same yearly rate as total GNP, and this occurred. The most difficult component of consumption to estimate was purchases of consumer durables. In the 1970 and 1973 projections, consumer durables were expected to grow slightly slower than total consumption; the reverse occurred. Expenditures for consumer nondurables were expected to grow modestly slower than GNP; this pattern occurred. Expenditures for consumer services were expected to grow either at the same rate or

slightly faster than total consumption; in reality, they grew faster.

The three projections underestimated the export share of 1980 GNP by 2.3 to 4.7 percentage points. BLS analysts did not anticipate the surge in the export of food and feed grains, capital goods (except autos), and services. Even if 1979 had been the target year, exports would have been underestimated.

The import share of GNP was reasonably accurate for the 1973 and 1976 projections, but not for the 1970 projection. The 1970 projection was based on import growth .5 percentage points per year slower than GNP; it grew 2.5 percentage points per year faster.

Estimates of Federal Government purchases were reasonable for the three projections. State and local government expenditures, however, were overestimated, reflecting unanticipated budgetary problems facing State and local government in response to tax amendments, such as "Proposition 13" in California and "Proposition Two and One-half" in Massachusetts, and to the 1980 recession.

*Isolating output errors.* Estimated output reflects several factors—level and distribution of real GNP, projected bridge tables, and projected input-output coefficients. The bridge table converts the broad final demand categories, such as consumption expenditures for durable goods, to the industries producing the items in the categories, such as electrical appliances. The input-output coefficients represent purchasing patterns of businesses and technologies and innovations in producing goods and services. Both the bridge and input-output tables embody assumptions concerning energy, computers, business services, and other products and technologies.

Because of changes in input-output definitions and other factors, it is not possible to show the projection errors for the bridge tables and input-output coefficients. Nor is it possible to estimate the effect that projected final demand distribution, input-output coefficients, and bridge tables had on the projected output trends. The combined projection errors for these three factors increased the absolute errors of the output projections by the same magnitude as the errors in the projected level of GNP.

Isolating the error which would be attributed to two components involves constructing two hypothetical projections of outputs. For the effect of the GNP level, we constructed industry output levels which combined projected GNP and actual industry distributions. A comparison of these hypothetical outputs with actual outputs is a measure of the effect of projected GNP level. For the effect of final demand, input-output coefficients, and bridge tables, we constructed industry outputs which combined the actual GNP and the projected distribution of industry outputs. A comparison of these second hypothetical outputs with actual output levels is a measure of the impact of final demand and other factors.

The errors attributable to the projected distribution of

**Table 5. Percent distribution of demand gross national product in 1980, projected and actual**

Item	Projections published in —			Actual	
	1970	1973	1976	1979	1980
Gross national product . . . . .	100.0	100.0	100.0	100.0	100.0
Consumption . . . . .	61.4	61.4	62.6	62.7	63.1
Durable goods . . . . .	8.4	9.2	( <sup>1</sup> )	9.9	9.3
Nondurable goods . . . . .	23.3	24.1	( <sup>1</sup> )	23.9	24.1
Services . . . . .	29.7	28.1	( <sup>1</sup> )	28.9	29.7
Investment . . . . .	16.2	17.1	16.6	16.0	14.1
Nonresidential structures . . . . .	3.9	4.2	3.8	3.3	3.3
Producer durable equipment . . . . .	6.8	7.3	7.6	8.2	8.0
Residential structures . . . . .	4.3	4.1	3.7	4.0	3.2
Inventories . . . . .	1.2	1.5	1.5	.5	-.3
New exports . . . . .	.8	.8	1.4	2.5	3.4
Exports . . . . .	6.1	8.3	8.5	9.9	10.8
Imports . . . . .	-5.3	-7.5	-7.2	-7.4	-7.4
Government purchases . . . . .	21.6	20.7	20.6	18.8	19.3
Federal . . . . .	7.9	7.2	6.8	6.9	7.2
State and local . . . . .	13.7	13.5	12.6	11.9	12.1

<sup>1</sup>Not available.

outputs were small, 4 to 7 percent. However, the absolute error attributable to the projected distribution of outputs is nearly the same as that attributable to the projected GNP level for the 1970 and 1973 projections.

The following tabulation shows the effects of GNP and other factors on output estimates in private industries, except households:

Year published	Output errors		Error due to GNP		Error due to distribution	
	Percent	Absolute percent	Percent	Absolute percent	Percent	Absolute percent
1970 ...	28.9	32.4	20.9	20.9	4.5	17.7
1973 ...	29.2	33.8	22.3	22.3	5.9	19.5
1976 ...	18.7	25.1	11.8	11.8	6.5	18.4

**Employment/output ratios.** For the three projections, the absolute difference between projected and actual labor productivity trends was 2.38 percentage points per year per industry. In more than half of the estimates, the difference between the actual and projected trends was less than 2 percentage points per year. The 1970 projections were the most accurate of the three, with the lowest absolute differences, whether unweighted, weighted, or squared. Unlike employment and output, the larger difference did not always occur in the smaller industries in terms of employment. The following tabulation shows projected and actual employment/output trends by industry for the private economy, except households:

Year published	Pro-jected	Actual	Dif-ference	Absolute difference		
				Un-weighted	Weighted	Squared
1970 ....	-2.92	-1.66	-1.27	1.27	1.50	2.01
1973 ....	-3.84	-.97	-2.87	2.94	3.76	3.76
1976 ....	-2.36	-.94	-1.42	2.38	1.96	3.26

### Analysis of industry employment errors

Projected outputs times projected employment/output ratios yields projected industry employment. There are sufficient data to identify the errors for four factors—the level and distribution of both GNP and labor productivity. (See table 6.) The distribution of output includes the effects of the final demand distributions, bridge tables, and input-

output coefficients. The distribution of labor productivity reflects the estimated relative growth trends of labor productivity.

The data in table 6 highlight that aggregate errors in the GNP and labor productivity levels are nearly offsetting at the industry level. The distribution of industry outputs and labor productivity increased the employment errors. However, the errors resulting from the distributions of outputs and labor productivity are about the same as the errors resulting from the aggregate assumptions.

### Alternative projections

Were BLS' projections significantly less accurate than those of other analysts? If so, then more radical remedies and significant chances for improvement exist. The difference between projected and actual trends for employment were about the same for BLS and other medium-term forecasts of employment. BLS underestimated total employment by .9 percent in its 1973 projections and had an absolute difference per private industry of 10.6 percent when weighted for size of the individual industry. In 1974, Clopper Almon of the University of Maryland underestimated total employment in 1980 by 3.0 percent and had an absolute difference per private industry of 11.6 percent when weighted for industry size.<sup>10</sup>

In 1976, BLS underestimated total employment by 1.4 percent, and had an absolute error per private industry of 8.1 percent when weighted for industry size. In its 1976 projections, Chase Econometrics underestimated total employment by 4.2 percent and had an absolute error per private industry of 8.3 percent.<sup>11</sup>

BLS calculation of industry projection errors is based on 111 observations; both Almon's and Chase Econometrics' errors are based on 44 observations. Almon's and Chase Econometrics' estimates are for full-time equivalent jobs; BLS' are for jobs regardless of the number of hours worked. This distinction might affect the comparison if the workweek differed among the projections. Since the projections cited here, Chase Econometrics, Almon, and BLS have extensively revised and expanded their models.

Like BLS', Almon's and Chase Econometrics' projections of industry employment were based on a series of econometric and input-output models as well as judgments. However, specifications of the respective projection models differ. The similarity in the aggregate projection error may not be surprising because BLS' labor force projections were used by both Almon and Chase Econometrics. All three assumed the economy would move steadily toward full employment and thus did not anticipate the 1980 recession.<sup>12</sup> The differences in total employment between BLS and the other forecasters reflect the targeted levels of unemployment and the adjustments between the number of employed persons and the number of jobs.

**Simpler techniques.** BLS' projections are better than either

Year published	Projection error	Effect of projected—			
		Output		Productivity	
		Level	Distribution	Level	Distribution
Percent:					
1970 .....	0.2	20.9	4.5	-19.8	1.4
1973 .....	5.5	22.5	5.9	-17.9	3.1
1976 .....	2.3	11.8	6.5	-13.0	2.1
Absolute percent:					
1970 .....	15.3	20.9	17.7	19.8	15.7
1973 .....	17.0	22.3	19.5	17.9	18.5
1976 .....	12.9	11.8	18.4	13.0	13.6

NOTE: For the 1970 projections, these data are the mean values for 71 industries; for the 1973 and 1976 projections, 111 industries.

a simple extrapolation of past trends in industry employment or a simple regression equation when forecasting. The following tabulation shows the absolute percent errors in industry employment projections of the 1978, 1979, and 1980 economy:<sup>13</sup>

Year published	Period covered	Projections based on			Time trend
		BLS model	GNP regressions		
			Projected	Actual	
1970.....	1978	15.3	24.3	25.5	36.0
1973.....	1979	17.0	22.7	16.9	21.8
1976.....	1980	12.7	16.7	11.7	14.1

BLS' projections are based on a series of econometric and input-output models plus judgments. One might substitute either a time trend or a regression equation approach. A regression approach might relate an industry's employment to trends in GNP and the unemployment rate. A time trend would extrapolate past trends in industry employment forward to some target year. These two alternatives are certainly naive approaches, yet they provide a useful upper bound to acceptable projection errors.

In the preceding tabulation, two projections of 1980 employment are made with the regression technique. One uses actual GNP and unemployment rate values; the other uses BLS' projected 1980 GNP and the unemployment rate values. The difference between the two projections illustrates the effect of the aggregate errors. BLS could have correctly projected the GNP and unemployment rate but used a simple regression model. The accuracy of this combination would have been about the same as BLS' projections over a relatively short period, but less accurate than BLS' projections over a longer period.

### Past evaluations, future benefits

BLS has now evaluated five industry employment projections: one each of the 1970 and 1975 economy, and three

of the 1980 economy.<sup>14</sup> When the time span of each projection is considered, the magnitude of the projection errors has remained about the same across the five projections, as shown in the following tabulation:

Year published	Year projected	Absolute percent error	
		Unweighted	Weighted
1966 .....	1970	10.3	8.1
1973 .....	1975	14.8	8.0
1970 .....	1980	15.3	12.5
1973 .....	1980	17.0	10.6
1976 .....	1980	12.9	8.1

Since the 1980 projections, BLS has expanded the industrial detail and other aspects of the projection process. These expansions may or may not lead to more accurate projections. One characteristic of any projection—economic, demographic, or other—is that small groups or industries are not likely to be as accurately projected as large groups.<sup>15</sup> This raises the difficult question of the appropriate level of detail for a projection. From the point of view of accuracy alone, greater detail may impair the projection, yet the interaction of detailed industry groups may be one of the most valued characteristics of the projection. Although the detailed industry projections may have greater errors, their use may lead to more accurate aggregate projections.

Since these 1980 projections, BLS has also replaced its macroeconomic model with one developed and maintained by a private company. The new model is much broader and more detailed than the models used in the projections evaluated here. This should foster a better understanding of the interaction of many economic trends. However, projections must at some place in their structure hold change constant, whether it is the elasticities of substitution between income and expenditures or the concept of full employment. And yet the structure of the economy is continuously changing. This has the effect of underestimating the degree of change.<sup>16</sup> □

### FOOTNOTES

<sup>1</sup>The initial projections of the 1980 economy were described in "The U.S. economy in 1980: a preview of BLS projections," *Monthly Labor Review*, April 1970, pp. 3-34, and in *Patterns of U.S. Economic Growth*, Bulletin 1672 (Bureau of Labor Statistics, 1970). The second projections of the 1980 economy were described in "Projections of GNP, income, output, and employment," *Monthly Labor Review*, December 1973, pp. 27-42; *The U.S. Economy in 1985*, Bulletin 1809 (Bureau of Labor Statistics, 1974); and *The Structure of the U.S. Economy in 1980 and 1985*, Bulletin 1831 (Bureau of Labor Statistics, 1975). The third projections were described in Ronald E. Kutscher, "Revised GNP projections to 1980 and 1985: an overview," *Monthly Labor Review*, March 1976, pp. 3-8; Charles T. Bowman and Terry H. Morlan, "Revised projections of the U.S. economy to 1980 and 1985," *Monthly Labor Review*, March 1976, pp. 9-21; Thomas J. Mooney and John H. Tschetter, "Revised projections to 1985," *Monthly Labor Review*, November 1976, pp. 3-9; and Max L. Carey, "Revised occupational projections to 1985," *Monthly Labor Review*, November 1976, pp. 10-22.

<sup>2</sup>See Howard N. Fullerton, Jr., "How accurate were the 1980 labor force projections?" *Monthly Labor Review*, July 1982, pp. 15-21; and Max

Carey and Kevin Kasunic, "Evaluating the 1980 projections of occupational employment," *Monthly Labor Review*, July 1982, pp. 22-30.

<sup>3</sup>The methodology for the 1970 projections is described in *Patterns of U.S. Economic Growth*, Bulletin 1672 (Bureau of Labor Statistics, 1970); for the 1973 and 1976 projections, *The Structure of the U.S. Economy in 1980 and 1985*, Bulletin 1831 (Bureau of Labor Statistics, 1975).

<sup>4</sup>In this tabulation and throughout the article, the actual rates are based on least squares growth rates; projected trends are based on compound interest rates.

<sup>5</sup>See Fullerton, "How accurate were the 1980 labor force projections?"

<sup>6</sup>In this tabulation and throughout the article, for the 1970 projections, the data are the mean values for 71 industries; for the 1973 and 1976 projections, 111 industries.

<sup>7</sup>Richard W. Riche, Daniel E. Hecker, and John U. Burgan, "High technology today and tomorrow: a small slice of the employment pie," *Monthly Labor Review*, November 1983, pp. 50-58. The authors give three definitions of high technology; this evaluation uses the third.

<sup>8</sup>For an evaluation of the occupational projections to 1980, see Carey and Kasunic, "Evaluating the 1980 projections of occupational employment."

<sup>9</sup>The ideal way to analyze the sources of error would be to have macro and input-output models plus 1980 data which are consistent with the models and data used in each of the projections. Then one could, in turn, examine the effect of each model and assumption. However, this is not feasible because of changes in the definitions and concepts of input-output tables, revisions in National Income Accounts, and changes in the system for classifying industries. The discussion in this section is an approximation of the ideal. As will be apparent, assumption and modeling errors appear to be about equal in magnitude and usually are offsetting.

The projections assume there are no changes in the income and price elasticities of the forecasting model. Such an assumption is obviously unrealistic as the forecast horizon lengthens and for changes during a projected period which exceed the changes during a historical period. The unanticipated events discussed earlier are indicative of these problems.

<sup>10</sup>Clopper Almon, Margaret B. Buckler, Lawrence M. Horwitz, and Thomas C. Reimbold, 1985: *Interindustry forecasts of the American economy* (Lexington, Mass., Lexington Books, 1974).

<sup>11</sup>Chase Econometrics, *U.S. macroeconomic long-term forecasts, fourth quarter 1976*.

<sup>12</sup>Almon and others, 1985, p. 5.

<sup>13</sup>One regression uses actual GNP and the unemployment rate to project employment; the other uses projected GNP and the unemployment rate.

<sup>14</sup>For evaluations of the production and employment projections for the 1975 employment and output projection, see Paul T. Christy and Karen J. Horowitz, "An evaluation of BLS projections of 1975 production and employment," *Monthly Labor Review*, August 1979, pp. 8-19; for the 1970 projections, see Valerie A. Personick and Robert A. Sylvester, "Evaluation of BLS economic and employment projections," *Monthly Labor Review*, August 1976, pp. 13-26.

<sup>15</sup>Henri Theil, *Applied Econometric Forecasting* (Chicago, Rand-McNally and Co., 1966).

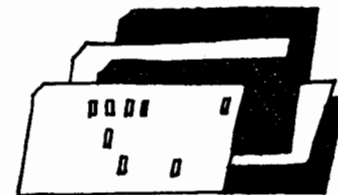
<sup>16</sup>Jacob Mincer and Victor Zarnowitz, "The Evaluation of Economic Forecasts," in Jacob Mincer, ed., *Economic Forecasts and Expectations: Analyses of Forecasting Behavior and Performance* (New York, National Bureau of Economic Research, 1969), pp. 3-46.

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#### A note on communications

The *Monthly Labor Review* welcomes communications that supplement, challenge, or expand on research published in its pages. To be considered for publication, communications should be factual and analytical, not polemical in tone. Communications should be addressed to the Editor-in-Chief, *Monthly Labor Review*, Bureau of Labor Statistics, U.S. Department of Labor, Washington, D.C. 20212.

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## Are unions facing a crisis? labor officials are divided

BRIAN HESHIZER AND HARRY GRAHAM

Union officials are concerned about the future of the labor movement, according to results of a recent survey. They recognize that they face a period marked by economic, technological, social, and political changes which do not augur well for organized labor. While the leaders who responded to the survey do not express panic over this prospect, they definitely see a period of difficulty ahead.

In 1963, a survey was sent to all national and international union presidents and union research and education directors listed in the Bureau of Labor Statistics directory of labor unions.<sup>1</sup> Of the 339 questionnaires sent, 85 responses were obtained, a response rate of 25 percent. In 1983, the same questions were asked of presidents and research directors of unions and employee associations listed in the 1979 Bureau of Labor Statistics directory of labor organizations. Of the 212 questionnaires sent, 79 usable responses were received, a response rate of 37 percent.<sup>2</sup>

Responding organizations represented unions and employee associations covering the broad spectrum of the labor movement. The size of responding unions ranged from several thousands to hundreds of thousands in membership. Most of the respondents were from traditional strongholds in manufacturing and nonmanufacturing and from the public sector, although unions in other sectors of the economy were represented as well. Employee associations in the respondent group came from States with strong union movements and with public sector bargaining laws. The size and industry distribution of respondents indicate that the sample is representative of labor organizations.

Responses to both the 1983 and 1963 surveys are shown in table 1. Using paired comparison t-tests, statistically significant differences at the .05 level, or lower, of significance were found for several questions, indicating a shifting of opinion among union officials on some important issues. In 1983, 62.7 percent of the union officials surveyed believed members do not know what their union does for them, up from 53.6 percent in 1963. Interestingly, a study by Thomas

Kochan shows that union members expect their union to perform at a higher level than what they perceive their unions to be providing.<sup>3</sup> Whether this reflects unrealistic expectations by union members is speculative, but union officials might interpret those results in that fashion.

Union officials perceive a general weakening of labor's power, compared with 20 years ago, saying that labor's social impact and collective bargaining power is weaker today. More of the current respondents strongly believe that economic considerations have limited their ability to improve the well-being of members. The effect of general economic conditions is also registered on the question of the employer's ability to pay. In the current survey, a significantly higher proportion of union officials recognize that this factor should be taken into account in bargaining.

Union officials believe that opportunities for advancement in union hierarchy are better today than they were in the earlier survey. They also believe the AFL-CIO should not coordinate activities such as organizing to any greater extent than it already does. (Only 15 percent agreed or strongly agreed that the "Federation should have more authority over organizing," a big change from 1963 when 25 percent agreed.)<sup>4</sup> They say labor is better prepared today to meet the problems posed by automation and economic change.

In both surveys, a large majority of respondents agreed that the labor movement has suffered from a lack of vitality in recent years. However, union officials do not see this as emanating from union leadership. In 1983, a larger proportion believed that such values as dedication and idealism are widely held, but still a sizable minority (37 percent in 1983 and 44 percent in 1963) believed such values are not widely held among union officials.

The responses indicate that union officials see the barriers to union growth as coming from outside the labor movement. A smaller proportion in 1983 believed that priority should be given to organizing white-collar workers over blue-collar workers.<sup>5</sup> Little change occurred in the beliefs of union officials on the need to establish links between organized labor and nonlabor reform groups. The entreaties of commentators from outside the labor movement who have called for re-establishing and forging new connections with nonlabor reform groups apparently have not shifted the views of union officials.<sup>6</sup> Nor was there any change in attitudes about borrowing ideas from foreign labor movements. Only 25 percent of the current respondents disagreed that unions were doing all they could to bring blacks into the movement,

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**Table 1. Union officials' attitudes about the labor movement**

Question	Survey date	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Mean <sup>1</sup>
Members do not understand what union does	1983	29.4	33.3	10.3	23.1	3.8	<sup>2</sup> 2.38
	1963	10.7	42.9	9.5	26.2	10.7	<sup>2</sup> 2.83
Need for formal opposition within unions	1983	5.1	22.8	32.9	20.3	19.0	3.25
	1963	8.3	21.4	16.7	39.3	14.3	3.30
Lack of vitality in labor movement	1983	29.1	44.3	8.9	12.7	5.1	2.20
	1963	27.4	36.9	6.0	23.8	6.0	2.40
Need for government involvement in internal union affairs	1983	7.6	32.9	10.1	27.8	21.6	3.23
	1963	10.7	37.6	3.6	24.7	23.5	3.13
Leader-held values of self-sacrifice, idealism, and dedication	1983	10.1	38.0	15.2	24.1	12.7	2.91
	1963	9.5	33.3	13.1	33.3	10.7	2.98
Less upward mobility in union hierarchy today	1983	3.8	19.2	16.7	47.4	12.8	<sup>2</sup> 3.45
	1963	9.4	30.6	10.6	36.5	13.0	<sup>2</sup> 3.16
More stress on organizing white-collar workers	1983	10.1	25.3	43.0	12.7	8.9	2.85
	1963	25.9	27.1	13.0	31.8	2.4	2.58
Future of labor movement is secure	1983	6.3	20.3	17.7	36.7	19.0	3.42
	1963	2.4	18.3	12.2	48.8	18.3	3.63
Internal problems are weakening the ability of labor union growth	1983	7.6	20.3	12.7	34.2	25.3	3.49
	1963	9.8	17.1	8.5	42.7	22.0	3.50
Most important force behind social legislation	1983	26.9	42.3	16.7	9.0	5.1	<sup>2</sup> 2.23
	1963	38.6	45.8	6.0	9.6	0.0	<sup>2</sup> 1.87
Federation should have more authority over organizing	1983	2.6	12.7	25.3	38.0	21.5	<sup>2</sup> 3.63
	1963	8.6	25.9	13.6	34.6	17.3	<sup>2</sup> 3.26
Labor's collective bargaining power is weaker today	1983	11.4	59.5	12.7	12.7	3.8	<sup>2</sup> 2.38
	1963	12.2	39.0	11.0	32.9	4.9	<sup>2</sup> 2.79
Too much political involvement, put more stress on collective bargaining	1983	8.9	7.6	10.1	34.2	39.2	3.87
	1963	6.0	7.2	3.6	37.3	45.8	4.10
Structure not adequate to meet challenge of robotics, automation	1983	15.2	26.6	12.7	36.7	8.9	<sup>2</sup> 2.97
	1963	16.9	37.3	19.3	24.1	2.4	<sup>2</sup> 2.58
Disregard economic situation of company in bargaining	1983	2.6	10.3	19.2	50.0	18.0	<sup>2</sup> 3.71
	1963	3.7	25.6	13.4	47.6	9.8	<sup>2</sup> 3.34
Not enough influence on foreign policy	1983	8.9	39.2	30.4	17.7	3.8	2.68
	1963	10.8	51.8	8.4	20.5	8.4	2.64
Should borrow more from European labor unions	1983	7.6	17.7	38.0	26.6	10.1	3.14
	1963	4.8	19.3	22.9	38.6	14.5	3.39
Closer ties with nonunion reform groups	1983	5.1	40.1	27.8	17.7	8.9	2.85
	1963	6.1	42.7	20.7	23.2	7.3	2.83
Unions doing all they can to bring blacks into the ranks	1983	13.9	32.9	27.8	17.7	7.6	2.72
	1963	12.9	34.1	11.8	28.2	13.0	2.94
Economic conditions weakening ability to get better wages and benefits	1983	32.9	60.8	0.0	5.1	1.3	<sup>2</sup> 1.81
	1963	10.7	54.8	10.7	19.0	4.8	<sup>2</sup> 2.52

<sup>1</sup>Attitudes were scaled from 1 to 5, with "strongly agree" equaling 1 and "strongly disagree," 5. The mean is the average value for responses to the question.

<sup>2</sup>Mean significantly different at .05 level or below.

compared with 40 percent in 1963.

About one-fourth of the current officials were confident about the security and status of the labor movement, compared with slightly more than one-fifth in 1963. Nonetheless, a majority of both current and past respondents disagreed that the "future of labor movement is secure," indicating, perhaps, that organized labor does not feel accepted in this country. However, with the difficulties caused by a weak economy and an increase in employer opposition to unions, the extent of agreement with the statement when compared with conditions at the time of the 1963 survey could indicate a more self-confident labor movement.

### Specific problems

Respondents were asked to comment on several questions on labor's problems and their causes. The responses are presented in table 2.

In 1983, 51 percent of the respondents believed there was a crisis in the American labor movement. The most frequently identified problems causing the crisis were union policies and structure, "antilabor" government policies,

and labor's public image. Only a few mentioned the economy and union leadership. Automation and unemployment were not even mentioned, unlike in 1963 when half of the respondents said these were the main problems. One respondent commented, "We live in an anti-union environment . . . a period of extreme uncertainty politically and economically" which has hurt the labor movement. A union president said unions were often perceived as "standing in the way of progress," and employers have used this to weaken unions. Another remarked that business "refuses to accept labor as a partner," unlike the situation in other Western industrialized countries, echoing a comment made in the 1963 survey.

Membership, bureaucracy, and leadership apathy have made it difficult for labor to respond positively to an economic situation that has eroded union strength in basic industries. While several respondents called for expansion of membership in the growing service sector and among white-collar workers, their comments evinced little in the way of optimism. A union official remarked that union membership has declined because "it [labor] did too good a job of raising

the standard of living of its members [who] are now complacent. In raising the standard of living for its members, other segments of society have been pulled along [and] these segments see no reason now to unionize.”

The internal causes of organized labor’s problems were identified as leadership and union policies and ideology. Respondents cited arrogance, inability to prepare successors, dogmatism, adherence to outdated ideas, and shortsightedness as leadership problems. The overall tone of this line of criticism is illustrated by this comment: “[the labor] movement has lost its role as a cause for many [leaders] and is simply a job. Many are more interested in holding union office for money and power and not to effect significant change. Union leadership worries about their reelection more than anything.”

Several respondents criticized union policy, or the “lack of philosophy,” as an internal cause of labor’s problems. One noted that organized labor “has not been able to persuade the majority of workers of the worth of unions.” The unions emphasize “the more, more, more philosophy instead of planning for the future.” Too often, the unions come across to the public with an attitude of “to hell with the consumer. We want what we want or we’ll cripple the economy.” Another believed that corruption still tainted the labor movement and that “unions need to purge corruption with the same effort they fight arbitrary management.” Yet, as one official wrote, even when labor has made “substantial inroads into solving the problem of . . . corruption,” the public perception remains negative.

In the 1963 survey, respondents listed three main external causes of labor’s problems: antiunion propaganda, unsympathetic government policies, and technological change and unemployment. Respondents in the current survey view the external causes as emanating from similar sources with some differences, though, in emphasis. Those who see government policy as an external cause mention the inability of the National Labor Relations Board to get compliance for some of its orders, the “hostile” administration of the National Labor Relations Act, the Railway Labor Act, and the

Landrum-Griffin Act, and the proliferation of State and local laws that hamper labor’s effort to organize and represent workers.

Current respondents see economic conditions and managerial attitudes often acting jointly to trouble the labor movement. Several commented that “there is . . . in the establishment . . . a concentrated effort to downgrade unions” by taking every opportunity to create a “public image of . . . unions as corrupt manipulators who steal . . . dues and cause all of a company’s problems . . . .” They believe that employers have taken advantage of the weakened economy, especially in basic industries, to close unionized plants and move elsewhere. The activities of antiunion groups spreading propaganda against unions and the use of union busters by management have made organizing and maintaining existing bargaining units more difficult.

The economy, one union official said, has served as a battering ram that companies have used to break collective bargaining relationships. That along with the transition to a service economy has “eliminated thousands of traditional union jobs.” The exasperations of many respondents were summarized by one official: “The unions are blamed for productivity problems—why doesn’t anyone . . . chide the corporations for failing to modernize instead of paying stock dividends.”

All the respondents who answered the question on external causes saw such causes as serious threats to the labor movement. One referred to the conjoining of these forces as a “debacle” for the labor movement. The broader implication of the weakening of organized labor is summed up in this comment: “[Unionism] has been the underpinning of middle-class achievements. We seem to currently be moving to a bipolar structure which will weaken further the middle class as changes occur in the economy. The effect of this . . . is yet to be seen . . . but is frightening.” □

—FOOTNOTES—

<sup>1</sup> Bureau of Labor Statistics, *Directory of National and International Labor Unions in the United States, 1961*, Bulletin 1320 (Washington, U.S. Government Printing Office, 1962). For an account of the 1963 survey, see Solomon Barkin and Albert A. Blum, “Is There a Crisis in the American Trade Union Movement?—The Trade Unionists’ Views,” *The Annals of the American Academy of Political and Social Science*, November 1963, pp. 16–24.

<sup>2</sup> Bureau of Labor Statistics, *Directory of National Unions and Employee Associations, 1979*, Bulletin 2079 (Washington, U.S. Government Printing Office, 1980). The post office was unable to deliver questionnaires to 30 labor organizations. This reduced the sample to 106 unions and associations.

<sup>3</sup> See Thomas Kochan, “How American workers view labor unions,” *Monthly Labor Review*, April 1979, pp. 28–30.

<sup>4</sup> See Derek Bok and John Dunlop, *Labor and the American Community* (New York, Simon and Schuster, 1970), pp. 194–96 for an analysis of the problems of federation-sponsored organizing which supports this conclusion.

<sup>5</sup> The means for the statement, “more stress on organizing white-collar workers,” were almost significant at the .10 level; the calculated t value for the means was .13.

<sup>6</sup> Bok and Dunlop, *Labor*, pp. 31–34; and H.W. Benson, “Labor Leaders, Intellectuals, and Freedom in the Unions,” *Dissent*, vol. 20, Spring 1973, pp. 206–19.

**Table 2. Respondents listing specific problems in labor movement, 1983**

Item	Percent
<b>Is there a crisis in the labor movement?</b>	
Agreeing . . . . .	51
<b>What are the problems causing the crisis?</b>	
Government policies and legislation . . . . .	39
Labor’s public image . . . . .	21
Union structure and administrative policies . . . . .	47
Union leadership . . . . .	11
Economy . . . . .	18
<b>What are the internal causes of organized labor problems?</b>	
Leadership problems . . . . .	45
Structural problems . . . . .	15
Policies and ideology . . . . .	39
<b>What are the external causes of organized labor problems?</b>	
Economic conditions/changes . . . . .	39
Government policy . . . . .	25
Management hostility . . . . .	36

## Preferences of temporary workers: time, variety, and flexibility

MARTIN J. GANNON

Part-time work—defined as less than 35 hours per week—is becoming increasingly important in the United States. Before World War II, only a negligible number of workers were classified as part time. Since then, the proportion of the civilian work force classified as part time has hovered around 18 percent. During economic upturns, this percentage tends to decrease, as many individuals desiring full-time employment are forced to work part time during recessionary periods.<sup>1</sup> Still, the percentage varies by only a few points from 1946 to 1983, as the majority of part-time workers do not want full-time jobs.

Within the part-time work force, temporary help constitutes a significant subgroup. Firms in the temporary help industry, such as Manpower and Kelly Services, send out their employees to complete assignments in various organizations. Afterwards, the employees return to the temporary help firms until additional assignments materialize. Hence, the workers are employees of the temporary help firms and not of the companies where they work. In 1956, there were only about 20,000 employees in this industry.<sup>2</sup> Today it is estimated that from 2 million to 3 million workers are employed as temporaries *at some time*—often for only a few hours, but more frequently for several days over a period of 3 or 4 months—during each year.<sup>3</sup> The number of temporary employees will probably increase substantially, because the industry provides job opportunities that do not require a full-time work commitment and, at the same time, helps businesses to solve many staffing problems, such as the need for additional workers during busy periods.

It should be emphasized that it is somewhat difficult to classify temporary help as either full time or part time, because many are seeking a full-time position, but only for a short while. However, the vast majority of these workers are employed less than 35 hours per week, as the temporary help firms typically do not have enough work to provide full-time employment opportunities.<sup>4</sup>

### Areas of study

This study focuses on two aspects of temporary help. The first is the specific time preferences of temporary employees, that is, when do they want to work. In contrast to the few previous studies,<sup>5</sup> it provides a relatively exhaustive analysis of these time preferences: days of the week, time of the day, and time of the year.

A second area concerns the relative importance (to the

employee) of flexibility in hours of work versus variety in the work or frequency in changing assignments. Some authors have argued that temporary employment is particularly attractive because it allows for variety in work.<sup>6</sup> However, the counterargument can also be made, that is, that the predominant reason for seeking this form of work is flexibility in scheduling hours, especially for working wives who may view work as subordinate to familial activities. Previous research suggests that flexibility and variety are independent dimensions or reasons for desiring temporary employment.<sup>7</sup>

Finally, it should be noted that the temporary help industry is generally considered to consist of three major sectors, and the percentage of employment in each of these sectors is estimated to be about 65 percent in the clerical/secretarial area, 30 percent in the industrial area, and 5 percent in the technical/professional area.<sup>8</sup> Previous studies rarely, if ever, go beyond a comparison of employees in the clerical/secretarial area and the industrial area. This study cuts across the three sectors, by focusing on the *relationship* between *skill level* and the issues of variety/flexibility and time preferences among employees in the *medical* temporary help area, which is the fastest growing segment of the temporary help market.

### Method of analysis

The study took place in a large, national firm that hires more than 50,000 health-care temporary employees each year. Four groups of workers were selected for intensive study: registered nurses, licensed practical nurses/licensed visiting nurses, nurses' aides, and homemakers. These groups were chosen because they represent the major occupations of the firm. More importantly, the skill level of each group is very distinct and decreases in the following order: registered nurses, licensed practical nurses/licensed visiting nurses, nurses' aides, and homemakers. Hence, it was possible to study the relationship between skill level and time preferences of the employees, all of whom were women.

Questionnaires were sent to 1,393 employees and the overall response rate was 79 percent, or 1,101 respondents.<sup>9</sup> The following tabulation shows the distribution of questionnaires among the occupations and the corresponding response rates (in percent):

	Received questionnaire	Response rate
Registered nurses .....	340	77.0
Licensed practical nurses/ licensed visiting nurses .....	275	80.5
Nurses' aides .....	517	79.0
Homemakers .....	261	80.5

To analyze the issue of time preferences, the respondents were asked to provide specific information on several aspects of their work preferences. For example, the respondents indicated whether they preferred to work some days

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of the week rather than others. Three answers were possible: yes, definitely; yes, but my preference depends on such factors as family responsibilities and time of the year; and no, I have no preferences.

The respondents were also asked to indicate which days of the week they preferred to work on a regular basis; they could select as many days as they desired. Hence, it is possible to analyze time preferences by day of the week and by total number of days per week the employees preferred to work.

The respondents were then requested to indicate which times of the day they preferred to work—morning, afternoon, evening, and night. Again, there was no limit on the number of categories that could be selected. As in the case of the days in the week, it is possible to analyze both the actual times of day and the total number of times per day that they preferred to work. In addition, the respondents were asked to indicate whether they wanted to work during a specific time or times of the day, and three responses were possible: yes, definitely on a regular basis; yes, but my preference depends on such factors as family responsibilities and time of the year; and no, I have no preferences.

To determine why individuals wish to become temporary help employees, the respondent was asked to identify her most important reason for choosing to work for the firm. The following choices were provided: (1) variety in work, that is, frequent changes in assignment; (2) a stopgap measure until I can obtain a permanent job; (3) freedom to schedule my work in a flexible manner; (4) employment during school vacations; and (5) other.

Chi square was used to analyze the relationships. This statistical test measures whether two discrete variables are independent of or related to one another.

### Survey results

There was a significant relationship between the respondents' skill levels and their preferences to work some days of the week over others. (See table 1.) In particular, 55.0 percent of the registered nurses and 44.2 percent of the licensed practical nurses/licensed visiting nurses, but only 30.8 percent of the nurses' aides and 27.0 percent of the homemakers indicated that their preference depends on such factors as family responsibilities and time of year.

Table 1 also profiles the specific days of the week that the respondents desired work. Because the respondents were allowed to check as many days as desired, it was not possible to use chi square. However, 31.1 percent of the registered nurses, 32.2 percent of the licensed practical nurses/licensed visiting nurses, 22.8 percent of the nurses' aides, and 14.4 percent of the homemakers preferred Sunday. Thus, skill level was positively associated with the desire to work Sundays.

An important relationship was also established between skill level and the total number of days that the respondents preferred to work each week. (See table 1.) Only 44.2

percent of the registered nurses and 56.1 percent of the licensed practical nurses desired 5 days or more per week, while 70.9 percent of the nurses' aides and 66.3 percent of the homemakers were of a similar persuasion.

In addition, table 1 indicates that there was a significant correlation between skill level and the preference to work a particular time or times of the day (morning, afternoon, evening, or night). First, as skill level rose, there was an increase in the desire to work during a certain part of the day, and the preference depended on such factors as family responsibilities and the time of year. More specifically, as skill levels rose, so did the preference to work in the evening and at night. (Again, because the respondent could check as many times as she preferred, it was impossible to compute chi square.)

The relationship between skill level and the total number of preferences for a particular time or times of working during the day (morning, afternoon, evening, or night) is significant only at the .10 level. Still a significant proportion of all four work groups, regardless of skill level, prefer to work only during one time of the day (morning, afternoon, evening, or night).

Table 2 contains information on the issue of variety and flexibility. Only 16.6 percent of the entire sample cited

**Table 1. Relationship between skill level and preferences of temporary help employees**

Preferences	Skill level (high to low)			
	Registered nurses	Licensed practical nurses/licensed visiting nurses	Nurses' aides	Homemakers
Preference to work some days over others: <sup>1</sup>				
Yes, definitely . . . . .	31.0	38.1	50.1	44.5
Yes, but depending on family responsibilities and time of year . . . . .	55.0	44.2	30.8	27.0
No preference . . . . .	14.0	17.7	19.1	28.5
Specific days preferred on regular basis:				
Saturday . . . . .	33.2	28.1	29.9	23.0
Sunday . . . . .	31.1	32.2	22.8	14.4
Monday . . . . .	62.1	74.9	79.2	79.2
Tuesday . . . . .	65.8	70.8	80.6	84.8
Wednesday . . . . .	67.9	77.8	80.3	77.5
Thursday . . . . .	65.3	74.3	78.9	84.3
Friday . . . . .	58.9	66.1	78.9	74.7
Total number of days each week preferred to work: <sup>2</sup>				
One . . . . .	3.2	2.3	1.4	2.8
Two . . . . .	21.1	8.8	7.7	9.6
Three . . . . .	15.3	20.5	11.7	9.0
Four . . . . .	16.3	12.3	8.3	12.4
Five . . . . .	37.9	44.4	60.3	57.9
Six . . . . .	3.7	7.0	8.3	4.5
Seven . . . . .	2.6	4.7	2.3	3.9
Preference to work a certain time of day: <sup>3</sup>				
Yes, on a regular basis	56.9	61.6	57.8	54.5
Yes, but depending on family responsibilities and time of year . . . . .	37.7	32.9	29.6	25.7
No preference . . . . .	5.4	5.6	12.6	19.8
Morning . . . . .	64.4	58.5	69.5	82.2
Afternoon . . . . .	54.1	47.5	49.9	58.9
Evening . . . . .	35.1	35.0	26.3	21.7
Night . . . . .	28.2	31.5	22.7	15.0

<sup>1</sup>Chi square = 61.70 (p ≤ .001).

<sup>2</sup>Chi square = 80.71 (p ≤ .001).

<sup>3</sup>Chi square = 37.79 (p ≤ .001).

variety as the most important reason for becoming a temporary help employee, while 60.2 percent chose freedom to schedule work in a flexible manner. In addition, there was a significant relationship between skill level and the most important reason for working as this type of employee ( $p \leq .001$ ). The two groups highest in skill level, registered nurses and licensed practical nurses/licensed visiting nurses, cited freedom to schedule work flexibly much more frequently than did the two groups lowest in skill level, nurses' aides and homemakers. The opposite pattern emerged on the dimension of variety in work, that is, the two groups lowest in skill level cited this reason much more frequently than did the two groups highest in skill level.

**Conclusions**

Previous research has suggested that temporary help firms experience great difficulty obtaining employees during vacation periods.<sup>10</sup> This study confirms and extends this generalization to indicate that this difficulty will be exacerbated at particular times of each day and each week as skill level rises.

This finding is important in view of the fact that the technical/professional sector of the temporary help industry possesses great potential for expansion, and that industry needs a great number of highly skilled and educated workers. However, because the higher-skilled workers are less available than the lower-skilled workers, there will probably be a great amount of unmet demand in the marketplace.

As expected, the most unpopular times of the day to work are in the evening and at night, and on weekends. It is during such times that many temporary help firms must deny customer requests for workers.<sup>11</sup> Hence, such firms may not be able to expand into new markets because of the limited availability of employees.

Why are the higher-skilled employees less available? Previous studies have shown that the rate of moonlighting among the more skilled workers is significantly greater than among those of lower skill.<sup>12</sup> In effect, many of these workers appear to be using temporary help employment as a second job. Another possible reason for limited availability of high-skill workers may be that they possess greater financial resources than those having lower skills and hence do not need temporary work as much.

The present study also clarifies the concept that the temporary help employee is seeking a full-time job, but only for a short period of time.<sup>13</sup> The majority want to work 8 hours per day. However, a significant minority of these workers desired work for only one time of the day, regardless of skill level. Thus, it appears that many of these employees are seeking employment for a short period of time, but employment involving only 4 hours per day.

Finally, the research indicates that flexibility in scheduling is a much more important source of motivating individuals to apply to a temporary help firm than is variety, at least in terms of frequencies. The study also shows that, the higher the skill level, the greater the probability of citing flexibility in scheduling as the most important reason for becoming a temporary help employee. □

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- <sup>1</sup> Robert Bednarzik, "Short workweeks during economic downturns," *Monthly Labor Review*, June 1983, pp. 3-11.
- <sup>2</sup> Mack Moore, *The Role of Temporary Help Services in The Clerical Labor Market*, Ph.D. diss. (Madison, University of Wisconsin, 1963).
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**Table 2. The relationship between skill level and the most important reason for working at this temporary help firm**  
(In percent)

Reason	Entire sample	Registered nurses	Licensed practical nurses/licensed visiting nurses	Nurses' aides	Homemakers
(1) Variety in work, that is, frequent changes in assignment...	16.6	8.8	13.1	21.5	20.6
(2) A stopgap measure until I can obtain a permanent job . . . . .	8.2	9.2	8.0	7.2	9.0
(3) Freedom to schedule my work in a flexible manner . . . . .	60.2	70.3	65.3	55.9	50.8
(4) Employment during school vacation . . . . .	1.0	.8	0	.8	2.6
(5) Other . . . . .	14.1	10.9	13.6	14.6	16.9

NOTE: Chi square = 40.26 ( $p \leq .001$ ).

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(3) Freedom to schedule my work in a flexible manner.....	60.2	70.3	65.3	55.9	50.8
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(5) Other.....	14.1	10.9	13.6	14.6	16.9

NOTE: Chi square = 40.26 ( $p \leq .001$ ).

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**Table 1. Number of production and related workers and average straight-time hourly earnings,<sup>1</sup> by selected characteristics, basic iron and steel mills, United States and regions,<sup>2</sup> August 1983**

Characteristic	United States		Northeast		South		North Central		West	
	Number of workers	Average hourly earnings	Number of workers	Average hourly earnings	Number of workers	Average hourly earnings	Number of workers	Average hourly earnings	Number of workers	Average hourly earnings
All production workers . . . . .	184,078	\$11.87	48,388	\$11.71	32,265	\$11.24	92,848	\$12.03	10,577	\$13.05
Size of community:										
Metropolitan areas <sup>3</sup> . . . . .	171,637	11.96	41,876	11.88	26,336	11.36	92,848	12.03	10,577	13.05
Nonmetropolitan areas . . . . .	12,441	10.65	6,512	10.61	5,929	10.68	—	—	—	—
Size of establishment:										
100-999 employees . . . . .	46,746	10.37	14,705	10.85	15,851	9.71	13,104	10.59	—	—
1,000-2,499 employees . . . . .	29,225	12.26	14,941	12.00	—	—	12,136	12.54	—	—
2,500 employees or more . . . . .	108,107	12.41	18,742	12.17	15,370	12.74	67,608	12.22	—	—
Size of company:										
100-9,999 steel industry employees . . . . .	82,131	11.36	24,505	11.51	14,786	9.51	35,504	11.66	7,336	13.12
10,000 or more steel industry employees . . . . .	101,947	12.28	23,883	11.92	17,479	12.70	57,344	12.26	—	—
Job and pay system:										
Common job and pay system <sup>4</sup> . . . . .	90,286	12.13	31,557	11.86	—	—	45,491	12.33	—	—
Not under common job and pay system . . . . .	93,792	11.62	16,831	11.44	22,268	10.98	47,357	11.75	7,336	13.12
Labor-management contract coverage:										
Establishments with—										
Majority of workers covered . . . . .	169,010	12.06	47,034	11.64	23,084	12.13	89,623	12.10	9,269	13.54
None or minority of workers covered . . . . .	15,068	9.75	—	—	9,181	8.99	3,225	10.15	—	—

<sup>1</sup>Excludes premium pay for overtime and for work on weekends, holidays, and late shifts.

<sup>2</sup>The regions are defined as follows: *Northeast*—Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont; *South*—Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia; *North Central*—Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin; and *West*—Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming. Alaska and Hawaii were not included in the study.

<sup>3</sup>Standard metropolitan statistical areas as defined by the U.S. Department of Commerce through October 1979.

<sup>4</sup>Includes mills in common job evaluation and pay systems, that is, with the same \$9.495 minimum hourly wage and 14.7 cents-per-hour increment between job classes.

NOTE: Dashes indicate that no data were reported or that data do not meet publication criteria.

survey conducted in August 1983. At that time, production and related workers in basic iron and steel mills averaged \$11.87 an hour—43 percent above the \$8.32 recorded in February 1978.<sup>1</sup> During this same period, the Bureau's Employment Cost Index of wages and salaries in durable goods industries rose 50 percent.

Moreover, the Bureau's *Employment and Earnings* series reported that average hourly earnings for steelworkers declined in 1983 for the first time in 20 years—by about 4 percent for the year.<sup>2</sup> This decrease ended a trend that began in 1970 with average annual increases in gross earnings in basic iron and steel mills exceeding those in all manufacturing industries and in durable goods production.

These developments reflect the bargaining in the spring of 1983 between the union's Basic Steel Industry Conference and the seven Coordinating Committee Steel Companies. Settlements called for reduced pay and benefits in exchange for improvements in job security and increased aid to laid-off workers, as well as for capital improvements to existing facilities. About six-tenths of the workers surveyed were affected by the \$1.25-an-hour cut in regular pay plus elimination of a cost-of-living allowance of 6 cents. For workers who were paid on an incentive basis, the pay reduction amounted to slightly over \$1.31.<sup>3</sup>

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## Survey findings

*Variation in regional pay patterns.* Steelworkers in the North Central States made up one-half of the employees surveyed and averaged \$12.03 an hour. (See table 1.) Western mills recorded the highest pay level, \$13.05 an hour, but accounted for less than one-tenth of the work force. Earnings averaged \$11.71 an hour in the Northeast and \$11.24 in the South. Although southern mill workers had the lowest regional hourly average, workers in large establishments and companies and in unionized plants fared better than those in the Northeast and North Central States, with an average pay advantage of 4 percent.

*Occupational earnings.* In 1983, separate wage data were developed for 62 occupations covering slightly more than one-third of the production workers surveyed. To facilitate analysis, the jobs were divided into two groups. In the first group, job classifications were limited to selected production departments; the second group comprised jobs that cut across departments.

Average hourly earnings of the first job group ranged from \$15.45 for continuous billet or slab casters to \$8.81 for cut-off machine operators in tube finish mills. Wire drawers in rod and wire mills, the largest occupation surveyed with over 1,500 workers, averaged \$10.37. Job classifications with at least 500 workers included first helpers at electric furnaces (\$14.60), keeper helpers in blast furnaces

(\$11.91), and cut-off machine operators.

Pay levels in the second group ranged from \$13.56 an hour for bricklayers to \$9.50 for laborers. The largest group studied—12,000 millwrights—averaged \$12.72. Jobs with at least 4,000 workers included laborers (\$9.50) and motor inspectors (\$12.92).

**Incentive workers predominant.** Almost four-fifths of the steelworkers surveyed received pay based on wage incentives. This proportion was higher in establishments using the common job evaluation and pay system (nine-tenths) than in mills with other types of formal job evaluation systems (two-thirds). The predominance of incentive workers is traceable to the design of the pay system which provides for direct, indirect, and secondary indirect incentives. The three types are differentiated by the extent to which a worker, alone or as part of a crew, can affect or control the rate of output or the utilization of equipment. For example, furnace operators are direct workers, while millwrights assigned to specific departments are indirect. Maintenance workers and general laborers not assigned by department are secondary indirect employees.<sup>4</sup>

**Employee benefits.** Virtually all of the workers were in establishments providing paid holidays and vacations and various health and insurance benefits. The most common provisions were 10 paid holidays annually and 1 week of paid vacation after 1 year of service, 2 weeks after 3 years, 3 weeks after 10 years, and 4 weeks after 25 years. Almost all production workers were eligible for life insurance, sickness and accident insurance, hospitalization, surgical and basic and major medical insurance, and retirement pension plans. Supplemental unemployment benefits, dental insurance, and retirement severance plans applied to four-fifths of the workers or more. Most of the health, insurance, and retirement plans were paid for entirely by the employer.

A summary report, *Basic Iron and Steel Mills, August 1983* (Summary 84-6) is available from the Bureau or any of its regional offices. A comprehensive bulletin is scheduled for publication later this year. □

—FOOTNOTES—

<sup>1</sup>Earnings data exclude premium pay for overtime and for work on weekends, holidays, and late shifts. Incentive payments, such as those resulting from piecework or production bonus systems and cost-of-living adjustments, were included as part of the workers' regular pay. For a report on the earlier survey, see *Industry Wage Survey: Basic Iron and Steel, 1978-1979*, BLS Bulletin 2064 (Bureau of Labor Statistics, 1980). The 1978 survey was limited to establishments with 250 workers or more; the 1983 study covered establishments with 100 workers or more.

Both surveys included establishments employing workers engaged primarily in manufacturing steel products classified in the following industries as defined in the 1972 *Standard Industrial Classification Manual* (SIC) of the U.S. Office of Management and Budget: (1) Blast furnaces (excluding merchant coke ovens), steelwork, and rolling mills (part of sic 3312); (2) steel wire drawing and steel nails and spikes (sic 3315); (3) cold rolled steel sheet, strip, and bars (sic 3316); and (4) steel pipe and tubes (sic 3317). Excluded from the surveys were merchant coke ovens (part of sic 3312), electrometallurgical products (sic 3313), establishments producing steel solely for use by their parent company and not classified in the steel

industry, and separate auxiliary units such as central offices and warehouses.

<sup>2</sup>The Bureau's *Employment and Earnings* series reports gross earnings which include premium pay for overtime, holidays, vacations, and sick leave paid directly to the employee.

<sup>3</sup>The concessions included elimination of a cost-of-living allowance of 6 cents accumulated since November 1982. Cost-of-living adjustments were suspended until at least August 1984, a paid holiday was dropped, and other benefits were reduced. One week of regular paid vacation was eliminated for employees eligible for at least 2 weeks' vacation in 1983, but the week was restored in 1984. The extended vacation plan was discontinued in 1983 and vacation bonuses were eliminated in 1984. In return, steel firms agreed to invest the savings in capital improvements and to increase financing of the Supplemental Unemployment Benefit fund. For details, see *Current Wage Developments*, March 1983, pp. 1-2.

<sup>4</sup>For a detailed discussion of the incentive pay system in the industry, see Joseph Bush, "Incentive pay patterns in the steel industry," *Monthly Labor Review*, August 1974, pp. 75-77.

## Area occupational pay in auto dealer repair shops

Occupational pay varies widely in automobile dealer repair shops, according to a Bureau of Labor Statistics' survey. The November 1982 study covered eight occupations in 24 metropolitan areas and found that diverse employee skills, extensive use of incentive pay plans, and pay differences among individual shops contributed to the wide range of earnings.

Journeyman auto mechanics, who repair, rebuild, or overhaul major assemblies of cars and light trucks, averaged from \$14.52 an hour in San Francisco to \$8.59 in Birmingham.<sup>1</sup> (See table 1.) Most commonly, journeyman mechanics averaged 20 to 40 percent more than automotive service mechanics in the same metropolitan area. Average earnings of service mechanics, who perform minor repairs and tuneups, ranged from \$10.99 an hour in Dallas-Fort Worth to \$6.80 in Boston; in most areas, however, averages were between \$7 and \$9 an hour.

Among the jobs studied, body repairers or painters had the highest average in 20 of the 24 areas studied. Averages for painters ranged from over \$15 an hour in three areas—Denver-Boulder (\$16.49), Chicago (\$15.61), and Kansas City (\$15.59)—to \$8.60 in New York and \$8.12 in Memphis. For body repairers, who repair bodies and body parts of automotive vehicles, hourly averages ranged from \$14.68 in San Francisco to \$9 in Indianapolis. Painters typically averaged 8 to 14 percent more than body repairers in the 12 areas where painters held the wage advantage. When body repairers held the edge in an area, their wage advantage was usually 11 percent or less.

Lubricators and new-car get-ready workers, usually the lowest paid, averaged between \$5 and \$8 in a majority of the areas. Service salesworkers, who examine automobiles to determine the need for and cost of repairs, averaged more than \$9 an hour in most of the areas surveyed. Their highest hourly average was found in San Francisco-Oakland (\$13.58)

and their lowest in Pittsburgh (\$7.72). Service salesworkers averaged 15 to 30 percent more than parts clerks in each area but Houston, where parts clerks held a slight edge—\$12.27 to \$12.16.

In the six occupational classifications for which data are available for all areas,<sup>2</sup> pay levels in November 1982 were most often highest in San Francisco–Oakland and lowest in Birmingham and Pittsburgh. The interarea spread in average earnings, however, differed considerably by occupation. For example, new-car get-ready workers in San Francisco–Oakland averaged 90 percent more than their counterparts in Washington, D.C., whereas the spread between these two areas was 33 percent for journeyman automotive mechanics, 14 percent for body repairers, and 2 percent for painters.

Within the same area and occupation, individual earnings were widely dispersed, especially when the occupation was

typically paid on an incentive basis. In nearly all areas, for example, earnings of the highest paid journeyman mechanic exceeded those of the lowest paid by at least \$9 an hour. In San Francisco, where virtually all journeyman mechanics were time rated, their earnings fell within a comparatively narrow range—\$13 to \$16.50.

The dispersion of individual earnings resulted more from disparate pay levels among establishments than from pay differences within establishments. For example, the earnings of the highest paid body repairer rarely exceeded those of the lowest paid by more than \$6 an hour within individual establishments. However, earnings of the highest paid body repairer in an area exceeded those of the lowest paid by at least \$14 an hour in nearly all areas. As a result of the wide dispersion of earnings within an occupation, there was a considerable overlapping of individual workers' earnings

**Table 1. Number of workers and average straight-time hourly earnings<sup>1</sup> in selected occupations in auto dealer repair shops, 24 areas,<sup>2</sup> November 1982**

Area	Body repairers		Lubricators		Mechanics, automotive, journeyman		Mechanics, automotive, service		New-car get-ready workers		Painters		Parts clerks		Service salesworkers	
	Number of workers	Average hourly earnings	Number of workers	Average hourly earnings	Number of workers	Average hourly earnings	Number of workers	Average hourly earnings	Number of workers	Average hourly earnings	Number of workers	Average hourly earnings	Number of workers	Average hourly earnings	Number of workers	Average hourly earnings
<b>Northeast</b>																
Boston	408	\$10.32	60	\$5.32	1,069	\$10.13	100	\$6.80	116	\$6.88	7	\$11.69	357	\$7.10	241	\$8.46
Nassau–Suffolk	101	10.20	7	6.02	663	11.96	342	7.94	121	7.91	28	9.34	263	8.29	193	10.21
New York	236	10.46	64	7.08	1,058	11.39	679	8.85	253	7.42	38	8.60	529	9.13	391	9.49
Philadelphia	366	9.84	27	5.50	1,544	10.10	583	7.01	376	5.77	131	9.78	591	6.69	422	8.20
Pittsburgh	464	10.15	48	4.46	883	10.05	88	6.91	170	5.61	—	—	317	6.12	193	7.72
<b>South</b>																
Atlanta	240	12.06	29	7.46	810	10.95	190	9.47	128	6.65	83	11.70	320	8.12	204	10.32
Birmingham	86	9.50	17	5.44	224	8.59	90	8.53	40	4.66	14	10.62	114	8.60	75	10.74
Dallas–Fort Worth	481	13.23	47	8.24	702	11.65	771	10.99	212	9.49	191	11.94	565	10.56	348	12.30
Houston	571	13.55	65	8.50	1,310	12.74	114	10.06	419	7.48	175	13.70	614	12.27	293	12.16
Memphis	96	12.09	18	5.53	234	8.65	76	7.04	60	4.97	41	8.12	155	8.47	60	8.74
Miami	171	12.51	19	6.49	436	11.36	67	8.17	99	7.15	57	11.43	201	8.11	132	10.42
Washington	580	12.90	12	3.74	1,801	10.90	264	7.50	370	5.15	170	14.54	630	7.70	424	9.60
<b>North Central</b>																
Chicago	783	13.67	33	7.67	1,997	12.34	151	7.21	256	6.62	93	15.61	738	7.29	510	9.35
Detroit	756	12.53	107	7.04	1,292	12.24	514	8.68	129	6.85	301	12.48	536	6.83	408	7.86
Indianapolis	204	9.00	22	6.05	403	8.97	90	7.42	55	7.24	58	12.07	192	7.00	91	8.07
Kansas City	281	12.53	43	9.61	561	10.66	44	7.86	54	8.28	43	15.59	193	8.19	146	11.44
Milwaukee	283	11.68	36	6.44	487	11.42	79	7.49	85	5.87	22	11.59	166	6.62	142	8.44
Minneapolis–St. Paul	314	12.92	59	8.05	822	12.00	72	8.77	67	8.45	117	13.49	295	8.69	159	10.50
St. Louis	465	12.98	122	9.79	893	11.70	—	—	125	10.16	13	12.71	310	10.47	190	10.95
<b>West</b>																
Denver–Boulder	193	13.71	30	10.60	711	11.74	107	10.43	93	7.41	55	16.49	323	8.31	207	10.98
Los Angeles–Long Beach	817	12.48	194	10.18	3,023	12.39	579	9.73	377	8.02	287	13.76	1,374	9.62	815	12.70
Phoenix	188	11.49	48	6.21	534	9.85	124	8.84	66	7.09	89	11.27	224	8.67	144	10.99
Portland	123	10.78	59	5.58	508	10.87	79	8.13	71	5.56	38	11.60	208	7.93	123	9.69
San Francisco–Oakland	501	14.68	163	9.60	1,742	14.52	24	10.82	102	9.78	124	14.76	509	11.90	383	13.58

<sup>1</sup>Excludes premium pay for overtime and for work on weekends, holidays, and late shifts.

<sup>2</sup>The areas used in this survey are defined as follows: **NORtheast:** Boston—Suffolk County, 16 communities in Essex County, 34 in Middlesex County, 26 in Norfolk County, and 12 in Plymouth County, Mass.; Nassau–Suffolk—Nassau and Suffolk Counties, N.Y.; New York—New York City (Bronx, Kings, New York, Queens, and Richmond Counties and Putnam, Rockland, and Westchester Counties, N.Y., and Bergen County, N.J.); Philadelphia—Bucks, Chester, Delaware, Montgomery, and Philadelphia Counties, Pa.; and Burlington, Camden, and Gloucester Counties, N.J.; and Pittsburgh—Allegheny, Beaver, Washington, and Westmoreland Counties, Pa.; **south:** Atlanta—Butts, Cherokee, Clayton, Cobb, Dekalb, Douglas, Fayette, Forsyth, Fulton, Gwinnett, Henry, Newton, Paulding, Rockdale, and Walton Counties, Ga.; Birmingham—Jefferson, St. Clair, Shelby, and Walker Counties, Ala. Dallas–Fort Worth—Collin, Dallas, Denton, Ellis, Hood, Johnson, Kaufman, Parker, Rockwall, Tarrant, and Wise Counties, Tex.; Houston—Brazoria, Fort Bend, Harris, Liberty, Montgomery, and Waller Counties, Tex.; Memphis—Shelby and Tipton Counties, Tenn.; Crittenden County, Ark.; and DeSoto County, Miss.; Miami—Dade County, Fla.; and Washington—The District of Columbia; Charles, Montgomery, and Prince Georges Counties, Md.; and Alexandria, Fairfax, and Falls Church Cities and Arlington, Fairfax,

Loudoun, and Prince William Counties, Va.; **NORTH CENTRAL:** Chicago—Cook, DuPage, Kane, Lake, McHenry, and Will Counties, Ill.; Detroit—Lapeer, Livingston, Macomb, Oakland, St. Clair, and Wayne Counties, Mich.; Indianapolis—Boone, Hamilton, Hancock, Henricks, Johnson, Marion, Morgan, and Shelby Counties, Ind.; Kansas City—Cass, Clay, Jackson, Platte, and Ray Counties, Mo.; and Johnson and Wyandotte Counties, Kans.; Milwaukee—Milwaukee, Ozaukee, Washington, and Waukesha Counties, Wis.; Minneapolis–St. Paul—Anoka, Carver, Chisago, Dakota, Hennepin, Ramsey, Scott, Washington, and Wright Counties, Minn.; and St. Croix County, Wis.; and St. Louis—St. Louis City, Franklin, Jefferson, St. Charles, and St. Louis Counties, Mo.; and Clinton, Madison, Monroe, and St. Clair Counties, Ill.; **west:** Denver–Boulder—Adams, Arapahoe, Boulder, Denver, Douglas, Gilpin, and Jefferson Counties, Colo.; Los Angeles–Long Beach—Los Angeles County, Calif.; Phoenix—Maricopa County, Ariz.; Portland—Clackamas, Multnomah, and Washington Counties, Ore.; and Clark County, Wash.; and San Francisco–Oakland—Alameda, Contra Costa, Marin, San Francisco, and San Mateo Counties, Calif.

NOTE: Dashes indicate no data reported or data that do not meet publication criteria.

even among jobs with substantially different pay averages.

Incentive pay systems, most commonly flat-rate hours plans, determined the earnings for just over one-half of the 91,680 service workers covered by the study.<sup>3</sup> Under flat-rate hours plans, which applied to three-tenths of the workers, pay is computed by multiplying the number of flat-rate hours predetermined for each task by an established hourly rate. Group bonus and commission plans together covered one-seventh of the service workers. Other incentive systems in auto dealer repair shops include individual bonus plans and flat-rate percent plans. In the latter, workers receive a stipulated proportion (most often 50 percent) of the labor cost charged to the customer. These flat-rate percentage plans applied to fewer than one-tenth of the workers.

Slightly more than two-fifths of the service workers were paid time rates in November 1982, typically under informal plans providing individual rates in specified occupations. Formal time-rated plans providing single rates for specified jobs within establishments were more common than the informal plans in eight areas, including San Francisco; there, single-rate plans applied to four-fifths of the workers.

Paid holidays were provided to at least nine-tenths of the workers in all areas except Denver-Boulder, where the proportion was about seven-tenths. Holiday provisions, however, varied widely by area. In seven areas (Boston, Chicago, Minneapolis, Nassau-Suffolk, New York, San Francisco, and St. Louis), at least two-thirds of the workers received 9 holidays or more annually; in most southern areas, provisions for more than 5 days were rare.

Incentive workers, particularly those paid under flat-rate systems, may receive holiday pay which differs from their usual pay. About one-third of the incentive workers were granted holiday pay which was substantially less than their usual pay. Most of the remainder received holiday pay that equaled, or approached, their regular pay. A few incentive workers received holiday pay that was greater than their regular pay.

Virtually all nonsupervisory service workers were in shops providing paid vacations after qualifying periods of service. Although vacation provisions varied substantially among the areas, typical provisions were 1 week of pay after 1 year of service and 2 weeks after 2 years. Provisions for at least 3 weeks of vacation pay, generally after 10 to 15 years of service, were more common in the Northeastern and North Central areas than in the other two regions. Only in Chicago, Minneapolis, St. Louis, and San Francisco were a majority of the workers covered by 4-week plans.

Almost all service workers were in establishments providing hospitalization, surgical, basic medical, and major medical insurance for which employers paid at least part of the cost. Provisions for life insurance covered nine-tenths of the workers; accidental death and dismemberment insurance, four-fifths; and short-term protection against sickness or accident, two-thirds. As with the other elements of this survey, incidence of certain health and insurance plans

varied widely by area.

Retirement pension plans (other than social security) applied to at least 90 percent of the workers in Minneapolis-St. Paul, St. Louis, and San Francisco. Elsewhere pension plans covered a majority of the workers in eight areas and typically from one-fourth to one-third in the remaining 13, principally in the South.

The 3,363 auto dealers within the scope of the survey—those with at least 20 workers—employed 173,682 workers in November 1982. Included were the repair departments of establishments engaged primarily in selling new, or new and used, automobiles. Dealerships primarily selling trucks and used cars, and general automobile repair shops, were not included. In the 24 areas combined, executive, supervisory, and office personnel made up 24 percent of the work force; auto salesworkers made up 19 percent, and the non-supervisory service workers accounted for 57 percent.

One-third of the areas accounted for about three-fifths of the 91,680 nonsupervisory service workers. The Los Angeles-Long Beach area had the largest number (10,083), followed by Washington (8,024), Chicago (7,080), Houston (6,107), Philadelphia (5,924), Detroit (5,623), Dallas-Fort Worth (5,557), and San Francisco (4,579). In the remaining 16 areas, employment ranged from 3,898 in New York to approximately 1,000 in Birmingham.

Slightly more than one-fifth of the nonsupervisory service workers were covered by labor-management agreements. The proportion was about nine-tenths in San Francisco and St. Louis; between three-fifths and four-fifths in Chicago, Minneapolis, Nassau-Suffolk, and New York; nearly two-fifths in Kansas City; and one-fourth or less in Boston, Detroit, Milwaukee, Philadelphia, and Pittsburgh. In the remaining 12 areas, primarily in the South and West, no establishment visited reported a majority of its nonsupervisory service workers under union contracts. The major unions in the industry were the International Association of Machinists and Aerospace Workers (AFL-CIO) and the International Brotherhood of Teamsters, Chauffeurs, Warehousemen, and Helpers of America (Ind.). In a few areas, both of these unions had bargaining agreements with the same establishment.

A comprehensive report on the survey findings, *Industry Wage Survey: Auto Dealer Repair Shops, November 1982* (Bulletin 2198), is for sale by the Government Printing Office, or by any of the Bureau's regional offices. □

—FOOTNOTES—

<sup>1</sup>Earnings data exclude premium pay for overtime and for work on weekends, holidays, and late shifts.

<sup>2</sup>Data did not meet publication criteria for automotive service mechanics in St. Louis and for painters in Pittsburgh.

<sup>3</sup>These "nonsupervisory service workers" included working supervisors and nonsupervisory workers in all departments except the office and auto sales departments. Included are workers in departments such as repair, service, and parts.

## New Jersey trends in high tech employment

The State of New Jersey has consistently been among the leading centers of high technology industry in the Nation. A recent State study, employing a broad definition of high technology, found that employment in New Jersey's high tech industries rose 3.1 percent annually between 1975 and 1980, compared to a 2.0-percent increase for all other private nonfarm industries. However, because the national rate of growth in high tech jobs was 4.7 percent per year over the same period, the State's share of the U.S. total actually declined from 4.6 percent in 1975 to 4.2 percent by 1980.

Nearly 224,000 persons were employed in New Jersey's high tech industries in 1980, about 31,000 more than in 1975. These workers, who accounted for 1 of every 11 private nonfarm jobs in the State, were distributed among four broad components: manufacturing (69 percent); communications (23 percent); computers and data processing (7 percent); and research (1 percent). The employment performance of the four components was mixed over the study period, with sizable annual increases in computers and data processing and in communications, slower growth in manufacturing, and large absolute declines in the research area.

Manufacturing was the largest component, accounting for 70 percent (155,559) of New Jersey's high technology jobs in 1980. Although the 2.0-percent annual employment growth in the State's high tech manufacturing industries over the study period was modest, it outpaced the 1.2-percent increase recorded for traditional manufacturing, with the result that the high tech share of the State's total manufacturing employment grew from 18.7 percent in 1975 to 19.3 percent by 1980. The drug industry was the largest high tech manufacturing employer with 32,679 workers in 1980, reflecting annual growth of 3.3 percent since 1975. Other numerically important three-digit SIC industries and their 1975-80 compound annual rates of growth:

	1980 employment	Annual rate of growth
Communications equip- ment .....	31,042	0.9
Electronic components ..	18,363	3.9
Electrical lighting equip- ment .....	11,311	0.4
Computer machinery ....	9,944	5.5
Surgical instruments ....	9,230	-0.6
Control instruments .....	6,970	9.3

Among nonmanufacturing industries, the second largest component of New Jersey's high technology sector was communications, with more than 50,000 employees in 1980 and growth of 5.8 percent per year, 1975-80. Telephone communications accounted for the bulk (44,644) of the workers in 1980, after 5 years of increase at a 4.9-percent

annual rate. Pulling up the average growth rate for the communications component were the small but rapidly growing telegraph communication and communications services industries, which recorded gains of 18.5 percent and 16.3 percent per year over the study period.

The computer and data processing component of the State's high tech sector posted a hefty 8.9-percent yearly rise between 1975 and 1980, employing 15,157 workers in the latter year. In sharp contrast was the performance of the research component, which consisted of research and development laboratories and noncommercial educational, scientific, and research organizations. Employment in R&D labs fell by 8.2 percent annually to 1,089 workers by 1980; noncommercial organizations lost jobs at a 12.3-percent rate, and employed only 524 persons Statewide at the end of the study period. However, the declines noted in the research component should be interpreted with caution, because employment in research units that are divisions of larger firms is often reported under the SIC code of the parent company and cannot be broken out separately for statistical analysis.

The study, based on information from the Census Bureau's *County Business Patterns*, also compared the employment performance of New Jersey and 15 other States with large high tech sectors. Among the salient findings from this portion of the analysis:

- New Jersey ranked seventh of 16 in terms of 1980 high tech jobs—behind California, New York, Illinois, Texas, Massachusetts, and Pennsylvania.
- Declining employment shares in high tech manufacturing between 1975 and 1980 were observed in States whose economies have traditionally been manufacturing based, such as Connecticut, New York, Pennsylvania, Ohio, Illinois, and New Jersey. There thus appears to be a link between the health of a State's overall manufacturing sector and its share of high tech employment. New Jersey ranked seventh among the States in terms of such employment in 1980.
- In terms of 1980 employment, New Jersey ranked eighth in the communications component, eleventh in independent noncommercial scientific and research organizations, and twelfth in research and development laboratories. The State's highest ranking—fifth—was in computer and data processing services.

High tech employment trends over the study period are also presented for each State by major industry component.

*New Jersey's High Technology Economy: A Profile of Recent Developments and Comparative Performance* was prepared by Theodore A. Minde of the Office of Economic Research, New Jersey Department of Commerce and Economic Development (Trenton, 1983). □



# Foreign Labor Developments



## Lifetime employment in Japan: three models of the concept

KAZUTOSHI KOSHIRO

As the Japanese economy overcame the adverse effects of two oil crises, admiration for its management emerged in foreign countries. The success of Japan's economy tended to promote myths about the "lifetime employment" practices of Japanese firms. Following is a brief look at three models of the lifetime employment system.<sup>1</sup>

Lifetime employment is a long-established practice in large Japanese firms. However, it is a "gentlemen's agreement" and is not guaranteed by statute or collective bargaining agreement.<sup>2</sup> The recent concept of lifetime employment is described as follows:

Workers become employed right after their graduation from school with a particular company. The employer will not lay off his workers if possible even in the course of depression. The employee in turn will not quit his job at this company but tend to continue working there until he reaches his retirement age.<sup>3</sup>

This definition reflects the concept of lifetime employment which prevailed during years of high economic growth which began about 1955. It also reflects the social ideas generated by labor unions' resistance to mass dismissals during the preceding decade, as well as court decisions to restrict employers' right to dismissal due to business difficulties. This concept differs from the prototype of the lifetime employment system originated in large firms around 1910. Three differences, in particular, should be noted.

First, in the prewar period, there had been a considerable number of job changes by workers prior to their entering large firms. Most workers usually established a career after finishing compulsory military service, not right after graduation from school. Therefore, many tended to change jobs during the first 10 years after school. After World War II, because of the abolition of military service and continuous growth of large companies, employment practices changed so as to recruit a new work force mostly from recent grad-

uates. However, in the 1960's through the early 1970's, many fast-growing companies faced labor shortages due to a continuous increase of output. Occasionally, these companies would recruit temporary workers until they could fill vacancies with regular workers from the ranks of new school graduates. A number of these temporary workers had opportunities to be retained as "halfway" regular employees if they could demonstrate good performance and efficiency. Most of the "halfway" workers came from rural areas. Their pay was less than that of standard regular workers, even if they had equal capabilities and skills, because they had fewer years of service with the company. However, over time the wage differentials between the two groups could be reduced because of accumulated merit ratings.

Second, there was intense competition among workers with many years of service in the same company for promotions and wage increases. Lifetime employment and seniority-based wages do not exclude competition among workers, although since the war, the labor movement has endeavored to control the wage differentials resulting from merit rating. Even blue-collar workers are rated by merit at least three times a year. Promotion is determined according to the results of such accumulated merit ratings. To maintain the fairness and continuity of the merit rating system, management keeps detailed records of the personal history of each worker. At one time, these records were kept in both the worker's ledger and the wage ledger. Now they are stored in a computerized data base.

Third, the prototype stationary model of lifetime employment assumes that a certain percentage of workers will voluntarily quit their jobs as a result of competition among work groups.

*The stationary model.* Under the stationary model, lifetime employment is a system of highly developed internal labor markets.<sup>4</sup> It consists of a web of administrative rules for pricing labor and allocating the labor force within a firm. It is characterized by specialization of labor, on-the-job training, and a body of firm-specific customs.

The stationary model is illustrated below. For simplification, the maximum length of service was limited to 10 years.

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<i>Number of employees</i>	<i>Years of service</i>	<i>Wage rate</i>	<i>Total wages</i>	<i>Separation rates</i>
1 .....	10	10	10	1/2
2 .....	9	9	18	1/3
3 .....	8	8	24	1/4
4 .....	7	7	28	1/5
5 .....	6	6	30	1/6
6 .....	5	5	30	1/7
7 .....	4	4	28	1/8
8 .....	3	3	24	1/9
9 .....	2	2	18	1/10
10 .....	1	1	10	0
55	-	-	220	19.3

New workers are recruited only at the bottom of hierarchy (usually from among new school graduates). To maintain the hierarchy, it is implicitly expected that a worker will quit voluntarily as a result of failure to compete successfully with fellow workers of the same generation and tenure. Theoretically, this should be the least efficient worker in the group. Each remaining worker can then receive a wage increase of one grade and can be promoted to higher positions. The wage fund can be maintained at the stationary level of 220 in spite of wage increases for remaining workers. Thus, the average wage rate can be maintained at the constant level of 4. Because one worker from each generation quits, the total annual rate of separation is 19.3 percent in this model. (If the maximum length of service is extended to 30, the average separation rate becomes 10 percent.) In other words, all workers who are hired after school cannot necessarily continue their employment until the age of mandatory retirement, contrary to the usual definition of lifetime employment cited above.

*The growth model.* For this model, the concept of stationary lifetime employment is modified. The organizational growth of a company makes it possible for all workers to expect to remain employed and be promoted each year until retirement. One of the basic characteristics of the growth model is its strong dependence on organizational growth, which in turn requires the expansion of market shares. The larger the market share of a company, the greater the opportunities for organizational growth which guarantees employment security and improvement of wages and other conditions of work. In this sense, Japanese firms tend to have stronger impetus for organizational growth, rather than increased rate of return on investment.

*The stagnation model.* After the oil crisis in 1973-74, most of the major firms changed their employment strategies to adjust to new market situations. They reduced employment by various measures: cutting overtime, laying off temporary workers, stopping new recruitment, not filling vacancies, and transferring workers to other shops or plants within their company as well as to related companies or subsidiaries. Some deeply depressed industries, such as shipbuilding and petrochemicals, promoted voluntary sep-

aration by offering severance payments. For example, more than 10,000 workers left Mitsubishi Heavy Industries Corporation during the years following the first oil crisis. Part-time workers with lower labor costs were recruited to fill the vacancies. As a result, organizational hierarchies tended to shrink, illustrating the stagnation model. □

————FOOTNOTES————

<sup>1</sup>This report is excerpted from Kazutoshi Koshiro, "Personnel Planning, Technological Changes, and Outsourcing in the Japanese Automobile Industry," a paper prepared for the Workshop on Industrial Relations and Industrial Change in the World Automobile Industry, Brussels, February 16-18, 1983. The workshop was part of an international joint project on the future of the automobile. The paper, Discussion Paper Series 83-3, May 1983, is available from the Center for International Trade Studies, Faculty of Economics, Yokohama National University, Yokohama, 240 Japan.

<sup>2</sup>The civil law requires an "unavoidable reason" to terminate an employment contract without notice. The labor standards law introduced an even tighter restriction—it permits dismissal without notice only when there is an "inevitable cause." There are no laws requiring a reason for dismissals with notice. However, legal theory has established some very strict rules concerning dismissal with notice. See T.A. Hanami, *Labour Law and Industrial Relations in Japan* (The Netherlands, Kluwer-Deventer, 1979), p. 82.

<sup>3</sup>Kazuo Koike, "Nihonteki Koyo Kanko" ["Japanese Employment Practices"] in Toyokeizai Shinposha, ed., *Keizaigaku Daijiten [Encyclopedia of Economics]* (Tokyo, Toyokeizai Shimpō Sha, 1980), Vol. II, pp. 100-08.

<sup>4</sup>Peter B. Doeringer and Michael J. Piore, *Internal Labor Markets and Manpower Analysis* (Lexington, Mass., D.C. Heath and Co., 1971).

## Robots are a big success at auto plant in Japan

KAZUTOSHI KOSHIRO

In 1971, robots were first introduced in a plant at X Motor Co. in Japan.<sup>1</sup> During the latter half of the 1970's, the number of robots at the plant increased dramatically; by 1981, the company had 730 robots. Most of them (90 percent) perform welding operations in the body assembly shops. The company also uses robots for painting, and is considering robots for battery and spare-tire loading. Other automation, such as computer-aided design and manufacturing, transfer machines, and automobile loaders are widely used by the company.

The robots were obtained largely to do heavy, hazardous, and monotonous work for which very few workers were available during the period of high output growth. Because robots are adaptable and can simultaneously work on different models of cars, the company believed they would improve product quality and save energy and space.

Automation at X Motor Co. has contributed to improved product quality by decreasing human error and increasing mechanical reliability. The company's output increased 186 percent between 1970 and 1980, and productivity increased

139 percent. However, it is difficult to isolate the impact of robots on productivity because other factors such as rationalization of the production process, automation, improved equipment, and efforts by quality control circles also contributed to improved product quality and output. Over the 1970–80 period, expenditures for capital equipment decreased because the flexibility of robots allowed mixed production, and because of the extended life of robots.

The investment for robots is returned within 2 years. For example, cost of a welding robot is about 12 million yen, whereas the average annual wage for a welder is 5 million yen. However, the average value of depreciation per employee was 13 million yen in fiscal 1981. Total depreciable assets were 331,310 million yen, of which the value of the robots, 8,760 million yen, represents only 2.6 percent.

Each of the 730 robots at X Motor Co. replaces 0.7 worker. Because the plant has two shifts, one robot replaces 1.4 workers. Therefore, 1,022 workers or 1.8 percent of the company's total employment have theoretically been replaced by robots.

When the robots were first introduced, maintenance and operating workers were sent to robot manufacturers for technical instruction and training. Thus, these workers were able to program the robots. Although the number of workers at X Motor Co.'s body assembly shop decreased by 4 percent because of the introduction of robots, there were about the same percentage of retirements, so few, if any, workers needed to be transferred. About 100 workers were moved to new assembly lines which required the use of robots.

The welding robots improved product quality and reduced the price of automobiles, causing an increased demand for automobiles. In turn, employment in the body assembly shops increased to some extent, especially in the more skilled jobs such as operating, maintaining, and programming robots. Work injuries decreased and job satisfaction was enhanced as workers were relieved from noise, oscillation, and other job hazards.

Prior to the introduction of robots and other automation, X Motor Co. consulted with trade unions at the Central Labor-Management Consultative Council on long-term production and investment plans and matters related to technological changes. The Council's subcommittees are responsible for discussing problems relating to production, technology, overtime, transfer, improvement of work environment, health and safety conditions, and other matters which might arise during the introduction of automation. Each month, a plant's managers and union representatives can consult with the subcommittees on any of these matters.

In Japan, a trade union is organized on a company-by-company basis. X Motor Trade Union, an affiliate of the Federation of Japan Automobile Workers' Union (JAW, *Jidosha Roren*), organizes all of the plants of X Motor Co. At each plant, there is a local branch of X Motor Trade Union with several full-time officers.<sup>2</sup> Shop stewards or

chief stewards meet and negotiate with section chiefs (who are union members) or foremen on working conditions within that workshop, consulting the Central Labor-Management Consultative Council if necessary. Transfers to another workshop are negotiated between union branch officers and plant management.

Labor-management relations in the automobile industry have been cooperative and harmonious since the collapse of militant left-wing unionism in 1953. Like other unions, the X Motor Trade Union has been pursuing "3-P movements" (productivity, progress, and participation) and generally has been positive about the introduction of automation.

In recent years, however, the Federation of Japan's Automobile Workers' Union began a campaign to get X Motor Co. to sign an agreement covering the introduction of new technology. In 1982, the union submitted to management a proposal containing the following requirements.

- Consultation with the Federation of Japan Automobile Workers prior to the introduction of new technologies.
- No layoffs resulting from the introduction of robots.
- No demotions or wage reductions from the introduction of robots.
- Education and retraining for affected workers prior to, as well as after, the introduction of robots.
- A fair distribution of the fruits of increased productivity which results from the introduction of robots.

The Federation of Japan Automobile Workers demands that it be consulted even at the initial stage of planning new technologies. It contends that this proposal is not new, but merely a reflection of long established labor-management practices at X Motor Co. Although management had some misgivings, it signed a new contract in March of 1983 covering the introduction of new technologies based largely on the union's proposals.

The government is also taking a cautious approach toward robots, partly because some industrial accidents occurred while workers were programming the robots. Also, the Ministry of Labor is concerned that employment may be adversely affected if the economy continues to stagnate. □

—FOOTNOTES—

<sup>1</sup>This report is excerpted from Kazutoshi Koshiro, "Personnel Planning, Technological Changes, and Outsourcing in the Japanese Automobile Industry," a paper prepared for the Workshop on Industrial Relations and Industrial Change in the World Automobile Industry, Brussels, February 16–18, 1983. The workshop was part of an international joint project on the future of the automobile. The paper, Discussion Paper Series 83–3, May 1983, is available from the Center for International Trade Studies, Faculty of Economics, Yokohama National University, Yokohama, 240 Japan.

<sup>2</sup>See Kazutoshi Koshiro, "Industrial Relations in the Japanese Automobile Industry," a paper presented at the Workshop on the Future of the Automobile, Wissenschaftszentrum, Berlin, March 1982. This paper, Discussion Paper Series No. 82–5, August 1982, is available from the Center for International Trade Studies, Faculty of Economics, Yokohama National University, Yokohama, 240 Japan. See also, Kazutoshi Koshiro, "Personnel Planning."