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The Evolution of Unemployment in the United States: 1968–1985

1. *Introduction and Summary*

In the recession of 1958, the peak unemployment rate in the United States reached 7.4 percent, a level that was not surpassed until the recession of 1975. In contrast, the current cyclical low unemployment rate fluctuates around 7.0 percent, and it has not been significantly below that level in seven years. Indeed, the average unemployment rate in the United States since 1975 (7.6 percent) is higher than in *every* preceding postdepression year, and each cyclical peak of unemployment since 1970 has exceeded the one before it. Though these facts have been of intense interest to both researchers and policy makers, we know of no empirically convincing theory that explains the trend toward higher unemployment.

This apparent secular increase in unemployment is not peculiar to the United States. Figures 1A and 1B display time series of unemployment rates in major OECD countries since 1960. While there are differences among countries in timing and degree, the central point is clear: unemployment in developed economies is higher now than it was before. On average in OECD labor markets, unemployment has been 142 percent higher in the post-1975 era than it was in the previous decade. Especially of late, the U.S. experience with unemployment has been somewhat better than in other Western economies, which is attributable

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(in an accounting sense) to more rapid employment growth in the United States.[1]

This article studies the determinants of employment and unemployment dynamics in the United States since 1968. The primary goal of our analysis is to document the empirical "facts" about unemployment over this period, and to confront various theories of unemployment with them. A second goal is to isolate the class of models that are consistent with both a secular increase in unemployment rates and with other important features of labor market performance that we document below. Our main source of information for this task is an eighteen-year time series of cross sections of individual data drawn from the Annual Demographic File (the March survey) of the *Current Population Survey* (CPS). The CPS data form the basis of published labor force statistics, and each March File contains important retrospective information for the previous calendar year on employment, unemployment, and earnings for large samples of labor market participants. We focus our analysis on a subsample of males with "strong" labor force attachments, for whom the CPS data yield about 540,000 individual records.

Our key findings are in four main areas:

Neutrality The trend toward higher unemployment is not heavily concentrated in particular sectors of the economy. Unemployment has increased in all major industries, in all age and schooling groups, and in all major regions of the country. The timing and magnitudes of changes in unemployment are very similar across identifiable groups. Similar and consistent results hold for the sectoral distribution of wage adjustments over the period that we study. There are large changes in average weekly earnings among the men in our data, but these are mainly composed of fluctuations in aggregate wages. Relative industry wages have been very stable through time, especially for prime-aged workers. These facts challenge theories that emphasize sector-specific factors as determinants of aggregate unemployment. This is not to say that relative wages and unemployment rates do not vary—they do—but these adjustments appear to be of secondary importance in explaining the trend toward rising unemployment. Nor is there evidence of a (very) long recession. The distribution of unemployment during periods when it is high but stable is very similar to its distribution during periods of low unemployment.

1. For a detailed comparison of employment, unemployment, and labor force participation in major Western economies, see *OECD Employment Outlook*, Paris, September 1986. As pointed out by Blanchard and Summers (1986), there are important differences between the U.S. and European experiences with unemployment that make a unified analysis difficult. We focus solely on the United States in this paper.

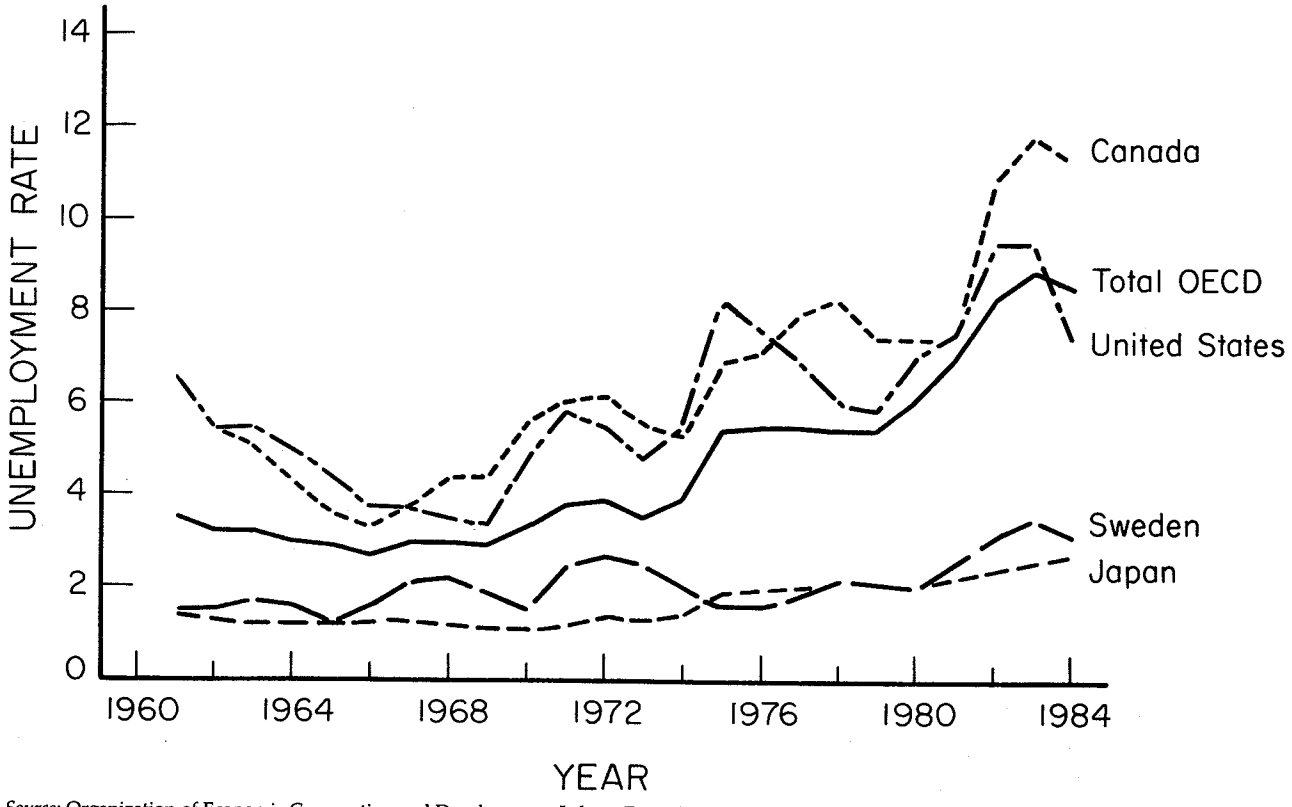
The only significant relative changes in the distribution of unemployment occur across geographic regions, where local market conditions have played important roles at various times during this period.

Long-term Unemployment In an accounting sense, rising unemployment is due to both increased rates of entry into unemployment and longer spells. In terms of these flows, roughly two-thirds of the secular increase in the average unemployment rate may be attributed to increased probabilities of *entering* unemployment. Yet despite this importance of rising entry rates, the vast majority of the increase in unemployment is accounted for by an increase in the frequency of very long unemployment spells. For example, between survey years 1971–1973 and 1983–1985, the average annual number of weeks unemployed for persons in our data increased from 1.8 to 3.0 weeks. Nearly two-thirds of this increase is accounted for by persons who were unemployed for six months or more during a calendar year, and 93 percent by persons reporting at least 15 weeks of unemployment. The frequency of short spells of unemployment (less than 15 weeks) did not change appreciably over time. Consistent with the neutrality results mentioned above, these features are remarkably uniform across sectors, regions, and demographic groups. For example, average weeks unemployed rise by very similar proportions in expanding industries (such as retail trade) and in those that are in long-term decline (such as manufacturing).

Heterogeneity and the Distribution of Unemployment Based on observed characteristics of workers, unemployment is now much more broadly based than it was in the past. Differences in unemployment probabilities between persons who are currently employed and those who are currently unemployed have fallen substantially since the 1960s. Thus the secular increase in unemployment has been concentrated on groups that were relatively insulated from it in the past, so unemployed persons have become less distinguishable from the rest of the population. However, our evidence also suggests greater inequality in the distribution of unemployed weeks at the individual level. Persons who experience unemployment now remain unemployed for a much longer period, on average, and persons with past unemployment are more likely to experience future unemployment spells. Both of the latter forces tend to increase inequality as unemployment rises.

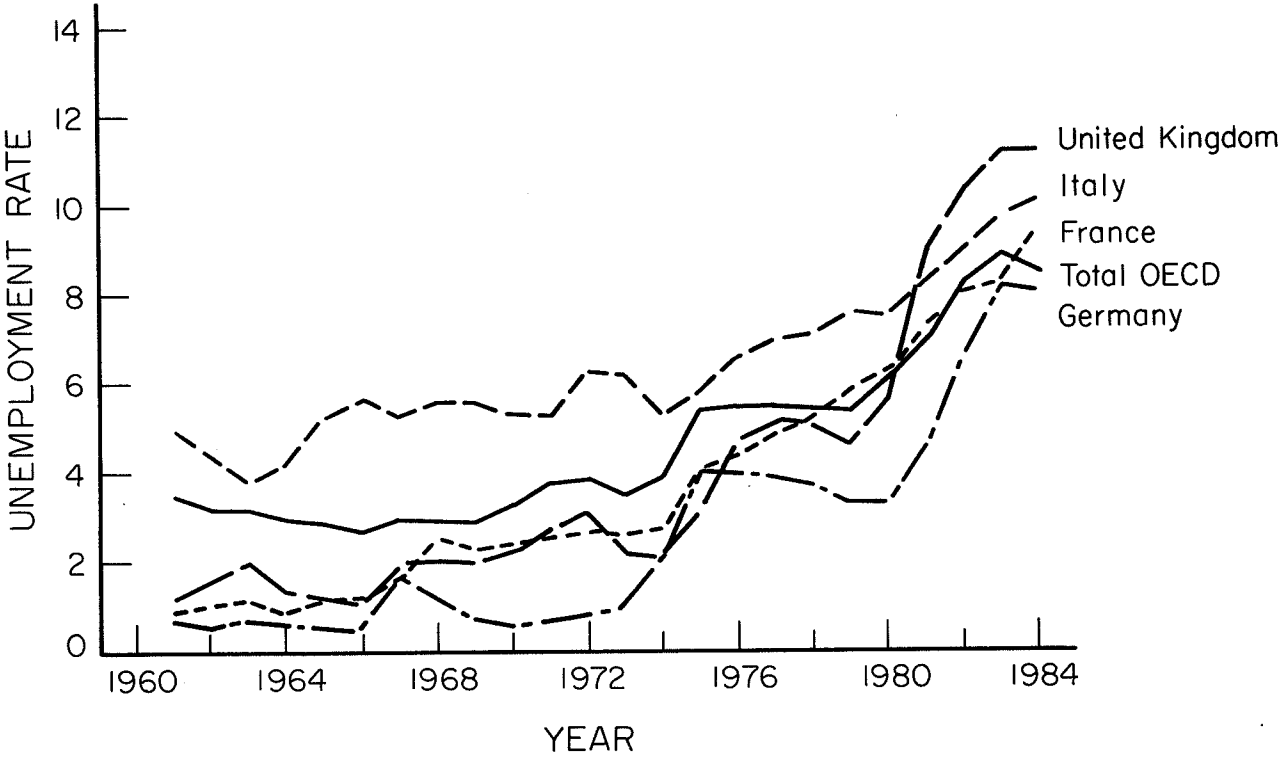
Declining Mobility Mobility is a key feature of virtually all "natural rate" theories of unemployment (for example, Lucas and Prescott 1974). One of the most attractive theories of the behavior of unemployment since

Figure 1A UNEMPLOYMENT RATES, SELECTED OECD COUNTRIES



Source: Organization of Economic Cooperation and Development, Labour Force Statistics

Figure 1B UNEMPLOYMENT RATES, SELECTED OECD COUNTRIES



Source: Organization of Economic Cooperation and Development, Labour Force Statistics

1970 is the "sectoral shift" hypothesis of a fluctuating natural rate, driven by changes in the pace of labor reallocation among sectors of the economy (Lilien 1982). A virtue of this theory is that it delivers strong predictions about the relation of mobility to unemployment. The data reject these predictions. Following cohorts of workers over the period of our data, we document significant net migration of workers among sectors in the post-1970 period. Further, persons who change job or industry are far more likely to experience unemployment than are "stayers." Yet we also find that total mobility is strongly procyclical, and that the pace of intersectoral migration of experienced workers was significantly higher before 1974, when unemployment was comparatively low. We find that both gross and net sectoral mobility have declined, and that both employed and unemployed individuals are less likely to move between industries in periods of high unemployment. Most damaging to the sectoral mobility hypothesis is the fact that industry changers account for a minor, and virtually constant, amount of total unemployment. Our evidence is that cyclical and secular changes in unemployment are overwhelmingly accounted for by varying incidence among persons who do not change industry.

It may still be true that the shocks generating changes in aggregate unemployment are concentrated in particular sectors or industries, but if they are, there must be powerful demand spillover effects among sectors that are difficult to identify in time-series data, and which inhibit sectoral mobility. In geographic data, we do find evidence of important interindustry spillover effects on unemployment that are driven almost exclusively by the performance of manufacturing. Thus sectoral shocks appear to play a role. But we frankly doubt that these effects are sufficiently important to generate the broad-based neutrality of unemployment fluctuations observed in aggregate data.

Despite well-known examples of declining industries and problems of worker displacement, these points indicate that the main factors influencing the behavior of unemployment in the 1970s and 1980s have been economywide. We think that the decline in mobility among both employed and unemployed individuals is especially important in this regard, as is the significant increase in the length of spells. In the last section we discuss some alternative explanations for the data, and outline one consistent model that is based on specific capital and optimizing behavior. The proposed model is consistent with key features of unemployment data over this period, but it is speculative in that we do not yet offer strong, independent tests of its predictions.

2. *Components of Unemployment, 1968–1985*

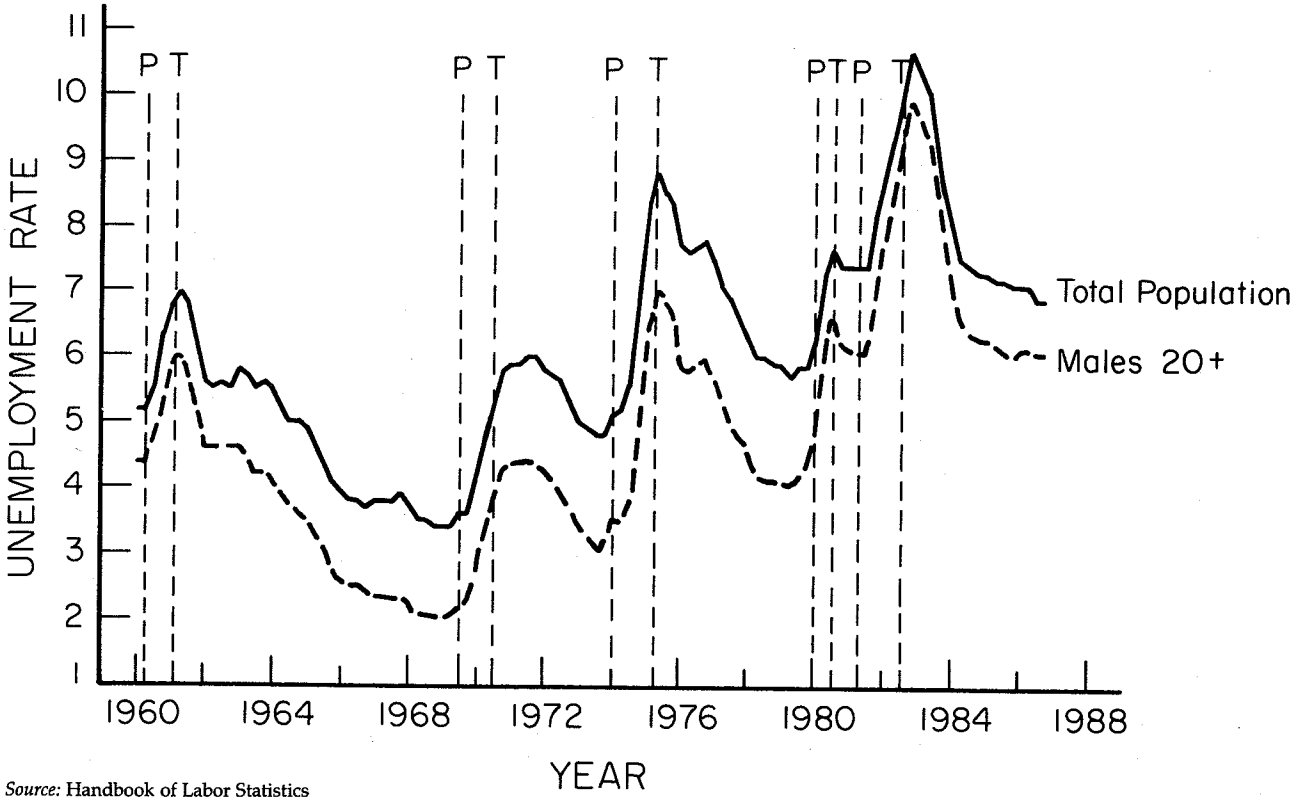
We will study the behavior of unemployment among men with "strong" labor force attachments. We focus on this group because of their relative homogeneity, and because we wish to avoid complicating issues, such as participation decisions, that are more important for other demographic groups. For reference, figure 2 plots the quarterly time series of male (aged 20+) and total unemployment since 1960. NBER reference business cycles are also identified in the figure. Unemployment for this group clearly mirrors aggregate unemployment. The figure also illustrates two other aspects of unemployment time series that we think are important. First, following cyclical contractions in which unemployment rises rapidly, the unemployment rate tends to decline slowly over a long period, or until the next recession. This "asymmetry" of response in aggregate unemployment time series has been noted by Neftei (1984) and by DeLong and Summers (1986) among others, though other measures of performance than unemployment do not exhibit this pattern. Second, aggregate contractions of output have been relatively frequent in the post-1970 period, and in this period each cyclical peak of unemployment exceeds its predecessor. We return to these points in section 6.

The Annual Demographic File of the CPS includes retrospective information on respondents' unemployed weeks during the previous calendar year. We use this information in table 1 to calculate the incidence of unemployment (at least one spell during the previous year), and the unemployment rate (unemployed weeks as a proportion of total labor force weeks) for the period 1968–1985. The estimates in the table are for male civilian nonagricultural workers, between the ages of 18 and 64, who were labor force participants for at least forty weeks during the previous calendar year, and who report that they usually work full time. With some exceptions, we adhere to these sample selection criteria in what follows.

Despite strong labor force attachment, the evolution of unemployment for this group is very similar to that of the labor force as a whole. To illustrate the secular increase in unemployment for this sample, we break the 1968–1985 period into six three-year intervals,[2] and report averages within each interval. On average, roughly 14 percent of all workers report some joblessness during a calendar year, which is about triple the average unemployment rate. Both the incidence of unemployment and

2. In terms of NBER reference business cycles, each of these intervals except 1968–1970 and 1977–1979 includes a cyclical trough. Aggregate contractions occur in 1970, 1974–1975, 1980, and 1981–1982.

Figure 2 UNEMPLOYMENT RATES, TOTAL POPULATION AND MALES 20+



Source: Handbook of Labor Statistics

Table 1 VARIOUS UNEMPLOYMENT MEASURES, CPS SURVEY YEARS 1968–1985

		1968–70	*1971–73*	*1974–76*	*1977–79*	*1980–82*	*1983–85*	*1968–85*
1.	Incidence	8.77	13.07	13.65	14.88	15.35	17.65	13.90
2.	Rate	2.06	3.81	4.17	4.66	4.82	6.30	4.30
3.	Aggregate rate, males aged 20+	2.00	3.60	4.23	4.60	4.83	7.13	4.40
4.	Insured rate	2.22	3.53	3.90	3.78	3.32	3.62	3.40
5.	Insured entry rate (monthly)	1.80	2.35	2.44	2.35	2.25	2.29	2.25

Note: Row 1 is the sample percentage of individuals reporting some unemployment in the previous year. Row 2 is unemployed weeks in the previous year as a percentage of total labor force weeks. Row 3 is calculated from the *Economic Report of the President* 1986, table B-38. Row 4 is insured unemployment as a percentage of covered workers (employment plus unemployment), and row 5 is average monthly initial claims for unemployment insurance as a percentage of covered employment. Rows 4 and 5 are calculated from the *Economic Report of the President* 1986, table B-39.

the unemployment rate rose steadily over the period, though the proportional increase in incidence, which doubled, is smaller than the increase in the unemployment rate. This fact suggests that longer spell durations also help to account for rising unemployment over the period, a point we develop below. The most rapid increase in incidence occurred in the recessionary years at the end of the data, when nearly one worker in five experienced unemployment.[3] For comparison, we also report corresponding values of the unemployment rate for males aged 20 and over tabulated from monthly surveys. The correspondence between these estimates and our own is nearly exact until 1983–1985, where the retrospective data produce a small underestimate.[4]

The last two rows of table 1 show the anomalous behavior of insured unemployment over this period.[5] Before the mid-1970s, the insured unemployment rate closely tracked total unemployment (Burtless 1983). After that the two series diverge, and the insured rate shows no important trend. One explanation for this divergence is that the durations of insured spells have increased, so a larger fraction of unemployed weeks is accounted for by persons who have exhausted their eligibility. While this effect must play some role,[6] row 5 of the table indicates that long current spell durations cannot be the only factor. We report the estimated monthly flow into insured unemployment as a proportion of covered employment, calculated from data on weekly initial UI claims for the indicated years. After 1970, there is no discernible increase in the average entry rate for covered spells. Comparing these figures to the incidence estimates in row 1, it seems clear that a declining proportion of newly unemployed workers collect UI.[7] A plausible reason is that fewer *new*

3. In calendar year 1982 (survey year 1983), 20.4 percent of all workers reported some unemployment during the year.
4. This divergence between the unemployment rates calculated from retrospective data and from monthly surveys has also been noted by Akerlof and Yellen (1985). They argue that less painful experiences are more likely to be forgotten in retrospective data. Thus the divergence between the two unemployment rates may indicate that current unemployment may be psychologically less painful than in earlier years. Our analysis does not address this issue.
5. The insured unemployment rate is usually defined as the number of individuals receiving UI benefits as a proportion of covered employment. We have calculated the rate as insured unemployment as a percentage of insured employment and unemployment. This adjustment has a negligible effect on the estimates.
6. Exhaustions as a proportion of new claims averaged .078 in 1967–1969, and .152 in 1982–1984. However, there is no significant trend to this ratio after 1970 (*Economic Report of the President*, January 1987, table B-39). Table 4 documents the increasing importance of spells lasting more than six months—the usual limit for UI recipiency—among workers in our data.
7. Coverage of the UI system was expanded to include public employees and agricultural workers in January 1978. Conceivably, this increase in coverage could have caused the insured unemployment rate to fall relative to the total unemployment rate. However, the

Table 2 CURRENT LABOR FORCE STATUS OF MALES WHO WORKED POSITIVE WEEKS DURING THE PREVIOUS YEAR, MARCH 1968–1985

		1968–70	*1971–73*	*1974–76*	*1977–79*	*1980–82*	*1983–85*	*1968–85*
1.	Working	96.67	95.13	93.45	94.55	92.89	92.60	94.22
2.	Unemployed	2.13	3.57	5.04	4.11	5.74	6.04	4.44
3.	Unable to work	0.16	0.18	0.22	0.13	0.12	0.08	0.15
4.	Out of the labor force	1.04	1.12	1.28	1.21	1.24	1.27	1.19
5.	Labor force participation rate (1. + 2.)	98.80	98.70	98.49	98.66	98.63	98.64	98.65

Note: Tabulated from March CPS files, 1968–1985. The sample consists of males who report positive weeks worked during the previous calendar year and who are not currently in school. Total sample size is 543,014. Reported estimates are three-year averages.

spells qualify for coverage: while state qualifying provisions vary widely, a common requirement to collect UI is a substantial period of continuous employment during the previous year. If higher unemployment is also highly concentrated among individuals who cycle frequently between employment and unemployment, then fewer reported spells will qualify for UI. We provide evidence on this point below.

Another possible reason for the relative decline in covered unemployment is that the increase in *reported* unemployment is not "real." Respondents may simply answer questions differently than before, so some individuals who would have been counted as "out of the labor force" in earlier years now report themselves as unemployed. We address this point in table 2, which shows the current (March) employment status of all nonstudents in our data who worked positive weeks in the previous calendar year. Inspection of the table reveals that none of the increase in unemployment among these individuals can be attributed to changes in nonparticipation (which has risen slightly) or to those who report that they are unable to work. All of the increase in reported unemployment is accounted for by an almost exactly corresponding decline in the employment rate. In the absence of evidence that the distinction between *work* and unemployment has changed over time, we interpret these data to mean that the increase in measured unemployment is a real phenomenon. For these workers, unemployment has risen.

2.1 TYPES OF UNEMPLOYMENT SPELLS

Table 3 uses current spell information to decompose unemployment by reason for the initiation of the spell in progress. Maintaining prior convention, we define "temporary layoffs" to include all spells with a fixed recall date within thirty days of the survey, plus fixed duration spells that are longer than thirty days or that have an indefinite recall date. "Separations" are employer-initiated spells from which the worker does not anticipate rehire, and "quits" are employee-initiated. The latter two categories imply continuous search from the date the old job ended. "Reentrants" have not searched continuously, but they do report efforts to find work during the four weeks preceding the survey. A remarkable fact documented in this table is that *all* of the relevant components of unemployment have trended upward. The main cyclical and secular variations in unemployment are clearly dominated by employer-initiated spells, however.

ratio of insured to total unemployment for males aged 20 and over actually increased from .83 to .89 between 1977 and 1978 (*Economic Report of the President*, January 1987, table B-39).

Table 3 UNEMPLOYMENT BY REASON: PRIME-AGED WORKERS, 1968–1985

	Total	*1968*	*1969*	*1970*	*1971*	*1972*	*1973*	*1974*	*1975*	*1976*	*1977*	*1978*	*1979*	*1980*	*1981*	*1982*	*1983*	*1984*	*1985*
Unemployment rate	5.56	2.44	2.04	3.56	4.92	4.58	3.74	3.94	8.68	6.18	6.03	4.81	4.24	5.80	6.50	8.67	9.98	6.15	5.82
Temporary layoffs	1.91	0.65	0.53	1.17	1.53	1.38	1.03	1.40	4.01	2.09	1.89	1.51	1.33	2.15	2.20	3.36	3.59	1.96	1.86
Separations	2.70	1.19	1.03	1.58	2.63	2.34	1.73	1.77	3.75	3.20	3.01	2.25	1.96	2.49	3.04	4.19	5.32	3.21	2.93
Quits	0.51	0.35	0.27	0.45	0.39	0.50	0.63	0.48	0.50	0.44	0.58	0.59	0.52	0.60	0.60	0.62	0.57	0.50	0.41
Reentrants	0.45	0.25	0.20	0.36	0.37	0.37	0.35	0.29	0.42	0.45	0.56	0.47	0.44	0.55	0.66	0.49	0.50	0.48	0.62

Note: Calculated from March CPS files for the indicated years. Sample is male workers aged 18–64 who participated in the labor force for at least 40 weeks in the previous calendar year.

One point of table 3 is to rehabilitate temporary layoffs as an important component of unemployment. Recent literature (for example, Hall 1979) has stressed the fact that layoffs account for a minor proportion of unemployment in the total labor force, with the implication that attachment of unemployed workers to former employers and even to former industries is weak (Clark and Summers 1979).[8] For workers with strong labor force attachments, however, layoffs account for about a third of all unemployment spells, and this share is strongly countercyclical.[9] In the recession of 1975, nearly half of all spells in progress began as temporary layoffs, but layoffs were somewhat less important in the 1983 recession, which was more severe in terms of total unemployment. Despite small relative shifts such as this, table 3 shows no important evidence of a changing composition of the stock of unemployed persons according to the reason for the spell in progress. We have also calculated estimated entry and exit rates for unemployment by type of spell, and the conclusion is essentially the same.[10] Changes over time in relative entry and exit rates for spell types have been negligible. In light of these facts, we will drop the distinction among types of spells.

2.2 THE IMPORTANCE OF LONG SPELLS

Under steady-state dynamics, the unemployment rate is approximately the ratio of the per-period entry and exit probabilities for unemployment spells. Empirically, cross-sectional differences in unemployment rates—say across demographic groups—are commonly accounted for by differences in probabilities of entering unemployment. Heterogeneity of spell

8. Based on matched CPS files for consecutive months, Clark and Summers (1979) estimated that only about half of all workers on temporary layoff return to their original industry and occupation. This estimate ignores measurement errors in reported industry and occupation, which will cause estimated industry attachment to be understated in panel data. In our data, measurement error causes between-industry mobility to be overestimated by about 50 percent. See Murphy and Topel (1986) or Kruegar and Summers (1986) for a more thorough discussion.
9. Temporary layoff spells are also typically shorter than permanent layoffs, so they account for a larger share of the occurrence of unemployment spells. There is some seasonality to layoff data that is primarily accounted for by construction workers, for whom temporary layoffs are common. Nonwinter months generally have a smaller share of unemployment accounted for by temporary layoffs. Thus, the March data may overstate the share of all unemployment spells due to layoffs.
10. We estimated the entry rate for each spell type as the number of individuals with reported incomplete spell durations of one or two weeks as a fraction of employment, expressed at a monthly rate. The exit rate was calculated as the percentage of all spells that end between months $t - 1$ and t, where t refers to March of each year. The estimates showed that the inflow rate to unemployment increased by about 40 percent over the period of our data, while exit rates declined by about 30 percent. The changes in these rates are very similar for temporary layoffs and separations.

durations plays a less important role. Similarly over time, table 1 showed that the annual incidence of unemployment had roughly doubled over the period 1968–1985, while the unemployment rate itself tripled. This suggests that more than half of the secular increase in the unemployment rate is due to increased probabilities of entering unemployment, with the remainder attributable to longer-spell durations. This decomposition is somewhat deceiving since these "new" unemployment spells are very long. To illustrate, table 4 reports the average annual number of weeks spent unemployed for persons in our data, averaged over three-year intervals, and the distribution of those weeks over various lengths of time spent unemployed. For each week's interval in the table, the reported estimate is the contribution to the overall average by persons reporting the indicated number of weeks. Thus, for example, in the three survey years 1983 to 1985 persons with 15 to 26 weeks of unemployment contributed 1.02 weeks to the overall average of 2.96 weeks spent unemployed.[11]

The estimates in table 4 show that nearly all of the secular increase in unemployment is accounted for by persons reporting long periods of joblessness. For example, between survey years 1971–1973 and 1983–1985, unemployed weeks for the average individual increased by about 1.2 weeks per year (66 percent). Of this increase, 62 percent is accounted

11. Before 1976 retrospective data on unemployed weeks were reported in the weeks intervals shown in the table. After 1976 the data are continuous. We converted the post-1976 data to the pre-1976 intervals, and assigned post-1976 within-cell means for each year. Thus, let u_{it} be the percentage of the sample reporting unemployed weeks in interval i, year t, and w_i be mean weeks within the cell. Then the reported estimates are $u_{it}w_i$.

Table 4 DECOMPOSITION OF AVERAGE WEEKS UNEMPLOYED LAST YEAR BY INTERVALS OF REPORTED WEEKS

	Weeks Unemployed Last Year						
Survey Year	1–4	5–10	11–14	15–26	27–39	40+	Total
1968–70	.07	.16	.15	.36	.15	.07	0.97
1971–73	.07	.22	.23	.65	.43	.20	1.78
1974–76	.07	.23	.23	.73	.46	.25	1.97
1977–79	.07	.23	.26	.78	.53	.34	2.22
1980–82	.07	.23	.28	.83	.54	.34	2.30
1983–85	.07	.23	.28	1.02	.77	.59	2.96
1968–85	.07	.22	.24	.74	.49	.31	2.07

Note: Reported figures are the contributions to average total weeks unemployed in each year by persons reporting the indicated number of weeks. Thus, in 1983–85 persons with 15–26 weeks unemployed contributed 1.02 weeks to the total of 2.96.

for by persons who were unemployed for six months or more, and 93 percent by persons who were unemployed for more than 15 weeks. In fact, the striking feature of these data is the dichotomy in the relative incidence of short and long periods of unemployment. The frequency with which people experience short periods of unemployment, say less than 15 weeks, has remained relatively constant through time. Thus, while an increase in the rate of occurrence of spells (shorter job durations) is the proximate "cause" of rising unemployment, the increase in the unemployment rate is due almost exclusively to an increased incidence of long stretches of unemployment.[12]

Over the 18-year period shown in table 4, the proportion of total unemployed weeks accounted for by persons reporting six or fewer months of unemployment in a calendar year fell from .76 to .54. This trend aids in understanding the decline in the share of unemployment covered by UI, since most state UI programs cover only 26 weeks of unemployment in a benefit year.[13] Further, to the extent that the occurrence of unemployment is a serially correlated event for individuals, a smaller proportion of *new* spells will be covered by UI. For example, of all individuals who had been unemployed for ten weeks or less at the March survey dates, so their current spells did not spill over into the previous calendar year, 52 percent had been unemployed during at least part of the previous year, and 28 percent had been unemployed for 15 weeks or more. The latter estimate averaged .22 from 1968–1976 and .32 after 1976, when insured and total unemployment diverged. Thus there is little doubt that fewer new spells will qualify for UI coverage, and the average length of coverage will be shorter. These magnitudes do not appear sufficient to explain the large divergence between covered and total unemployment shown in table 1, however.[14]

2.3 DEMOGRAPHIC, INDUSTRY, AND REGIONAL DIFFERENCES

One of the most important features of the secular increase in unemployment is that it has occurred across all demographic groups, sectors of the economy, and regions. This point is illustrated in table 5, where we report average unemployment rates by various age, education, industry, and regional categories. The estimates are calculated from reported

12. Some of the individuals who report many weeks of unemployment experience more than one spell in a year. The CPS data also record the number of spells in the previous calendar year, up to a maximum of three. The average number of spells per worker with some unemployment was 1.55 and the range was from 1.65 in 1968–1970 to 1.52 in 1983–1985. Thus most of the increase in unemployed weeks is due to longer spells rather than a sequence of short spells.
13. Topel (1985) summarizes state qualifying provisions in major UI programs.
14. This conclusion supports the analysis of Burtless (1983), using similar data.

Table 5 UNEMPLOYMENT RATES BY SELECTED CHARACTERISTICS: CPS MALES, 1968–1985

		1968–70	1971–73	1974–76	1977–79	1980–82	1980–85	*Share of Increase Due to Long Spells*[a]
Total		2.06	3.81	4.17	4.66	4.82	6.30	.62
Age:	20–24	4.06	8.39	8.59	9.02	9.21	10.70	.69
	25–29	2.09	4.30	5.09	5.63	6.01	7.72	.60
	30–34	1.85	3.35	3.54	3.99	4.48	6.14	.59
	35–49	1.66	2.76	3.04	3.31	3.42	4.96	.64
	50–59	1.91	2.90	2.80	2.99	2.92	4.26	.73
Schooling:	8–11	2.88	5.23	5.74	7.11	7.64	10.27	.64
	12	1.75	3.64	4.33	4.87	5.40	7.45	.59
	13–15	1.29	3.14	3.47	3.75	3.66	4.84	.54
	16	0.66	1.55	1.81	1.96	1.69	2.18	.42
Industry:								
Mining		2.81	3.53	3.41	4.20	5.49	8.72	.57
Construction		6.54	9.47	10.69	11.85	12.23	15.22	.68
Durable goods		1.82	3.86	3.87	4.05	4.46	6.36	.66
Nondurable goods		1.47	2.58	3.20	3.48	3.57	4.71	.62
Transportation		1.26	2.60	2.73	3.23	3.24	4.27	.60
Wholesale trade		1.11	2.41	2.76	2.92	3.03	3.62	.45
Retail trade		1.61	3.48	3.87	4.47	4.34	5.86	.61
Region:								
Northeast		1.96	4.01	4.50	5.19	4.56	5.62	.70
Midwest		1.68	3.76	3.84	4.00	5.09	6.79	.65
South		1.82	2.81	3.68	4.04	4.41	5.91	.59
West		3.33	5.24	4.93	5.34	5.34	7.08	.63

[a]The share due to long spells is the proportion of the change in average annual unemployed weeks between 1971–73 and 1982–85 accounted for by persons reporting six months or more.

weeks unemployed in calendar years 1967–1984. The steady rise in unemployment is apparent for all age groups except workers over the age of 50, for whom labor force participation declined sharply over the period. Even for them, however, the recession in calendar years 1982–1983 caused a sharp increase in unemployment. Proportional increases in unemployment are smallest for young (aged 20–24) men, for whom relative unemployment rates have fallen steadily since the early 1970s (Bloom and Freeman 1986). In contrast, the largest proportional increase in unemployment during the 1980s was for prime-aged (30 to 49) workers. This is because they started from the lowest base, however; absolute changes in jobless rates are fairly uniform across groups.

To us, the most important feature of the estimates in table 5 is the uniformity of the trend toward rising unemployment. Time spent unemployed has risen in every illustrated category, and the magnitude of this increase is surprisingly evenly distributed. This neutrality is particularly true of industries. There is no evidence in the table that "declining" industries such as durable goods manufacturing have performed worse than expanding ones. The only notable exceptions to this finding are the distributions of unemployment across schooling categories and regions: there is some evidence of an increasing return to education—workers with a high school education or less have experienced a larger secular increase—and the regional distribution of unemployment rates shows the resurgence of the northeast (mainly New England) during the 1980s. Moreover, in nearly every category that we have examined the prime component of rising unemployment is long spells. To illustrate, in the last column we report the proportion of the increase in each category's unemployment rate between survey years 1971–1973 and 1983–1985 that is accounted for by persons reporting more than six months of joblessness in a calendar year. The estimates are tightly bunched around the full sample proportion of .62. We conclude from these data that the increased importance of very long spells is a general phenomenon that is not tied to changes affecting particular industries, regions, or demographic groups. Rather, increased incidence of very long spells is a main factor underlying a *general* increase in measured unemployment.

3. *Modeling Unemployment and Unemployment Transitions*

All of the previous tabulations are essentially one-way classifications that do not control for other background characteristics of individuals that may also vary over time, and that may affect measured unemployment. For example, the proportion of workers in our sample who had com-

pleted college rose from 11.8 percent in 1968 to 22.3 percent in 1985, while the proportion unmarried rose from 12 percent to 26 percent. Based on well-known cross-sectional relationships, the former change would normally serve to reduce unemployment, while the latter might increase it. Further, our previous tabulations suggested that changes in both the occurrence and the duration of unemployment spells have contributed to rising unemployment. Those estimates as well are subject to the criticism that they do not control for worker characteristics. For example, periods in which aggregate durations are relatively long may be generated by a slower job-finding rate for the representative worker who enters unemployment, or by an increased flow into unemployment of workers who typically have longer spells (Darby, Haltiwagner, and Plant 1986). Previous tabulations cannot distinguish these hypotheses.

To address these issues in a way that is amenable to the large samples available to us, we propose the following statistical framework for decomposing unemployment over time. For each individual in our data, we know the number of weeks spent unemployed during the previous years.[15] We do not know when they occurred within the year or how they were generated, though for our sample table 3 indicated that the vast majority of spells are employer-initiated. Let $u(x_i,\beta_t)$ be the probability that person i with observable characteristics x_i is unemployed during a random week of year t.[16] We assume for simplicity that $u(\bullet)$ is roughly constant within a year. Then the retrospective information is equivalent to 52 (nonindependent) weekly samples reporting employment status for the individuals in our data. The retrospective data pools these weekly samples, so the contribution of person i who reports η_i weeks of unemployment during year t to the sample marginal likelihood is

$$L_i(x_i,\eta_i,T_i,\beta_t) = u(x_i,\beta_t)^{\eta_i}(1 - u(x_i,\beta_i)^{T_i-\eta_i} \quad (1)$$

where T_i is total labor force weeks for person i. We assume that $u(x_i,\beta_t)$ is logistic:

$$u(x_i,\beta_t) = \frac{e^{x_i\beta_t}}{1 + e^{x_i\beta_t}} \quad (2)$$

15. Before survey year 1976, the number of unemployed weeks in the previous year was reported in intervals (the ones used in table 4). For consistency across years, we assigned individuals the post-1975 means of weeks for these intervals in all years of the data. (The within-cell means were virtually constant from 1976 to 1985.) Thus, for example, a person with one to four weeks of unemployment in any year was assigned 3.4197 weeks of unemployment.
16. We ignore unobserved heterogeneity in estimating the model.

Parameter vectors $\beta_t (t = 1967–1984)$ can be consistently estimated by maximizing the sample marginal likelihood function defined by equations (1) and (2).

Given equations (1) and (2), we use the incidence of unemployment (positive weeks) in year t to estimate the probability that a person enters unemployment. Let $\lambda(x_i,\gamma_t)$ be the cumulative exit hazard function for employment to unemployment transitions in year t.[17] Then the probability that person i reports zero weeks unemployed in year t is:

$$P_i(x_i,\beta_t,\gamma_t) = [1 - u_0(x_i,\beta_t)]e^{-\lambda(x_i,\gamma_t)} \quad (3)$$

where $u_0(\cdot)$ is the probability that person i was unemployed in the first week of year t, and the right-hand term is the probability that a person does not enter unemployment during the year (the survivor function). In order to implement equation (3) empirically for the entry hazard, we adopt the proportional hazards specification $\lambda(x_i,\gamma_t) = \exp\{x_i\gamma_t\}$. Given our assumptions, both β_t and γ_t are identified from equations (2) and (3).

We use these estimates to calculate average conditional entry and exit rates from unemployment. The average monthly flow into unemployment in year t is $\lambda(x,\gamma_t)/12$. Given this flow, the evolution of unemployment from year t to $t+1$ is determined by inflows and outflows from unemployment over time:[18]

$$u_0(x_i,\beta_{t+1}) - u_0(x_i,\beta_t) \approx (1 - u(x_i,\beta_t))\lambda(x_i,\gamma_t) - u(x_i,\beta_t)\Omega(x_i,t) \quad (4)$$

where $\Omega(x_i,t)$ is the cumulative exit hazard from unemployment for persons with characteristics x_i in year t. Given $u(\cdot)$ and $\lambda(\cdot)$, this exit rate is determined residually from equation (4).

In practice the parameter vectors β_t and γ_t are estimated from equations (2) and (3) via a two-step procedure. These estimates are then used with equation (4) to calculate average monthly inflow and outflow rates from unemployment. The vector of control variables for these calculations, x, includes indicator variables for ten one-digit industry classifications, seven age categories, four regions, five schooling categories, and interactions of race (black-white) and marital status (married, spouse present, and others).

17. That is, $\lambda(x_i, \gamma_t) = \int_0^T \tilde{\lambda}(x_i, \gamma_t)d\tau$ where $\tilde{\lambda}(\cdot)$ is the conditional probability (density) of entering unemployment.

18. We estimated the initial unemployment rate in each year, $u_0(x_i, \beta_t)$ by multiplying the annual unemployment rates $u(x_i, \beta_t)$ by the ratio of the January aggregate rate to the annual aggregate rate, and then averaging between years t and $t+1$.

Over the eighteen survey years this procedure produces 576 parameter estimates for β alone, so there is no way to conveniently summarize all of the results.[19] Suffice it to say that the main conclusions accompanying table 5 continue to hold. In terms of relative unemployment rates, the increase in aggregate unemployment is broadly distributed across observable demographic and economic characteristics of workers. One exception worth noting is that the estimates that condition on background characteristics predict a somewhat sharper decline in relative unemployment rates of very young (aged 20–24) workers.

To summarize the overall impact of changes in the distribution of observables, x, as opposed to changes in the environment generating unemployment (β_t and γ_t), table 6 shows actual and predicted unemployment rates and labor force flows over the 1968–1985 period. In order to "fix" the observables, x, for these calculations, the predicted values by year are generated by using the 1977 CPS sample, so that the full joint distribution of the observables in that year is preserved. This procedure is necessary because the model is nonlinear.[20] Using this procedure, we estimate that if the distribution of observable characteristics in 1977 had held throughout the sample period, the aggregate unemployment rate would have been about 10 percent higher, on average, in the years from 1968 to 1973, and about five percent higher from 1974 to 1976. As a

19. Tables reporting all the parameter estimates are available from the authors on request.
20. Since $u(x_i,\beta_t)$ is convex in x, simply evaluating the model at sample means (or any fixed vector of characteristics) will understate the unemployment rate in any year.

Table 6 ESTIMATED UNEMPLOYMENT RATES AND TRANSITION PROBABILITIES, SURVEY YEARS 1968–1985 (Percent)

	1968–70	*1971–73*	*1974–76*	*1977–79*	*1980–82*	*1983–85*
Sample	2.1	3.8	4.2	4.7	4.8	6.3
Fixed x = 1977	2.3 (.043)	4.2 (.055)	4.4 (.055)	4.6 (.049)	4.7 (.047)	6.4 (.061)
Entry Rate	.5417	.7950	.8283	.8292	.9450	1.0800
Exit Rate	25.40	19.76	18.58	17.32	17.45	16.88
Entry Rate Fixed x	.6000 (.014)	.8750 (.016)	.8583 (.014)	.9000 (.016)	.9583 (.013)	1.1500 (.016)
Exit Rate Fixed x	25.2	20.0	19.6	18.1	18.2	17.6

Note: Entry and exit rates are average monthly probabilities of transiting between employment and unemployment. See text for definitions of terms. Asymptotic standard errors in parentheses.

result, we estimate that about half of the increase in unemployment between 1971–1973 and 1980–1982 is accounted for by changes in observable characteristics of workers.[21] This adjustment had only a small impact on measured unemployment in the 1980s, however. If anything, our estimates imply that changes in worker characteristics have slightly attenuated the rise in unemployment during the 1980s.

3.1. HETEROGENEITY AND THE DISTRIBUTION OF UNEMPLOYMENT

Our previous tabulations, and virtually all previous studies of the determinants of unemployment, show that observable characteristics have significant power in predicting cross-sectional differences in unemployment rates. Thus, the unemployed at any one time are "different" than the employed, but how different are they? The procedure underlying the estimates in table 6 allows us to evaluate differences in unemployment probabilities and transition rates for different groups in the population. Specifically, we compare the unemployment prospects of persons with the characteristics of the unemployed population in each year to the unemployment prospects of the representative person. For example, consider the average entry rates into unemployment in year t for the populations of employed and unemployed individuals. These are weighted averages of estimated individual entry rates, using the probabilities of employment and unemployment as weights:

$$\lambda_{et} = \frac{\sum_{i=1}^{N_t} [1 - u(x_{it}\hat{\beta}_t)]\lambda(x_{it}\hat{\gamma}_t)}{\sum_{i=1}^{N_t} 1 - u(x_{it}\hat{\beta}_t)}, \quad (5)$$

$$\lambda_{ut} = \frac{\sum_{i=1}^{N_t} u(x_{it}\hat{\beta}_t)\lambda(x_{it}\hat{\gamma}_t)}{\sum_{i=1}^{N_t} u(x_{it}\hat{\beta}_t)}, \quad (6)$$

where N_t is sample size in year t. The sample average entry rate then satisfies $\lambda_t = u_t\lambda_{ut} + (1 - u_t)\lambda_{et}$, where u_t is the sample unemployment

21. The main components affecting these calculations are changes in the age distribution of workers (the baby boom) and changes in years of completed schooling.

rate in year t. If selection on observable characteristics is important in determining the occurrence of spells then $\lambda_{ut} > \lambda_{et}$, that is, the population of unemployed individuals in year t has characteristics that made them more likely to enter unemployment. Smaller differences between λ_{et} and λ_{ut} imply that the occurrence of spells is more evenly distributed, based on observables. Similar calculations hold for the probability of leaving unemployment (currently unemployed persons may have characteristics that are associated with longer spells so they are more likely to be found in unemployment) and for the unemployment rate itself.

These calculations are summarized in table 7. For each calendar year we report the probability of unemployment and the estimated monthly exit and entry rates for both the full population and for the unemployed. It is not surprising that the unemployed population has much higher unemployment probabilities than the population as a whole. That is why they are observed unemployed, and the difference summarizes the predictive content of the model. More interesting is that virtually all of the *cross-sectional* differences in unemployment rates are accounted for by differences in probabilities of entering unemployment.[22] On average over these years, the observed characteristics of the unemployed make them nearly twice as likely as a representative person to enter unemployment. Heterogeneity also implies a lower exit rate from unemployment for the population experiencing unemployment, but the estimates show that this difference is only slight (7 percent, on average). Thus, on average, about 90 percent of the difference in observed unemployment rates is due to differences in probabilities of becoming unemployed, and the rest is due to longer spells.

An interesting and important feature of the estimates in table 7 is that, based on observables, unemployment is now much more broadly based than it was in the past. In the first three years of the data (1967–1969) we estimate that the characteristics of unemployed persons made them 2.5 times more likely to enter unemployment than the population as a whole. This relative entry rate fell steadily, until it averaged only 1.66 in the last three years of the data. On the other margin, the typical unemployed person left unemployment significantly more slowly than would the typical person in 1967–1969, but this gap was largely eliminated by the end of the period. On the whole, the relative unemployment rates for persons with the characteristics of the unemployed fell from 2.76 in 1967–1969 to 1.68 in 1982–1984, a 64-point decline. Again, most of this change in relative unemployment rates is due to changes in

22. See Hall (1971) and Topel (1984) for similar conclusions.

Table 7 ESTIMATED AVERAGE ENTRY AND EXIT RATES FOR UNEMPLOYMENT, 1968–1985

Calendar Year	*Unemployment*			*Entry Rates*			*Exit Rates*		
	Total Population	Unemployment Weighted	Relative	Total Population	Unemployment Weighted	Relative	Total Population	Unemployment Weighted	Relative
1967	.023	.058	2.64	.611	1.466	2.398	28.716	25.124	.875
1968	.021	.057	2.85	.570	1.475	2.586	30.098	26.671	.889
1969	.024	.064	2.78	.689	1.756	2.547	27.848	23.687	.851
1970	.040	.087	2.29	1.043	2.158	2.070	21.833	18.914	.866
1971	.045	.089	2.07	.908	1.792	1.973	20.900	19.615	.939
1972	.039	.087	2.35	.797	1.731	2.172	24.023	21.452	.893
1973	.031	.068	2.27	.732	1.670	2.281	22.466	21.544	.959
1974	.039	.077	2.08	.922	1.830	1.986	16.872	15.571	.923
1975	.061	.107	1.84	1.186	2.189	1.846	17.878	17.598	.984
1976	.055	.103	1.94	1.011	1.891	1.871	18.163	16.937	.933
1977	.046	.087	1.98	.910	1.796	1.974	21.229	20.607	.971
1978	.037	.069	1.92	.779	1.448	1.860	22.421	21.132	.943
1979	.035	.065	1.91	.826	1.506	1.822	21.807	20.370	.934
1980	.051	.089	1.82	1.072	1.888	1.761	17.792	16.811	.945
1981	.055	.097	1.83	1.100	1.926	1.751	18.556	17.478	.942
1982	.077	.116	1.59	1.518	2.361	1.555	16.733	16.135	.964
1983	.066	.104	1.65	1.131	1.832	1.619	18.849	18.300	.971
1984	.051	.088	1.80	.957	1.683	1.759	18.926	18.261	.965

relative probabilities of becoming unemployed, although recall the previous discussion of the importance of long spells.

A cautionary note is in order in interpreting these results. The estimates in table 7 imply that the increase in unemployment has been accompanied by a broadening of its distribution based on observable characteristics of workers. The unemployed are now less statistically distinguishable from the employed population. This means that the secular increase in unemployment has been relatively concentrated among groups who experienced much less unemployment in the past. We have showed that most of the increase in unemployment has been accomplished by an increase in the incidence of very long spells, which is a force in the direction of greater inequality in the distribution of unemployed weeks. In addition, currently unemployed persons are more likely to experience future unemployment[23] than are currently employed persons. Though we have not undertaken a detailed examination of the issue, we think that the increased importance of long spells and positive serial correlation in their occurrence point to much greater inequality in the distribution of unemployment that has accompanied the increase in its overall level.

The estimates in table 7 also provide evidence on the role of heterogeneity in generating the well-known countercyclical pattern of spell durations.[24] If those who enter unemployment during cyclical contractions have lower-than-average escape rates from unemployment, then average spell length will rise during recessions even if all individual escape rates are independent of aggregate demand conditions. Our estimated exit rates for the unemployed show this procyclical pattern. Yet the evidence also shows that the job-finding rate for the employed population is procyclical, and that the relative escape rate for the unemployed population *rises* during periods of high unemployment. Thus, to the extent that selection affects the aggregate data, it is because individuals with higher escape rates from unemployment enter during recessions. This selection dampens the aggregate pattern of spell durations relative to that for a representative worker.

23. As a rough calculation, we examined the relationship between survey week (March) unemployment and unemployment during the previous year. Excluding persons with current spell durations of greater than 10 weeks, which would spill over into the previous year, the frequency of being unemployed in the survey week conditional on some unemployment in the previous year is .122. For those with no prior unemployment the current frequency of unemployment is .017. Whether this correlation is caused by true "occurrence dependence" or by heterogeneity (Borjas and Heckman 1980) is not essential.
24. See Darby, Haltiwanger, and Plant (1985).

4. *Wage Adjustments*

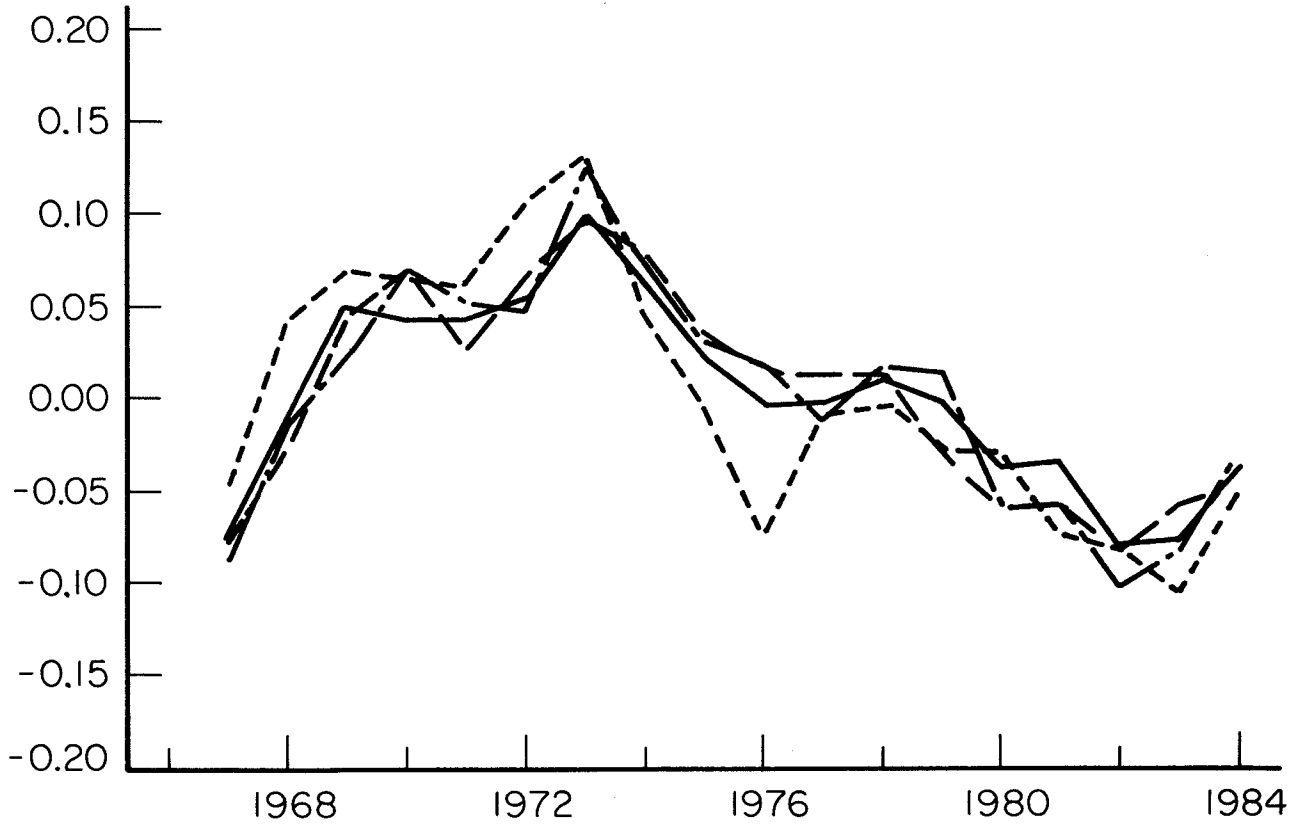
The secular pattern of wage growth over this period roughly mirrors the unemployment data. Controlling for a wide variety of background characteristics, for prime-aged workers real weekly wages grew by about 17 percent between 1967 and their peak in 1973, but real wage growth has been sluggish or negative since that time. On average, real wages in 1984 were about 8 percent below their 1973 level. Like the previously tabulated fluctuations in unemployment, these adjustments are remarkably neutral across sectors of the economy.

To illustrate these points, we estimated (log) weekly earnings models by least squares for each year of our data, conditioning on the same vector of industry and demographic controls used in the unemployment models above, plus age-industry interactions that allow profiles to shift within industry. Real weekly wages for each year were obtained using the GNP price deflator for consumption expenditures.[25] Figures 3 and 4 summarize the basic story. We plotted fitted values of log weekly wages for illustrative age and industry categories, expressed as deviations from category means. For these calculations, we held other background characteristics fixed at their full sample mean values. Thus in 1967 the real weekly wages of prime-aged (35–49) men with average characteristics were about 9.0 percent below their period mean (figure 3c). Wages grew by about 3 percent annually through 1973, but declined sharply in both the recessions of 1974–1975 and 1982–1983. In fact, real wages fell in every year between 1977 and 1983, and the total decline amounted to about 9 percent among prime-aged men.[26] The decline is significantly larger for younger men.

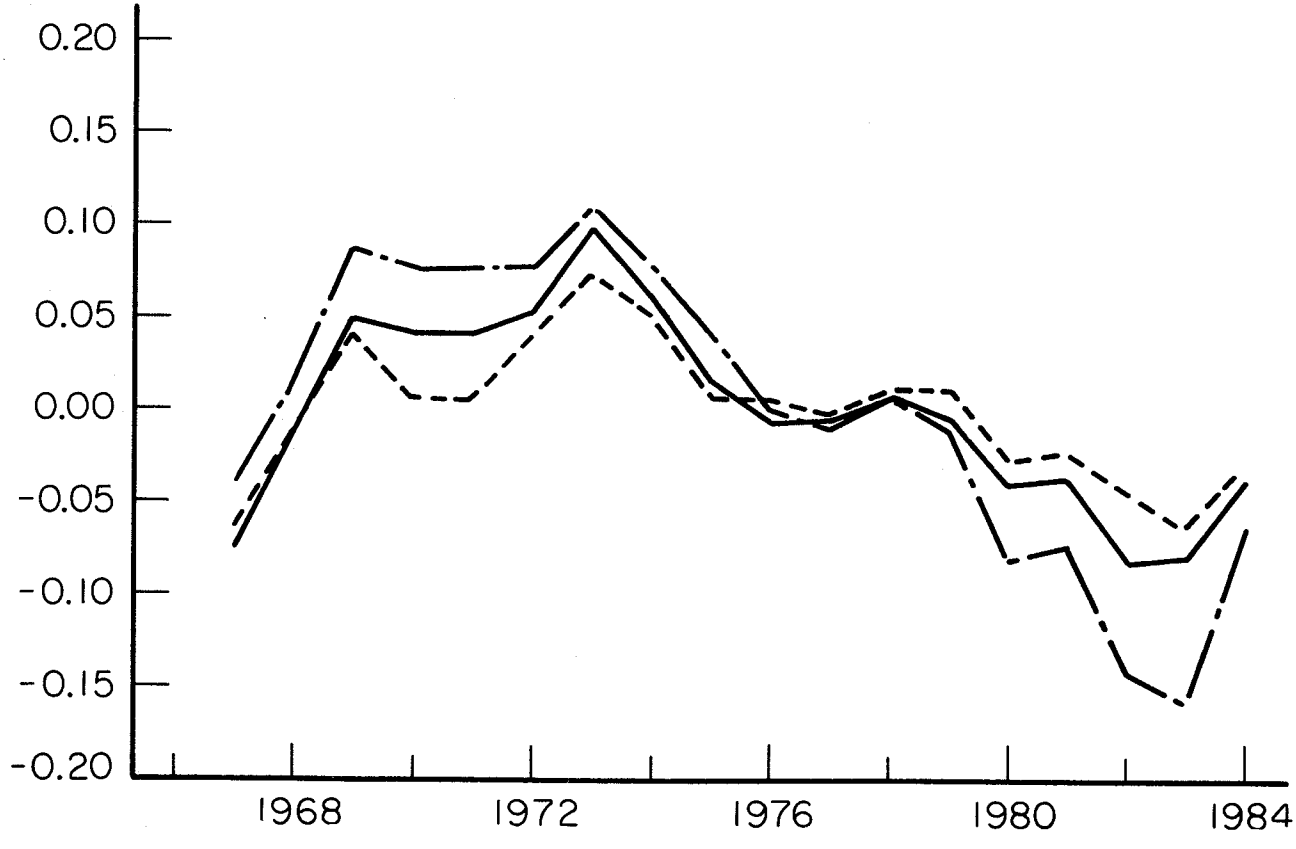
One important feature of the wage data is the close correspondence of wage adjustments among industries. Wage fluctuations have been largely neutral among sectors of the economy. Figure 3 illustrates this point for selected one-digit industries, and the result also holds at lower levels of industry aggregation.[27] In fact, experienced workers in durable goods manufacturing—the prototypical declining sector—have fared

25. Estimates using the CPI as a deflator showed even greater wage reductions after 1973. This is because the CPI gives excessive weight to housing costs, which rose dramatically in the latter part of the data.
26. Our estimates do not account for potential growth in the value of nonwage compensation, which may partially offset the wage decline illustrated here.
27. We have estimated corresponding wage models with simple shifters for 48 two-digit industries. The between-year correlation between these industry effects is .85 or higher at all lags, indicating that the relative industry wage distribution has been extremely stable over time. For related evidence see Murphy and Topel (1986), Krueger and Summers (1986), or Dickens and Katz (1986).

Figure 3 TIME-SERIES ADJUSTMENTS OF WEEKLY WAGES, 1967–84 (DEVIATIONS FROM WITHIN-INDUSTRY MEAN).

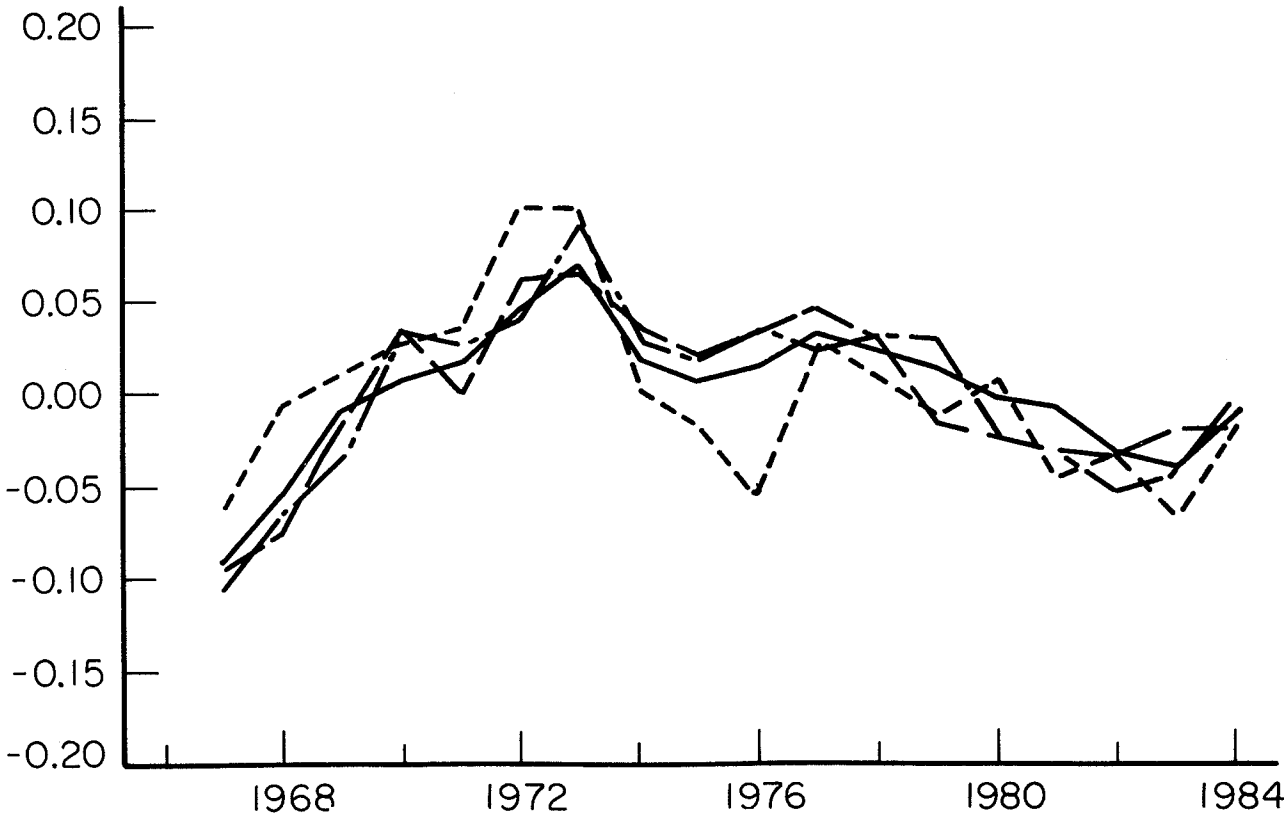


AGES 30–34; SERVICES, PROFESSIONALS, AND GOVERNMENT



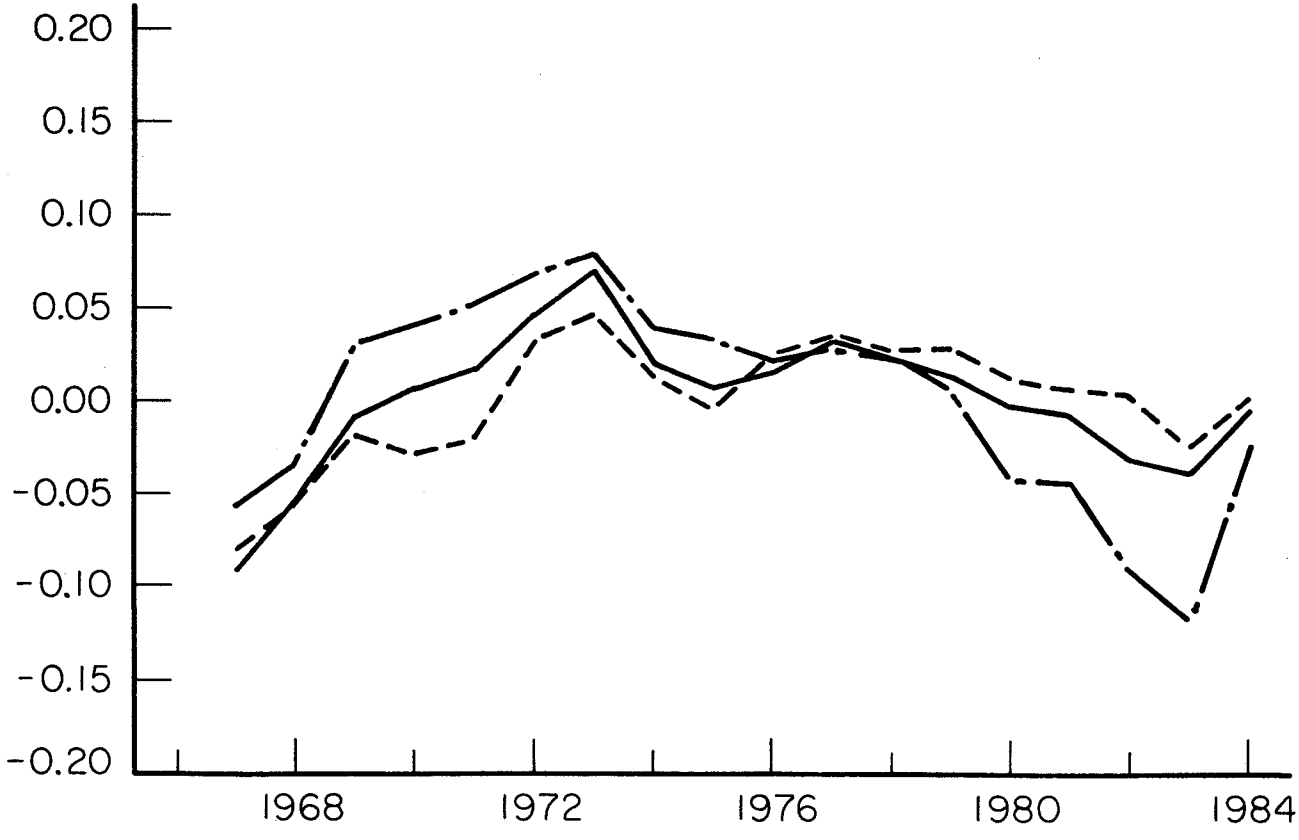
AGES 30–34; DURABLES AND RETAIL

(B) Key: _____ All industries; - - - - - Durable goods; .-.-.-.-.-. Retail trade.



AGES 35–49; SERVICES, PROFESSIONALS, AND GOVERNMENT

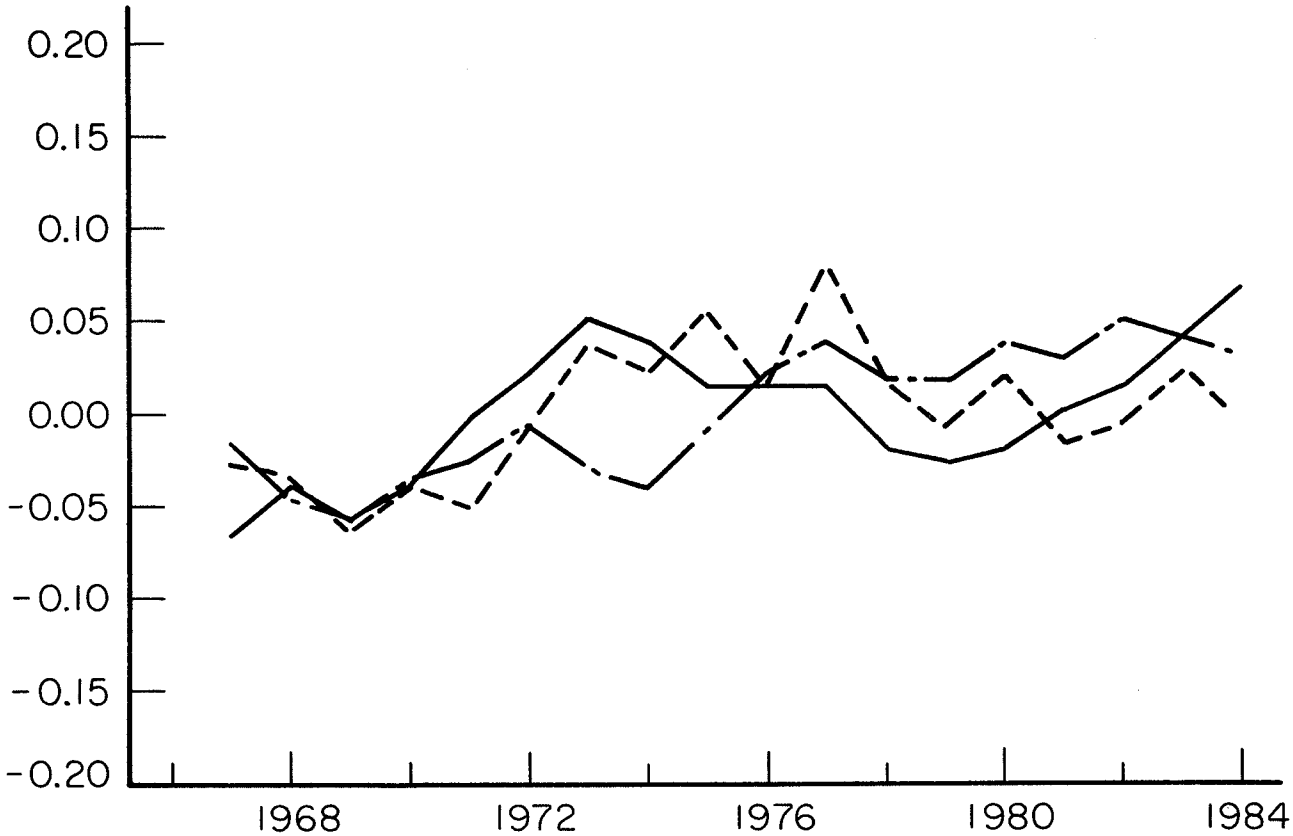
(C) Key: _____ All industries; - - - - - Services; .-.-.-.-.-. Professionals; — — — — — Government.



AGES 35–49; DURABLES AND RETAIL

(D) Key: _____ All industries; - - - - - Durable goods; .-.-.-.-.-. Retail trade.

Figure 4 TIME-SERIES ADJUSTMENTS IN RELATIVE WAGES: SELECTED AGE GROUPS, 1967–1984



Legend: _____ (35–49) − (20–24) - - - - - (35–49) − (25–29) .-.-.-.-.-. (35–49) − (30–34)

Note: The figures in the diagram represent $(w_{it} - w_j) - (w_{it} - w_j)$ where w_{jt} refers to predicted log weekly wages in age group j.

slightly (but only slightly) better than others during the 1980s, while the expansion of employment in retail trade has been accompanied by the largest wage reductions in the data. It is not easy to argue that these wage and employment changes are demand-driven.

Though we offer no formal test, we have seen nothing in the data suggesting that wage rigidities in particular sectors play an important role in rationalizing the trend toward higher aggregate unemployment. Wages fell substantially over the period. Sectors where wages are traditionally thought to be inflexible—unionized sectors such as manufacturing, for example—have not experienced greater amounts of unemployment or significantly different adjustments in real wages. Thus there is nothing here or in previous tabulations that points to labor market "segmentation" as an important force generating unemployment (Summers 1986). Relative wage adjustments have been very similar in "high" (manufacturing, construction) and "low" (retail trade, services) wage sectors, and the previously tabulated data on unemployment duration does not indicate a greater propensity to queue for jobs in high-wage industries. Changes in durations were also roughly sector-neutral.

The one anomaly is for very young workers. We showed in table 5 that relative unemployment rates for young men (aged 20–24) have fallen since the mid-1970s. One would expect rising relative wages as well, especially if the unemployment data are driven by changes in cohort size. In fact their relative earnings have fallen (see figure 4). Greater wage flexibility for young workers is a possible explanation, but so is the large decline in the real minimum wage over this period.

5. *Job Mobility, Sectoral Mobility, and Unemployment*

In most of its forms, the natural rate hypothesis of Friedman (1968) and others is intimately related to the process of labor reallocation in a dynamic economy. For example, in Lucas and Prescott's (1974) model of equilibrium search, specific productivity shocks affect the decisions of workers who are located on informationally distinct "islands." If the expected return to search exceeds the value of remaining on the current job, that job (efficiently) ends in unemployment. If these shocks are independently and identically distributed among a large number of such islands, then they will "average out" across markets (Lucas 1977) and the value of search and the unemployment rate will be constant in labor market equilibrium.

It is not hard to envision a model in which the stochastic structure that yields a constant natural rate is violated, but the principle of equilibrium unemployment is not. The key idea underlying equilibrium unemploy-

ment is the costly reallocation of the labor force to higher-valued activities, and some periods may require more reallocation than others. Thus the natural rate need not be constant (for example, Black 1982). This extension of the natural rate hypothesis led Lilien (1982) to examine the time-series relationship between changes in the sectoral composition of the labor force and the aggregate unemployment rate. Briefly, he found that periods of greater dispersion among industries in rates of employment growth are strongly associated with periods of high unemployment. Lilien's interpretation of this evidence is that "most of the unemployment fluctuations of the seventies were induced by unusual structural shifts within the U.S. economy."[28]

This is an attractive and innovative model of unemployment for several reasons, not the least of which is that it generates a testable (but untested) hypothesis: (some) fluctuations in unemployment are associated with demand shifts that require labor to move among sectors. The key criticism of the time-series evidence is that business cycles are known to be nonneutral across sectors (Mitchell 1941; Abraham and Katz 1986; Topel and Weiss 1986). Thus heterogeneity of annual employment growth rates across industries may merely reflect the particular incidence of cyclical demand changes across sectors, with no implications at all for sectoral reallocation of workers or changes in the natural rate. Further, a point that seems to have been missed is that this identification problem is virtually irresolvable in aggregate time-series data. The key implications of the theory refer to the incidence of unemployment as a consequence of sectoral mobility of labor, which is not recorded in published series. To us, the only valid tests of the theory require microdata on individuals' unemployment spells and mobility decisions.

There is no denying that sectoral mobility as a means of labor force reallocation was important during the 1970s. Table 8 reports industry distributions of employment for various labor market entry cohorts at five-year intervals since 1969. These estimates are based on each CPS respondent's reported industry of "longest job" during the indicated calendar year, so they are largely insensitive to short-term fluctuations in industry employment. "Entry cohort" refers to individuals who had reached their twentieth birthday on or before the indicated year. Thus the 1970 cohort turned 20 between 1965 and 1970. Reading down a column of the table shows changes over time in the proportion of workers from a given cohort who work in a particular industry. Reading across a diagonal holds age constant. The column labeled "total" shows the per-

28. For complementary evidence see Davis (1986).

Table 8 INDUSTRY DISTRIBUTIONS OF EMPLOYMENT BY ENTRY COHORT AND YEAR: PRIME-AGED MALES

	Entry Cohort												
Year	1930	1935	1940	1945	1950	1955	1960	1965	1970	1975	1980	1985	Total
							Durable Goods						
1970	25.9	29.2	31.6	30.6	30.2	30.5	29.7	32.0	30.4				30.3
1975		26.8	30.8	27.7	27.5	27.0	25.6	26.0	24.9	26.1			26.6
1980			25.9	27.1	26.2	25.5	24.8	24.0	21.8	22.8	22.4		24.0
1985				22.9	25.1	24.3	22.4	23.6	22.7	21.7	19.7	17.9	21.8
							Nondurable Goods						
1970	17.5	16.4	15.4	15.0	15.1	15.2	15.4	15.7	15.4				15.5
1975		14.9	15.5	15.1	14.7	13.3	16.8	13.3	12.6	13.2			14.2
1980			14.7	15.7	13.6	13.3	12.9	13.4	12.9	10.3	11.3		12.7
1985				13.0	12.6	15.1	12.6	13.4	11.4	10.8	10.4	11.1	11.9
							Service						
1970	5.7	5.4	5.1	6.0	5.6	6.0	6.0	5.1	5.9				5.6
1975		5.2	4.2	5.2	5.1	5.5	5.5	5.8	6.1	6.3			5.5
1980			6.6	5.7	6.3	6.3	6.5	7.1	6.9	7.5	8.4		6.9
1985				7.4	7.5	5.7	8.2	7.3	7.9	8.3	10.7	11.1	8.6
							Retail						
1970	13.6	11.6	12.2	11.5	10.5	11.0	11.5	11.8	14.8				11.8
1975		11.9	9.9	10.8	12.2	11.6	10.6	11.8	13.7	18.9			12.6
1980			13.4	10.1	11.3	10.0	11.2	11.7	12.9	15.4	19.7		13.3
1985				12.9	10.4	11.0	9.9	10.7	11.9	13.4	15.6	24.1	13.8

						Wholesale						
1970	5.6	5.1	5.9	5.5	5.9	5.2	5.1	5.4	4.2			5.3
1975		7.8	6.8	6.5	6.0	6.2	6.4	7.0	6.9	4.9		6.4
1980			6.3	6.7	5.7	6.9	6.7	6.8	6.3	6.4	5.5	6.3
1985				8.7	7.6	6.7	6.9	7.7	6.7	7.1	6.6	5.6	6.9
						Construction						
1970	8.3	10.5	9.2	9.7	11.4	10.9	10.1	9.3	11.4			10.2
1975		7.7	9.1	10.4	10.0	10.4	10.7	11.9	12.0	13.9		11.0
1980			9.1	8.8	9.9	10.6	10.9	9.9	10.8	13.7	15.2	11.5
1985				7.5	10.3	9.8	10.6	9.6	9.3	11.7	12.8	14.9	11.2
						Fire and Professional						
1970	12.5	8.9	9.4	8.9	9.0	9.6	10.3	10.4	8.1			9.6
1975		13.9	10.8	11.0	11.7	13.5	11.4	12.5	12.8	7.6		11.6
1980			13.2	12.4	12.9	12.1	13.6	13.0	14.6	11.3	7.2	12.1
1985				18.0	14.2	14.4	14.6	13.9	15.6	13.9	12.2	7.2	13.4
						Mining						
1970	1.14	1.76	1.48	1.57	1.54	.84	1.25	1.43	1.19			1.4
1975		2.54	1.93	1.74	2.05	1.62	1.92	1.05	1.68	1.90		1.8
1980			1.77	2.72	2.28	2.79	2.71	2.41	2.48	3.02	3.17	2.7
1985				2.43	2.04	1.93	2.41	2.19	2.32	2.89	2.93	2.31	2.5
						Transportation, Communications, Utilities						
1970	9.7	11.2	9.9	11.2	10.7	10.8	10.7	8.8	8.6			10.2
1975		9.2	10.9	11.5	10.7	10.7	11.3	10.7	9.2	7.3		10.1
1980			9.1	10.9	11.8	12.6	10.7	11.7	11.3	9.6	7.2	10.4
1985				7.0	10.4	11.2	12.4	11.6	12.1	10.3	9.1	5.8	10.1

Note: Entries in each column show the percent distribution of employment across industries for an entry cohort in the indicated year. Read diagonally across rows to hold age fixed, or down a column to keep cohort fixed.

centage of all workers who were employed in the indicated industry, by year.

Over the period, manufacturing's share of total employment fell by about 25 percent (12 points). This is well known, as is the fact that the largest relative decline occurred in durable goods. One might object that no major reallocation need be involved with this decline, since the *level* of employment in manufacturing changed only slightly over the period.[29] But reallocation did occur. In 1969, the age distribution of employment in manufacturing industries was remarkably uniform: about 45 percent of each entry cohort was employed there, with two-thirds of this total in durable goods. Then they began to leave. Manufacturing's share fell for every entry cohort, which is clear evidence of outmigration. The largest proportional declines tend to occur among younger workers, for whom the returns to mobility are largest, and the within-cohort direction of mobility is toward sectors that account for growing shares of aggregate employment.

How much mobility was there? Since workers who leave one industry must turn up somewhere else, a convenient measure of net mobility for a cohort is one-half of the sum of the absolute changes in industry shares between survey years. Table 9 reports these rates for cohorts aged 20–44 in 1960 (age 35–59 by the end of the data). The striking fact is that net intersectoral mobility was substantially greater *before* 1975, when unemployment was lowest. This is true for every entry cohort, though reading down a column of table 9 partially reflects the effects of aging. But even holding age constant (read diagonals in table 10 from right to left), net mobility falls. A related point is that these are five-year mobility rates, and they are not very large. Most of the implied job changes would be

29. In 1968, total manufacturing employment was 19.8 million, with 11.6 million in durable goods. By 1986 the corresponding values were 19.2 million and 11.3 million.

Table 9 NET SECTORAL MOBILITY BY AGE COHORT AND YEAR

	Age in 1969					
Years	20–24	25–29	30–34	35–39	40–44	Total
1969–74	9.2	9.0	5.7	6.5	5.0	7.0
1974–79	5.7	4.3	5.1	4.2	3.8	4.5
1979–84	4.1	2.1	4.5	5.0	4.6	4.0

Note: Reported figures are sums of absolute changes in industry shares for the indicated period, times 0.5. Tabulated from March CPS files for 1970, 1975, 1980, and 1985. "Age" refers to individuals who reached the indicated age level in 1969. For example, individuals who were 20–24 years old as of 1969 had a five-year mobility rate of 9.2 percent.

achieved without an intervening spell of unemployment, so their contribution to total unemployment is likely to be extremely small.

A reason for the decline in mobility among experienced workers is the increased supply of mobile young workers that occurred in the 1970s. With an increased relative supply of young workers, sectoral reallocations can be partially achieved by redirecting the flow of new entrants, leaving older workers in place.[30] To illustrate this trend, table 10 reports the employment distributions for recent entrants to the labor force. The shift out of manufacturing among new entrants is much more apparent than in the aggregate data, though they were heavily concentrated there in 1969. The modal career now starts in retail trade, which grew by 63 percent over the period and now accounts for nearly a quarter of all jobs.

Two objections to these tabulations are that they calculate mobility only between broad industry aggregates, and they provide no direct evidence on the relation of mobility to unemployment. To confront these points, we examine the incidence of unemployment among individuals who change industries in the CPS data by comparing industry and occupation "last week" with the same information coded for the previous year. In the March CPS, respondents provide a name, address, and job description for their current (March) job as well as their longest job in the previous calendar year. Before 1970, these questions were answered and coded independently, which resulted in substantial reporting and coding error. Estimated transitions based on these data result in many spurious moves. Since 1970, after providing current (or last) job information,

30. Mobile young workers will arbitrage wage differentials across sectors that arise due to demand shifts. This arbitrage reduces the returns to mobility for older workers.

Table 10 INDUSTRY ATTACHMENT OF RECENT ENTRANTS TO THE LABOR FORCE, SELECTED YEARS, 1969–1984

	1969	*1974*	*1979*	*1984*
Durable goods	30.4	26.1	22.4	17.9
Nondurable goods	15.4	13.2	11.3	11.1
Services	5.9	6.3	8.4	11.1
Retail trade	14.8	18.9	19.7	24.1
Wholesale trade	4.2	4.9	5.5	5.6
Construction	11.4	13.9	15.2	14.9
FIRE	8.1	7.6	7.2	7.2
Mining	1.2	1.9	3.2	2.3
Transportation, communications, utilities	8.6	7.3	7.2	5.8

Note: See notes to Table 8.

respondents are asked if this job is the same as their longest job in the previous year. If a respondent has not changed jobs, the current employer, industry, and occupation are recoded for the previous year. Thus, since 1970, reported industry changing in the CPS can occur only for individuals who report independently that they have changed employers.

Estimated frequencies of between-industry mobility are shown in table 11, broken down by survey year and for illustrative demographic characteristics. "Changers" are defined to be individuals for whom two-digit industry classification has changed.[31] It is clear from these tabulations that mobility declines with age, and also with skill level as measured by years of schooling. The key point, however, is in the time-series behavior of industry changing. Mobility is strongly procyclical. The periods of sharpest decline in mobility are coincident with the recessions of 1975 and 1983, which represent the peaks of cyclical unemployment in the postwar period. There is a smaller decline in mobility in the 1971 recession. Though we do not report the estimates here, this cyclical pattern also holds across all subcategories of the labor force that we have examined. These estimates also confirm the secular decline in mobility shown above. Between-industry gross mobility actually declined over the period, while aggregate unemployment and spell durations were rising. This surprising fact implies that high unemployment may be a symptom of unusually low mobility of workers, rather than the other way around.

These estimates ignore the incidence of unemployment among industry changers, which could have increased. Table 12 shows the incidence of unemployment by mobility status and year from 1970 to 1985. On average over this period about 15 percent of all workers experienced some unemployment during a year, and this proportion shows the expected cyclical pattern (row 1). Row 2 of the table shows that the incidence of unemployment is significantly higher among industry changers (40 percent), which confirms an important connection between mobility status and unemployment. Unemployment among changers is clearly cyclical, and it tends to rise over the period of the data. But the same pattern occurs among "stayers," and the proportional changes in unemployment are very similar. In fact, the share of total unemployment due to industry changing declines over the period *and* during each recession. This is the opposite of what sectoral reallocation theories predict.

31. These tabulations will understate annual mobility rates because the survey question refers to the longest job held in the previous calendar year. Thus, for example, if a transition to the current job occurred before midyear, it will not appear in the data. This feature of the data does not affect our inferences about the time-series behavior of mobility, or its connection to unemployment.

Table 11 SECTORAL MOBILITY OF EXPERIENCED WORKERS: MALE WORKERS 1970–1985 (Percent)

A. By Survey Year

	Total	*1970*	*1971*	*1972*	*1973*	*1974*	*1975*	*1976*	*1977*	*1978*	*1979*	*1980*	*1981*	*1982*	*1983*	*1984*	*1985*
Aggregate	8.53	9.39	9.32	8.52	10.06	10.71	10.59	6.42	7.73	8.18	8.50	8.45	8.03	8.37	6.77	7.75	7.62

B. By Age and Education

Age			Education		
20–24	*25–29*	*35–49*	*8–11*	*12*	*16+*
16.62	10.69	5.82	8.85	8.16	6.96

Note: Reported figures are proportions (percent) of the indicated group who report that (i) the current employer is different than the employer for the longest job "last year" and (ii) the two-digit industry codes for the two jobs are different.

Table 12 SECTORAL MOBILITY AND UNEMPLOYMENT: PRIME-AGED MALE WORKERS, SURVEY YEARS 1968–1985

	Total	*1970*	*1971*	*1972*	*1973*	*1974*	*1975*	*1976*	*1977*	*1978*	*1979*	*1980*	*1981*	*1982*	*1983*	*1984*	*1985*
(1) Aggregate incidence of unemployment	14.7	9.2	13.2	13.8	12.3	10.6	13.2	17.2	16.5	15.1	13.0	13.1	16.0	17.1	20.4	17.7	14.8
(2) Incidence among movers	39.6	25.5	37.6	38.3	33.0	29.2	32.1	48.7	46.0	42.9	34.7	35.9	43.6	47.5	52.2	47.5	39.1
(3) Incidence among stayers	12.4	7.6	10.7	11.5	10.0	8.3	11.0	15.0	14.0	12.6	10.9	10.9	13.5	14.2	18.0	15.1	12.8
(4) Fraction of unemployment due to movers	24.2	25.8	26.6	23.7	27.1	29.6	25.7	19.6	23.2	25.1	24.6	25.1	23.7	25.1	18.7	22.5	21.7
(5) Unemployment due to movers	3.3	2.4	3.5	3.3	3.3	3.1	3.4	3.1	3.6	3.5	3.0	3.0	3.5	4.0	3.5	3.7	3.0
(6) Unemployment due to stayers	11.4	6.9	9.7	10.5	9.0	7.4	9.9	14.1	13.0	11.6	10.0	10.1	12.5	13.1	16.9	14.0	11.9

Note: Row 1 is the sample proportion with positive unemployed weeks in the previous calendar year. Rows 2 and 3 are the proportions of movers and stayers with positive weeks. Row 5 is Row 2 times the aggregate mobility rate, and Row 6 is Row 3 times (1 − the aggregate mobility rate).

The key result is in row 5 of table 12. Overall, our tabulations imply that movers account for only 3.3 percentage points (24 percent) of the total incidence of unemployment in these data. What is more important, the contribution of industry changers to total unemployment is virtually constant over the post-1970 period. Unemployment due to industry changers ranges only from 2.4 to 4.0 percent, and this component shows no prominent cyclical pattern. Variations in unemployment are overwhelmingly accounted for by nonmovers. Thus, if interindustry job changes are contributors to the natural rate of unemployment, the evidence in table 12 is surprisingly consistent with a *constant* natural rate. It is surprisingly inconsistent with the hypothesis of a changing natural rate driven by large and sudden structural shifts in the sectoral demand for labor.[32]

5.1 ARE SECTORAL SHOCKS IMPORTANT?

These conclusions regarding the role of mobility do not rule out sectoral demand shocks as factors affecting aggregate unemployment. But in conjunction with the preceding neutrality results they imply that demand spillover effects between sectors would have to be very large and rapid. These effects are impossible to identify in aggregate time series. Changes in the geographic distribution of unemployment offer additional leverage, since industry shares of aggregate employment vary widely among regions. For example, the share of durable goods manufacturing ranges from .35 in Michigan and Wisconsin down to .11 in the Mountain states. Two-digit shares display even greater variation. With spillover effects, an industry-specific shock to labor demand will generate an increase in unemployment in other industries as well, and the magnitude of these effects will depend on the degree of local specialization in the affected industry. To test for these effects, we estimated the following model of state by industry unemployment over the eighteen years of our data:

$$u_{st} = \alpha_s + \gamma_t + \sum_j \beta_j k_{sj} u_{jt} + v_{st}$$

$$u_{ist} = \alpha_{is} + \gamma_{it} + \sum_j \beta_{ij} k_{sj} u_{it} + v_{ist}$$

32. The picture is no different at the industry level of aggregation. For example, we estimate that workers leaving durable goods manufacturing contribute only 2.9 points of the 14.4 percent average incidence of unemployment in the industry. There is no trend to this rate and only a minor cyclical pattern. Similar conclusions apply to other sectors of the economy.

where i and j index one-digit industries, u_{ist} is the unemployment rate in industry i, state s, in year t, u_{jt} is aggregate unemployment in industry j, and u_{st} is state unemployment. State-by-industry employment shares, k_{sj}, are calculated over the entire eighteen-year period. Since the models contain state and year effects for each industry, the parameters β_{ij} measure spillover effects of a predicted increase in industry j's contribution to state unemployment (based on aggregate unemployment in that industry and the state's industry share) on the unemployment rate in industry i. β_j measures this effect on total state unemployment. We summarize the results in table 13.

Our key finding is that the only industry generating spillover effects in the cross-section is manufacturing. To illustrate this finding, we report estimates of β_{ij} for manufacturing both with and without predicted unemployment rates for other industries in the model. We also report probability values for F-tests of the exclusion of all other industries. The estimates imply that each predicted point increase in state unemployment generated by manufacturing increases actual state unemployment by 2.06 points (row 1). Thus an extra unemployed person in manufacturing takes one nonmanufacturing worker with him. This estimate is insensitive to the inclusion of other industries in the model, and we cannot reject the hypothesis that these effects are jointly zero at any conventional significance level. The partial R^2 for this regression (conditioning on state and year effects) is .18, which is the proportion of the time-series variation in the distribution of state unemployment rates that is explained by the performance of aggregate manufacturing and state-specific shares alone.

The industry-specific estimates show how this effect is distributed. A predicted one-point increase in state unemployment that is generated by manufacturing has its strongest spillover effect on the demand for construction workers, raising their unemployment rate by 3.5 points. These manufacturing-generated spillover effects are important for all groups except professionals, and again we cannot reject the exclusion of other industry effects in any model. Weighting the industry-specific effects by employment shares and summing across industries yields the estimated total effect on unemployment shown at the bottom of the table, which is very close to the corresponding estimate in row 1.

The last part of table 13 shows predicted and actual deviations of regional unemployment from the national average for the New England and North Central regions. We chose these regions because they represent the largest relative shifts in regional unemployment in our data. As the table illustrates, relative changes in unemployment in the North Central region are closely related to the aggregate performance of manufac-

Table 13 ESTIMATED SPILLOVER EFFECTS OF MANUFACTURING UNEMPLOYMENT, 19 CPS STATES, 1968–1985
(Standard errors in parentheses)

	Model contains		
	(1) Manufacturing only	*(2) Manufacturing and all others*	*(3) P*
Overall	2.06	2.10	.30
	(0.25)	(0.27)	
Construction	3.51	3.18	.18
	(0.76)	(0.80)	
Durables	2.85	3.14	.14
	(0.42)	(0.44)	
Nondurables	0.99	1.24	.39
	(0.41)	(0.43)	
Wholesale trade	1.21	1.39	.09
	(0.43)	(0.45)	
Retail trade	1.61	1.54	.86
	(0.41)	(0.44)	
FIRE	0.89	0.65	.43
	(0.46)	(0.49)	
Services	2.44	2.40	.34
	(0.57)	(0.60)	
Professional	−0.12	−0.11	.66
	(0.28)	(0.30)	
Government	0.78	1.03	.38
	(0.31)	(0.33)	
Share weighted sum of effects:	2.04	2.00	

	Predicted and actual deviations of regional unemployment from aggregate unemployment, 1968–1985					
	1968–70	*1971–73*	*1974–76*	*1977–79*	*1980–82*	*1983–85*
North Central						
Actual	−.004	.010	.004	−.006	.019	.018
Predicted	−.003	.008	.005	−.000	.015	.016
New England						
Actual	−.013	.015	.009	.012	−.013	.000
Predicted	−.008	−.003	−.002	−.000	−.005	−.001

Note: Estimates refer to the effect β_{im} of an increase in the predicted manufacturing component of state s unemployment ($k_{sm}u_{mt}$). Column 1 reports the restricted model that contains manufacturing only. Column 2 reports the manufacturing effect from the unrestricted model. Column 3 reports the probability level for an F-test of the hypothesis that all nonmanufacturing effects are zero. The data refer to 19 state aggregates that are identified in the CPS prior to 1976. These aggregates were maintained in the post-1976 data.

turing. In contrast, the model does not track the full relative cycle in unemployment rates in New England at all, though the employment shares of manufacturing for the two regions are similar.

We conclude from the evidence in table 13 that sectoral shocks, coupled with strong spillover effects, may play some role in generating roughly coincident shifts in unemployment among sectors. Such localized effects have had an important impact on the regional distribution of unemployment. But given the strong neutrality in the timing and degree of aggregate unemployment and wage fluctuations among sectors, we doubt that sectoral shocks can be the main factor in generating the secular increase in aggregate unemployment.

6. *Conclusions and Directions for Future Research*

One might argue that the results in this paper raise more questions than they answer. Our view is that we have documented the "facts" that theory must accommodate. Focusing on strongly attached prime-age workers we find that the well-known increase in aggregate unemployment has been largely neutral among identifiable categorizations of the labor force, including all major industries, regions, and demographic groups. In addition to this broad-based neutrality, any theory of the evolution of unemployment over this period must confront the following facts:

1. In an accounting sense, higher unemployment rates have been generated by both more frequent and longer unemployment spells. Higher entry rates into unemployment account for between one-half and two-thirds of the increase, so increased labor turnover has played an important role in generating higher unemployment.

2. Nevertheless, long stretches of joblessness are the prime component of higher unemployment. Nearly two-thirds of the increase in unemployment since the early 1970s is attributable to an increase in the number of persons who report more than six months of unemployment in a calendar year. More than 90 percent is due to persons who are unemployed for 15 weeks or more.

3. Aggregate patterns of real-wage growth and unemployment are closely related. Wages are procyclical, and periods of rising unemployment in the recent past are also characterized by sluggish or negative real-wage growth. Relative wage adjustments among major industries have not been important. There is no obvious evidence of wage rigidities that are concentrated in particular sectors of the economy.

4. The increase in unemployment has been associated with a decline in both gross and net intersectoral mobility. Most fluctuations in unem-

ployment are accounted for by persons who do not report a change of industry. Nevertheless, sectoral shocks and associated spillover effects have played some role, at least in shifting the geographic distribution of unemployment.

The decline in sectoral mobility and the sharp increase in the number of long unemployment spells point to either a decline in the cost of unemployment or worsening alternatives as key factors. It appears that rising unemployment is a symptom of increased immobility of labor rather than fluctuations in the pace of labor reallocation. In order for a frictional theory of unemployment to apply to the United States experience, the amount of "friction" associated with a given amount of reallocation must have increased. Our opinion is that only a substantially revised view of "sectoral shifts" or other frictional unemployment theories can explain the data.

One such revision emphasizes spillover effects in demand that emanate from particular industries experiencing sectoral shocks. If these effects are large and rapid, then apparent aggregate neutrality could be supported. Our evidence is that the only candidate industry generating these effects is manufacturing. Yet it is difficult to argue that these cross-sectional spillover effects carry over to the behavior of aggregate time-series data, especially given the similarity among sectors in the timing and degree of unemployment fluctuations and the minor role of inter-industry mobility in generating unemployment.

Alternatively, the basic neutrality of the increase in unemployment makes aggregate factors that impact all sectors of the economy attractive. The widely documented increase in labor force participation among women, especially married women, would seem a prime candidate. With greater levels of female participation, increasing numbers of unemployed men are in households with working wives. The presence of an employed spouse may lead to longer-spell durations, since the wife's income may moderate the liquidity effects of long stretches of unemployment, and substitution within the household may increase the value of men's home time. Geographic mobility to obtain new employment is also more costly when both spouses participate.

Table 14 evaluates this idea. We report unemployment rates for married men with wives who participate in the labor force and married men whose wives do not participate. There is no evidence that wives' participation decisions increase unemployment of husbands. We have also examined the importance of long spells for married men, and the conclusion is the same: married men with working wives do not have longer or more frequent unemployment spells.

Increased participation in the labor market by women and others

could affect aggregate unemployment through marketwide effects rather than through individual household decisions. In addition to the increased participation among women, the very large entry cohorts of young workers that occurred in the 1970s have had a large impact on labor supply. Based on career patterns of job changing, these groups have weak job or industry attachments relative to experienced workers.[33] They are more mobile, and yet they are the group with whom the unemployed, or any prospective job changers, must compete for new job opportunities. Thus, optimal mobility decisions imply that experienced workers would be less likely to change jobs and sacrifice their specific capital or seniority because of the wage arbitrage offered by the large stock of inexperienced, and hence mobile, new workers. Returns to mobility decline for both employed and unemployed workers, who are more willing to wait for improved prospects in their current occupations. The incidence of unemployment and the length of spells both increase, while aggregate mobility declines. These changes are the major features of the data, and they are sector-neutral. They are also consistent with the decline in unemployment among women and recent entrants relative to experienced men. Nevertheless, we offer no independent evidence in favor of this model, so it must be regarded as speculative at this point.

In our opinion models that explain declining mobility and an increased willingness of workers to wait for rehire in their former jobs or industries

33. See Hall (1982) or Topel (1986).

Table 14 UNEMPLOYMENT RATES OF MARRIED MEN BY SPOUSE'S EMPLOYMENT STATUS

Year	*Employed wife*	*Nonworking wife*
1976	3.8	3.8
1977	3.1	3.5
1978	2.4	2.7
1979	2.4	2.6
1980	3.7	3.9
1981	3.8	3.9
1982	5.6	5.8
1983	5.7	5.8
1984	3.9	4.4
1985	3.6	4.1

Source: Labor Force Statistics Calculated from the Current Population Survey: A Data Book (Washington, D.C.: U.S. Bureau of the Census, 1983); *Monthly Labor Report*, various issues.

have the greatest potential for interpreting the data. Specific human capital accumulation is central to these models. Specific capital models also provide an interesting insight into the "asymmetry" observation that the unemployment rate persists at high levels following aggregate shocks. If aggregate shocks generating unemployment reduce the average amount of specific capital in the labor force, as they must if unemployed workers are reallocated across employers, then periods of high unemployment are likely to persist provided that the probability of entering unemployment declines substantially with seniority (which previous studies have found to be true).[34] Thus with specific capital, transitory shocks can have persistent effects on aggregate unemployment.

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34. See Abowd and Ashenfelter (1981) or McLaughlin (1986).

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Comments

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Murphy and Topel's article presents a very interesting compilation of facts about the extent and nature of unemployment over the last two decades. Like the recent paper by Summers (1986) it gives us a lot to chew over. Also like Summers, the authors devote far more time and systematic effort to cataloging facts than to their interpretation. Since I agree with most of what Murphy and Topel have to say about the facts I will

comment only briefly on the role of labor force composition in explaining the changes in the unemployment rate over time, the method by which Murphy and Topel estimate their unemployment exit and entry rates and on the relation of real wages and the business cycle. I will leave the discussion of the sectoral shifts hypothesis to David Lilien. Instead I will direct most of my attention to the interpretation of the evidence.

Composition of the Labor Force, Exit and Entry Rates, Real Wages and Unemployment

A quick reading of the text might leave one with a peculiar impression of the importance of changes in labor force composition for explaining increased unemployment. Murphy and Topel briefly note that, comparing the 1971–1973 period with the 1980–1982 period, half the change in the unemployment rate can be attributed to shifts in labor force composition. Since this compares a boom period with a recession period and since attention has been restricted to adult male workers who were employed full time for the previous year, this is phenomenal. A closer examination of table 6, however, takes away much of this surprise. In choosing the 1971–1973 period as their base the authors have picked the period in which the difference between the sample unemployment rates and the "fixed labor force composition unemployment rates" are the largest—more than twice as large as any other period. Comparing the 1968–1970 period with the 1980–1982 period, 89 percent of the change is left unaccounted for after taking labor force composition into account. Comparing 1968–1970 to 1983–1985, less than 3 percent of the change can be attributed to labor force composition. Perhaps there is something odd about the 1971–1973 period or perhaps the estimates for those years are statistical outliers, but the table and the text tell a different story.

A most interesting aspect of this article is the tabulation of estimated unemployment exit and entry rates by year. There are a number of theories with different predictions about how these should vary and the authors have done us a favor in putting these estimates together. But there is one problem with the rates they compute.

They might simply have computed exit and entry rates from reported durations of unemployment. Since it is well known that the duration data in the CPS are suspect, the authors use a method that allows them to estimate it from the reported incidence by unemployment in the current month and the total time spent unemployed in the previous year. The problem is that people's recollection of how long they were unemployed in the previous year is as bad or worse than their memory about the duration of current spells so it is not clear that the authors' estimates

are much better than the ones they would have gotten taking the durations as given or trying to correct for the sorts of errors we know are present. Still, these results are better than nothing. Magnitudes may not be reliable, but I can't think of any reason not to trust the trends the authors document.

There are many very good things about this article, but the analysis of real wages is not one of them. For fifty years the profession has been dealing with the question of the behavior of real wages over the business cycle. Perhaps the best analysis to date is Bils (1985). The analysis in this article is a step back. It ignores the previous literature and most of the problems identified in that literature. The authors are examining changes within one-digit industry classifications, but even within such broad categories it is generally true that more cyclically sensitive industries tend to be the more highly paid. Changes in industrial composition due to other causes such as trade or tastes also complicate the interpretation of the numbers the authors present. Another problem arises because Murphy and Topel are studying only a fraction of the whole work force. During good times adult males experience upgrading—promotion into better and higher-paying jobs. The resulting change in the average wage does not reflect the true change in the cost of labor to firms. While I suspect that the authors are correct that real labor costs have fallen since the mid-seventies, I don't think their estimates contribute much to our knowledge of the magnitude of the changes.

These problems aside, it is not clear what one could conclude. Murphy and Topel say that they see no evidence for the argument that wage rigidities or labor market segmentation have any role to play in explaining the increase in unemployment. It would be equally fair to say that there is no evidence against the argument. Even if we accept that real labor costs have fallen how do we know that they have fallen enough? Even if people are unemployed because they are waiting for jobs in the primary sector their unemployment may end with their taking secondary jobs.

Explanations For the Increase in the Unemployment Rate

What can be made of this wealth of information? The authors consider a number of explanations and dismiss all but two. The first is a decrease in the demand for workers in certain industries with spillovers to other industries. The second, which they prefer, explains the increase as a result of a decrease in the exit rate from unemployment of experienced workers who are willing to wait longer to get their old job back because of a

decline in the wages of job changers or new entrants. The lower wages are a result of the influx of new workers into the labor force.

The problem with this explanation can be seen from a quick analysis of the numbers presented in Murphy and Topel's table 7. My table 1 below shows the expected unemployment rate for the Murphy-Topel sample when we assume that all workers have the same constant exit and entry rates. The formula is $u = n/(n + x)$ where u is the unemployment rate, n is the entry rate and x is the exit rate. If we hold the entry rate constant at its average value for 1967–1969 and allow only the exit rate to increase to the 1980s values we get only a 1.2 percentage point increase in unemployment, which is less than one-half of the change in the unemployment rate over those years. For a complete explanation of the increase we need to explain the change in both entry and exit rates.

Can the decrease in the exit rate explain the increase in the entry rate? To some extent yes, but probably not all of the change that is observed. A large fraction of job changers never experience unemployment. Most of these workers have quit their previous job and waited until they had a new job lined up to do so. A study by Gladstein (1986) shows that at least 14 percent of permanently laid-off workers experience no unemployment in changing jobs. Thus at least some workers are beginning their search for a new job before they lose their old one. Consequently the decrease in the new job finding rate can explain the increase in the rate of entry into unemployment even if the old job separation rate is constant. If x is the new job finding rate (or the rate of exit from unemployment), d is the rate of forced separation from existing employment, m is the number of months people may search for new employment before they

Table 1 UNEMPLOYMENT RATES IMPLIED ASSUMING CONSTANT ENTRY AND EXIT RATES

		Exit rate		
		Average 1967–1969	*Average 1982–1984*	*1984*
		(percent)		
Entry rate	Average 1967–1969	2.11	3.32	3.19
	Average 1982–1984	3.99	6.21	5.97
	1984	3.21	5.00	4.81

Note: Entry and exit rates are computed from Murphy and Topel's Table 7. Unemployment rates computed as $u = n / (n + x)$ where u is the unemployment rate, n the entry rate and x the exit rate.

lose their old job (assuming on-the-job search is as effective as unemployed search), then the rate of entry into unemployment will be $n = d(1-x)^m$. Assuming d and m constant, we can substitute the authors' computed values of n and x from their table 7 into the equation for two different time periods and recover the values of d and m which would be required if changes in the entry rate were to be entirely explained by changes in the exit rate. Doing this for the change between the average values for the late 1960s ($x = .289$ and $n = .00623$) and 1984 ($x = .189$ and $n = .00957$) yields implausible values of a 1.9 percent monthly separation rate and a prelayoff search time of 3.3 months. This would imply that over half those workers displaced or laid off from their jobs are finding employment before their old job terminates. Taking more realistic values of $m = 1$ and $n/d = .8$ in 1984 less than a third of the increase in the entry rate can be explained by the decrease in the new job finding rate.

Is there anything else in the authors' preferred explanation that could account for the increase in the entry rate? If real wages for inexperienced workers are falling, could it be that firms are substituting away from experienced labor? If experienced and inexperienced labor are substitutes and not complements in production and if the wages of experienced workers are rigid for some reason (wage norms, for example) then this could be another explanation. But short of assuming such a market imperfection I do not see how the authors' explanation can be saved.

Of course there may very well be more than one explanation. Murphy and Topel may have a good story for part or all of what is happening with the exit rate. My own feeling is that high unemployment is still primarily a problem of inadequate aggregate demand. But this cannot be the whole story either, since we still see higher entry rates and higher job creation rates—more churning—in the 1980s than the 1960s. This could be due to the increased openness of the U.S. economy, to technological change, or to changes brought on by the major changes in fiscal policy since 1980. Whether it is a permanent change in one behavior of the U.S. economy remains to be seen.

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Comment

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Murphy and Topel set as the objective of their article "to confront various theories of unemployment" with the data. An admirable goal, but as my reading of the article suggests that the "sectoral shift" hypothesis is the only theory directly confronted, I find myself, as a believer in the theory, in a somewhat defensive position. The picture they paint does certainly not support the view that the process of labor reallocation to exogenous events accounted for a significant part of the higher unemployment experienced in the U.S. economy in the seventies and eighties. To the contrary, if I read their article correctly, it is their opinion that sectoral shocks account for none of the upward trend or cyclical pattern of unemployment over the last fifteen years. My comments then, will be aimed at resurrecting the sectoral shift hypothesis from the ashes of this article. I will not argue with the facts presented by Murphy and Topel, at least not much, but rather with their interpretation.

To begin, let me list two sets of facts that Murphy and Topel find most damaging to the sectoral shift hypothesis.

1. Labor mobility patterns are not consistent with the sectoral shift hypothesis. First, interindustry mobility at the two-digit level declines over the period while unemployment rises. Second, while the incidence of unemployment is much higher for industry movers, the contribution to unemployment of industry stayers is much higher than that of movers.

2. Unemployment over the period is characterized by neutrality, that is, it is not heavily concentrated in particular industries or demographic groups of the economy.

In what follows I will argue that (1) is totally consistent with and is in fact essential to the sectoral shift hypothesis, and that (2) is only partially true and can be explained by a variety of factors that are consistent with the theory.

Labor Mobility

Murphy and Topel take as a "strong prediction" of the sectoral shift hypothesis that unemployment should be positively correlated with the quantity of interindustry labor flows. Greater labor mobility should be associated with greater unemployment for interindustry movers and

thus a higher rate of unemployment. It is here that I take issue with the authors. The sectoral shift hypothesis is a hypothesis about the nature of disturbances to the economy, not specifically about the composition of unemployment.

There are two key components to the sectoral shift hypothesis. The first is that some periods, and specifically the period under investigation by Murphy and Topel, are characterized by unusually large shifts in the pattern of labor demand and employment.

The existence of large swings in the sectoral composition of employment over the last fifteen years are well documented and freely accepted by Murphy and Topel. But shifts in the pattern of employment are not sufficient to generate unemployment. This is after all the theme of the article. The second key element in the sectoral shifts hypothesis is that the labor reallocation induced by intersectoral demand shocks be time-consuming. If workers easily and quickly move between labor market sectors the adjustment to labor demand shocks is accomplished without generating unemployment. Thus, contrary to Murphy and Topel's interpretation, the prediction of the theory is that the unemployment generated by a particular set of demand shocks is inversely not positively related to the speed of labor reallocation.

In an earlier paper (Lilien 1982) I develop a sectoral model of the business cycle that generates unemployment only among industry stayers, the level of which is inversely related to the pace of labor mobility. In the model, labor is attached to specific labor market sectors. Employment within each sector is determined efficiently in the sense that the marginal revenue product of labor (hereafter MRP) is always set equal to the marginal disutility of work. Employment is maximized for the economy as a whole when the MRP is equalized across all sectors of the economy. Differences in sectoral MRPs imply that aggregate employment can be increased by shifting workers from low MRP sectors to higher MRP sectors. Because the model is an equilibrium model, unemployment is just a form of hours reduction. Workers expect to be unemployed a fraction of the time they stay in the sector, and any reduction in sectoral demand reduces total employment hours and increases the probability and duration of ex post involuntary unemployment.

In this economy, the initial effect of a shift of demand between sectors is to decrease employment (increase unemployment) in the declining sector and to increase employment (decrease unemployment) in the expanding sector. Diminishing returns to labor and increasing disutility of work lead to smaller employment gains in expanding sectors than the employment losses in contracting sectors. Thus, the aggregate unem-

ployment rate increases. Eventually labor flows act to equalize labor productivity among sectors and expand aggregate employment.

Some may find this characterization of unemployment improbable or unattractive, but none of what I have to say now depends specifically on this particular characterization. In a model with similar implications, Evans (1986) generates sectoral unemployment by assuming asymmetric wage rigidity. Failure of wages to fall in sectors with declining demand causes unemployment. In expanding sectors wages rise so there is no offsetting unemployment reduction.

The key element here is that intersectoral demand shocks generate unemployment among industry stayers, not movers. It is the failure of workers to abandon their sectors of attachment for industries where they may be more productively employed that is responsible for rising unemployment. Further, the lower the level of labor mobility, the slower the pace of labor reallocation and the more persistent unemployment. These implications are totally consistent with the findings of Murphy and Topel.

Neutrality and Unemployment

A more serious challenge to the sectoral shift hypothesis is the Murphy and Topel finding of neutrality of unemployment. That is, they find that with the exception of certain geographical areas there is no systematic concentration of unemployment in particular industries or among particular demographic groups. "The timing and magnitude of changes in unemployment are very similar across groups." This finding is important and does argue against the sectoral shift hypothesis.

No one would argue that all of the unemployment fluctuations over this period were due to sectoral shifts. The recession of the early eighties, in particular, was clearly due in large part to monetary policy aimed at fighting inflation. Nevertheless, if relative demand shocks were responsible for a significant part of the increased level of unemployment during the seventies and eighties we would expect that unemployment would be concentrated in declining industries, particularly manufacturing.

In fact unemployment in manufacturing did rise relative to total unemployment over the period (see my table 1). Durable manufacturing unemployment was approximately 13.4 percent higher in 1968–1976 and 14.6 percent higher in 1977–1986 than its relative level during the early 1960s. Unemployment in mining, construction, and services all fell relative to total unemployment. At least for manufacturing, there was no way for Murphy and Topel to observe these shifts because they are relative to the 1960–1967 period—before their sample begins. There does

not appear to be any increase in relative manufacturing unemployment over the period they investigate. Unemployment in mining does shift dramatically from 55.5 percent below its early sixties level in 1968–1976 to over 20 percent above its early sixties level during 1983–1986.

These qualifications aside, Murphy and Topel's finding that industry employment rates move together and share the same general cyclical pattern is basically correct. I think two factors explain this "near neutrality." The first concerns the level of aggregation. Statistics based on one-digit industries that are geographically aggregated are just too broad to capture any sectoral trends in the data. For example, decreased automobile employment in Michigan is partially offset by labor shortages in the electronics industry in New England, so that aggregate manufacturing unemployment shows only a small upward trend. Murphy and Topel's finding of shifting geographical patterns of unemployment is consistent with this view. Clearly this is a testable hypothesis but one not examined in the article.

Murphy and Topel themselves identify the second important factor in explaining near neutrality—demand spillover effects. Ignoring for a mo-

Table 1 RATIO OF INDUSTRY UNEMPLOYMENT RATES TO THE TOTAL NONAGRICULTURAL UNEMPLOYMENT RATE

	Corrected for cycle			Raw data	
	Mean	*Shift of mean*		*Shift of mean*	
Industry	*1960–67*	*1968–76*	*1977–86*	*1968–76*	*1977–86*
Construction	2.10	−.245	−.232	−.271	−.237
	(.04)	(.045)	(.043)	(.050)	(.049)
Mining	1.19	−.554	−.063	−.588	−.069
	(.11)	(.157)	(.150)	(.155)	(.151)
Durable	.89	.134	.146	.074	.135
manufacturing	(.03)	(.041)	(.040)	(.072)	(.071)
Nondurable	1.00	.048	.072	.052	.073
manufacturing	(.01)	(.018)	(.017)	(.018)	(.017)
Transport/Public	.65	−.040	.034	−.051	.031
utilities	(.01)	(.018)	(.017)	(.021)	(.020)
Trade	1.06	−.009	−.039	.035	−.032
	(.03)	(.041)	(.039)	(.060)	(.058)
Finance and service	.85	−.029	−.061	−.002	−.056
	(.01)	(.017)	(.016)	(.032)	(.032)
Government	.41	.087	.173	.104	.175
	(.02)	(.022)	(.021)	(.027)	(.027)

Note: Standard errors (in parentheses) are calculated from an OLS regression using annual data, 1960–1986. Cyclically corrected terms included a normalized and detrended unemployment rate in the regression.

ment geographical concentration of industries, we would expect the unemployment generated by labor imbalances to spread throughout the economy via reduced consumption demand and reduced demand for intermediate goods.

Consider the following hypothetical situation. Suppose there is an exogenous shift in demand away from automobile travel and toward air travel. In the short run we see unemployment in the automobile industry and labor shortages in the air transportation and aerospace industries. But the effect does not stop here. Unemployed auto workers reduce vacation travel, eat out less often, postpone home ownership, and generally curtail their consumption of all goods and services. Firms purchase less steel, rubber, and glass, employ fewer financial services, and cut their advertising budgets. In the longer run, we would expect these spillover effects to be offset by increased product demand by aerospace firms and workers. But in the short run, labor and capital shortages prevent a rapid expansion of the industry. Thus, unemployment temporarily rises throughout all sectors of the economy except the aerospace industry. Unemployment in durable manufacturing, which contains both the automobile and aerospace industries, rises by little more than unemployment for the economy as a whole.

If industries are geographically concentrated, as certainly many durable manufacturing industries and mining industries are, these spillover effects may have a larger effect on geographic unemployment rates than do broad one-digit unemployment rates. For this reason, the entire economies of some oil-producing states are now generally depressed although the shock that induced the downturn was industry-specific.

In conclusion, I think this article is important for the facts it reveals. Any theory of unemployment must, as Murphy and Topel argue, confront the evidence they have uncovered. However, I do not agree with them that the sectoral shift hypothesis fails this test.

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Discussion

Robert Gordon commented that demand and supply shocks have to be distinguished in discussing the cyclical behavior of real wages. Looking

at the data very closely, one can detect a slight tendency for real wages to move countercyclically before 1973, whereas they moved procyclically in 1974 and 1979–1980.

James Poterba commented on the interpretation of the dramatic rise in long-term unemployment. In the 1970s, there was a great deal of movement in and out of the labor market. He suggested the possibility that the fraction of people who leave the labor force may have decreased in the 1980s. Other things being equal, this would raise the fraction of people who stay in the labor force and are counted as unemployed, thus leading to a higher unemployment rate. He asked Robert Topel if there was any evidence for this line of argument. Topel answered that the proportion leaving the labor force has been small and has stayed essentially constant.

Lawrence Summers suggested that eligibility rules for unemployment insurance may account for the failure of the insured unemployment rate to rise. Even if a worker is insured when he becomes unemployed for the first time, he may lose eligibility if he becomes unemployed frequently. Thus when the worker becomes unemployed again, he is not counted as insured. Summers also questioned the tendency of the analysis of the sectoral shift argument to implicitly assume wage flexibility. If wages do not reflect the relative performance of industries, then the neutral rise in unemployment found in this article might in some way be consistent with the sectoral shock story.

Assar Lindbeck stressed the relativity of attitudes to unemployment. From the European point of view, the questions that would be asked would be why U.S. unemployment is so low and why unemployment spells increased so little in the United States. Concerning the sectoral shift hypothesis, he cited studies of European countries using a mismatch index constructed by Richard Jackman. The mismatch index, which is the sum over sectors of the absolute difference between vacancy and unemployment rates, divided by two, did not increase over time. This is consistent with the finding by Murphy and Topel.

Topel questioned Lilien's definition of the sectoral shift hypothesis in his comment. The sectoral shift story as it is usually presented gives the explicit impression that movers are unemployed. Topel agreed with Lilien on the presence of spillover effects, especially from the manufacturing sector. He did not think Summers's suggestion that the neutrality result can be obtained using wage rigidity was plausible. The neutrality result is prima facie evidence against the view that wage rigidity differs across industries.