STEPHEN T. MARSTON
Brookings Institution

The Impact of Unemployment Insurance on Job Search

WHETHER OR NOT a long-run tradeoff exists between unemployment and inflation, there seems to be little politically acceptable opportunity, except in the short run, to buy employment at the cost of inflation. Exponents of the Phillips curve find that it is steep, and accelerationists find that the natural unemployment rate is high. Hall recently estimated that a 5.5 percent aggregate unemployment rate is necessary merely to keep inflation from accelerating.[1] These findings point to a high floor for unemployment, which is resistant to a one-dimensional stabilization policy depending on manipulation of aggregate demand.

This realization has led to a search for structural factors that make the economy particularly prone to unemployment and inflation, a search that has uncovered the disturbing charge that the government itself promotes unemployment through the unemployment insurance system. The system is by far the most important support for unemployed workers in America. It

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1. Robert E. Hall, "The Process of Inflation in the Labor Market," *Brookings Papers on Economic Activity* (2:1974), p. 377. Hereafter, throughout this issue, this publication will be referred to as *BPEA*, followed by the date.

pays benefits to between 36 percent and 61 percent[2] of the unemployed, in amounts totaling $5.2 billion in fiscal year 1974 and projected at $13.6 billion for fiscal 1975.[3] Direct intervention into the labor market of this magnitude cannot fail to have some effect upon the behavior of workers and firms.

The critics of the system assert that it subsidizes workers to extend the duration of their unemployment, and, consequently, greatly increases unemployment and wastes labor resources. In a careful investigation, this study finds empirical evidence supporting such a subsidizing effect; but it does not appear to be a powerful cause for the unemployment problems of the seventies. The study also discusses the charge that unemployment insurance induces employers to expand seasonally variable employment, but does not estimate the size of such an increase.

This paper does not take a position on the welfare impact of the unemployment insurance system. That issue requires a careful balancing of the virtues of the system in maintaining income and stimulating job search against any tendency the program has to aggravate unemployment. Any serious study of the welfare impact must begin with an estimate of the magnitude of these effects.

Unemployment Insurance and the Duration of Unemployment

The issue of whether unemployment insurance serves as an incentive to extend joblessness is a traditional one, first arising when the system was established in 1935, but it has attracted special attention in recent years for two reasons. One is the desire to fashion a coherent manpower policy in the wake of disillusionment with aggregate monetary and fiscal policies. The second is the emergence of the job-search and labor-turnover theories of unemployment, which emphasize the dynamic nature of unemployment and its duration.

The rules governing unemployment insurance vary among the states, but the plans usually provide weekly payments for a maximum of 26 weeks.[4] Temporary federal programs have recently added 39 weeks to this limit. To

2. The fraction changes cyclically. See Gloria P. Green, "Measuring Total and State Insured Unemployment," *Monthly Labor Review*, vol. 94 (June 1971), pp. 37–48.

3. *Special Analyses, Budget of the United States Government, Fiscal Year 1976*, p. 198.

4. All of the rules mentioned in this paragraph are detailed in U.S. Department of Labor, Manpower Administration, *Comparison of State Unemployment Insurance Laws* (1972).

be eligible for immediate benefits an individual must have worked in a job that is covered by unemployment insurance for a specified minimum period and have lost the job involuntarily. He must be able and available to work, and he may be disqualified from benefits if he refuses a suitable offer.

The critics of the system argue (1) that it reduces and sometimes entirely eliminates the cost of unemployment imposed on a worker by wage loss, and (2) that because they have unemployment insurance, workers remain unemployed longer than they otherwise would and substitute leisure or job search for work.[5]

A second possible effect of unemployment insurance payments on the duration of unemployment involves the substitution of time in the labor force for time out of it. In order to collect benefits a worker ordinarily has to present evidence that he is searching for work—that he is indeed unemployed. The result may be a charade in which the recipient pretends to search, but is in fact out of the labor force; in this case unemployment insurance does not really induce labor force participation, though there may be an apparent increase in unemployment that is merely statistical. However, the recipient may in fact as well as appearance be dissuaded from dropping out of the labor force after a long period of unemployment because he gets paid to search. To the extent that his search is successful, unemployment insurance has a work-incentive effect as well as a work-disincentive effect.

Unemployment insurance might increase the number of spells of unemployment as well as its duration. Without the benefits, workers would require a higher wage to work in a relatively unstable job, especially a seasonal one. According to Feldstein, unemployment insurance reduces the necessary wage premium because workers know they can collect benefits after they are laid off.[6] In effect, the system subsidizes unstable employment, permitting it and the number of spells of unemployment to increase. This subsidy would not exist if the "experience-rating" method of financing unemployment insurance benefits succeeded in charging the firm for bene-

5. Martin S. Feldstein, *Lowering the Permanent Rate of Unemployment*, A Study Prepared for the Use of the Joint Economic Committee, 93 Cong. 1 sess. (1973); and Gene Chapin, "Unemployment Insurance, Job Search and the Demand for Leisure," *Western Economic Journal*, vol. 9 (March 1971), pp. 102–07. Gary Fields has summarized the issues and much of the previous empirical evidence; see his "The Direct Labor Market Effects of the U.S. Unemployment Insurance System: A Review of Recent Evidence," Technical Analysis Paper 26 (U.S. Department of Labor, Office of the Assistant Secretary for Policy, Evaluation and Research, 1975; processed).

6. *Lowering the Permanent Rate of Unemployment*, pp. 27–40.

fits received by employees it has laid off.[7] The experience-rating system levies taxes on employers according to the benefits its former employees are drawing. If the system were perfect, a firm would incur payroll taxes exactly matching the benefits its former employees collect, so that it would enjoy no subsidy to unstable employment. However, the system has maximum and minimum tax rates that allow some firms to pay less in taxes than their employees receive in benefits while requiring others to pay more. For firms at these limits the marginal cost of unemployment insurance is zero: an increase in layoffs will result in no increase in taxes. With no offset, an incentive toward unstable employment remains.

No empirical estimate of the increase in unemployment spells due to this cause has been made, although Baily has investigated the issue in some detail.[8] If this adverse incentive is shown to be sizable, the appropriate policy response is to remove the restrictions on the experience-rating system so that firms come closer to paying the full cost of their layoffs. Thus, the policy implications of this disincentive effect are very different from those of other such effects, which, if they prove to be important, appear to require some reduction in benefits. A separate estimate of the impact of unemployment insurance on unemployment duration is therefore useful.

Workers are unlikely to quit their jobs in order to collect unemployment insurance benefits. Job quitters are heavily penalized under the rules: thirty-two states deny benefits to job quitters entirely, and the other states impose a substantial disqualification period. Basing the taxation system on experience rating effectively engages employers in policing this rule: an employer will usually inform employment agencies about a quitter in order to disqualify the employee from benefits and save himself from higher payroll taxes. This mechanism is a strength of the U.S. structure of unemployment insurance that is absent from those in other countries.

UNEMPLOYMENT INSURANCE AND THE COST OF UNEMPLOYMENT

Feldstein argues the case for the fall in the cost of unemployment to workers using hypothetical Boston families.[9] In one example, weekly un-

7. A subsidy would still exist, though it would be smaller, because unemployment insurance benefits are not taxable income whereas the wage differential between stable and unstable employment in the absence of the system would be.

8. Martin N. Baily, "Unemployment and Unemployment Insurance," Department of Economics Discussion Paper 29 (Yale University, December 1974; processed).

9. *Lowering the Permanent Rate of Unemployment.*

employment insurance payments average 80 to 90 percent of the husband's previous wages net of taxes. In other examples, the weekly benefit rate actually matches or exceeds the net wage. In a later study, Feldstein still found several examples of benefits exceeding previous net wages, but the average replacement rates for all of the states were slightly lower, mostly between 60 and 80 percent.[10] Although the U.S. Unemployment Insurance Service finds that Feldstein's Massachusetts examples are of atypical families in an atypical state, and may be incorrectly calculated, they put benefit rates in the range of 50 to 70 percent of net wages.[11] In the most conceptually complete estimates of replacement-earnings ratios, Munts and Garfinkel have accounted not only for the effect of taxes on the ratios, as does Feldstein, but also for the effects of fringe benefits and average wage increases.[12] According to their results, in Ohio unemployment insurance replaces 40 to 50 percent of total remuneration after taxes. If workers are utility maximizers, this will be the crucial ratio rather than the one involving net wages solely. Without similar estimates for other states the average replacement rate is uncertain, but it must lie between one-half and two-thirds. Thus, while unemployment insurance substantially reduces the cost of unemployment, it does not completely eliminate it.

STUDYING THE IMPACT OF UNEMPLOYMENT INSURANCE ON DURATION

The question remains whether unemployment insurance payments do in fact induce an alteration in a worker's job-search behavior and therefore in his duration of unemployment. Despite the long history of this debate, empirical work has only recently begun to appear. Any such study must be based upon a measurable difference in the system's support to individuals that can be associated with a measurable difference in work effort. The literature discusses five distinct strategies for measuring these differentials:

1. Interstate comparisons. Because the amount and coverage of unemployment insurance benefits vary widely among the states, interstate com-

10. Martin Feldstein, "Unemployment Compensation: Adverse Incentives and Distributional Anomalies," *National Tax Journal*, vol. 27 (June 1974), pp. 231–44.

11. Interview, Margaret Dahm, Director, Office of Research Legislation and Program Policies, Unemployment Insurance Service, July 9, 1974.

12. Raymond Munts and Irwin Garfinkel, *The Work Disincentive Effects of Unemployment Insurance* (Kalamazoo: Upjohn Institute for Employment Research, 1974), appendix. The calculations apply only to the state of Ohio.

parisons provide a kind of natural experiment. Chapin concludes that mean durations of benefits are longer in states with more ample benefits.[13] However, his dependent variable is insured duration rather than total duration of unemployment, and must be viewed with caution because of the strong tendency toward liberality in maximum weeks of benefits in states whose maximum weekly amounts are liberal.[14] Thus, states with less ample benefits may merely substitute uninsured unemployment for insured unemployment without decreasing the total. Chapin also fails to control adequately for demographic differences among the states.

Gramlich, who allows carefully for demographic effects, finds that workers in states with wide unemployment insurance coverage spend more time unemployed than those in states with narrower coverage.[15] But the more generous states are characterized by heavier industrialization and unionization, which may account for their higher unemployment.

Holen and Horowitz are aware of the many possible directions of causality between unemployment insurance and unemployment and have built a multi-equation model of state unemployment, hoping to isolate the impact of the system from other influences.[16] Whether they have succeeded is questionable. They find no significant effect from the usual measures of benevolence (amount of benefits, coverage, eligibility), but a large impact from the degree to which states deny benefits because of voluntary job termination and failure to accept employment. Holen and Horowitz interpret their results to mean that tighter administrative screening of claimants can motivate more vigorous job search and fewer quits, a surprising conclusion in light of their negative findings on the other elements of liberality. Their results may be biased by the occurrence of low denial rates during high unemployment periods because of low quit rates and less frequent job opportunities.

2. Interpersonal comparisons. Within any one state, one unemployed worker will receive greater benefits than another, depending upon previous wage and size of family. The resulting different benefit-wage ratios do not result in significantly different durations of unemployment, according to

13. Chapin, "Unemployment Insurance."

14. Department of Labor, *Comparison of State Unemployment Insurance Laws.*

15. Edward M. Gramlich, "The Distributional Effects of Higher Unemployment," *BPEA* (2:1974), pp. 293–336.

16. Arlene Holen and Stanley A. Horowitz, *The Effect of Unemployment Insurance and Eligibility Enforcement on Unemployment* (Arlington, Va.: Public Research Institute, 1974).

Lininger.[17] He has controlled for several demographic characteristics, but he cannot control for income effects with this approach. Without differences in previous incomes, there would be very little variation in benefits.

3. Intertemporal comparisons. The state systems of unemployment insurance have undergone substantial change since their inception in the 1930s, in the direction of greater benefits and wider coverage. Although attempts have been made to measure the resulting changes in unemployment,[18] in general the revisions have been so gradual that the effects of unemployment insurance are difficult to distinguish from other changes in the economy.

4. Insured vs. uninsured. All states have complex formulas to determine the eligibility of unemployed persons for benefits. Comparison between the job-search activity of insured and uninsured unemployed workers appears a fruitful route to uncovering any measurable difference in incentive. In contrast with the other strategies, this approach offers the advantage of striking differences in benefit levels within a single jurisdiction.

Only Feldstein has attempted this direct comparison. In his controversial and influential testimony, he compares the average duration of unemployment of insured workers with that of all workers.[19] The present study presents an alternative comparison that contrasts sharply with Feldstein's and is based upon more accurate estimates of average durations of unemployment and adjustments for demographic characteristics. This study uses its conclusions to estimate the increase in unemployment that can be attributed to the unemployment insurance system.

5. Insured vs. exhaustees. All states have a maximum duration for benefits. After his "potential benefits" have been drawn, a recipient becomes an "exhaustee" even if he remains unemployed. A comparison of the search behavior of unemployed workers during and after the period of benefits would be useful in evaluating the impact of unemployment insurance. The advantage of this approach is that it eliminates the problems associated with comparing unequal labor groups, while retaining a large and sudden change in benefit levels.

No such study has yet appeared. This paper uses data from the so-called

17. Charles A. Lininger, Jr., *Unemployment Benefits and Duration* (University of Michigan, Institute for Social Research, 1963).

18. Baily, "Unemployment and Unemployment Insurance."

19. Martin Feldstein, "Policies to Lower the Permanent Rate of Unemployment," in *Reducing Unemployment to 2 Percent*, Hearings before the Joint Economic Committee, 92 Cong. 2 sess. (1972).

"post-exhaustion" studies of the state employment agencies and combines it with data on claims to approximate this comparison.

PREVIOUS COMPARISON BETWEEN THE INSURED AND UNINSURED

Feldstein contrasts the average of 14.2 weeks of unemployment benefits drawn per beneficiary in fiscal year 1971 with an average duration of 8 weeks for the uninsured unemployed, estimated from the average duration reported by the U.S. Bureau of Labor Statistics of 10.1 weeks for all unemployed.[20] Feldstein attributes the difference to the disincentive effect of unemployment insurance, but the data are not comparable for at least three reasons.

First, the unemployment insurance figure describes insured unemployment during an entire year, which often includes more than one spell of unemployment per person. The BLS figure reports the average number of consecutive weeks of unemployment experienced up to that point by workers who are unemployed in the survey week. Thus, the unemployment insurance figure refers to total weeks of unemployment during a year, in any number of spells, while the BLS figure refers to weeks of unemployment during a single spell of unemployment.[21]

Second, the BLS reports an average duration of unemployment up to the time of the survey—that is, an average for spells that are still in progress; the average for weeks of unemployment insurance benefits drawn per beneficiary is an average for completed spells. The next section demonstrates that the first cannot be usefully compared with the second or even with other averages that purport to measure continuing spells.

Third, the insured and uninsured unemployed differ greatly. Thus, some or all of the difference in duration may be due to demographic differences rather than to insurance.

The body of this paper is an attempt to adjust for these three problems and thereby provide a better comparison of the insured and uninsured un-

20. Ibid. Shortly after these hearings, Feldstein became aware of the difficulties here and removed the comparison from his study, *Lowering the Permanent Rate of Unemployment*. The study, a denunciation of the current program, unfortunately is thus virtually devoid of empirical evidence on the current impact of unemployment insurance in the United States.

21. The unemployment insurance figure for the average duration of a spell of insured unemployment was 7.0 weeks in 1971, but for reasons discussed below it cannot be appropriately compared with the 10.1-week average for the duration of unemployment for all unemployed.

employed. The first step is to define average duration of unemployment more precisely.

The Average Duration of Unemployment

Kaitz has pointed out two distinct ways of looking at the duration of unemployment.[22] In the first, a survey is conducted at a single moment in time to query unemployed workers and measure the length of each unemployment spell up to that moment, even though it is not yet complete. From these numbers the average duration of unemployment is calculated. In 1969 it was 8.0 weeks.

In the second approach, the duration of unemployment is measured at the time of completion of the spell. The mean of these durations is referred to here as the expected duration of unemployment. Kaitz calculated this mean to be 4.6 weeks in 1969 in the United States.

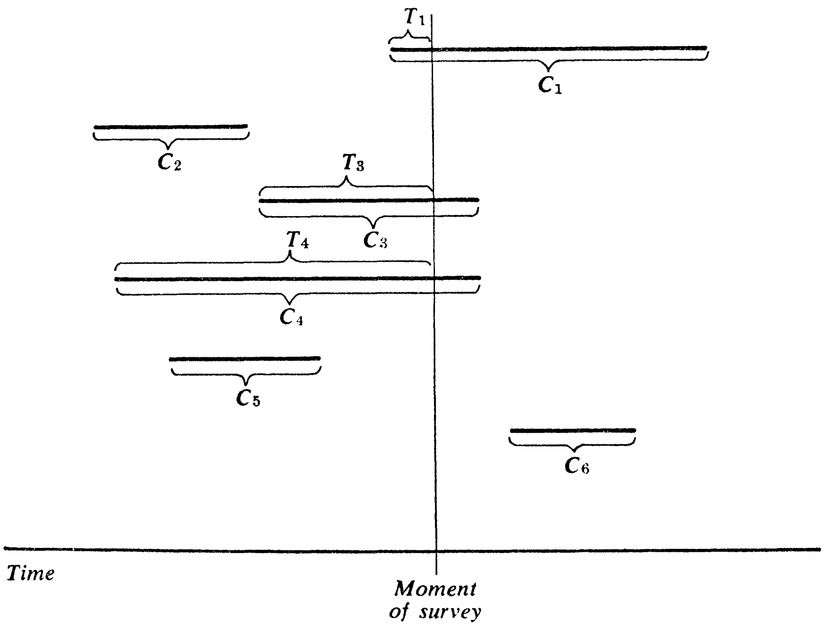
Figure 1 shows how the two measures compare. Of the six spells in this example, only three were caught by the survey. The T variables measure the duration of unemployment up to the time of the survey, while C measures the entire spell. Thus the average duration is the average of T_1, T_3, and T_4, but the expected duration is the average of all C_1 through C_6. The average duration suffers from two flaws as a measure of unemployment duration: (1) it measures only part of any spell of unemployment, and (2) because longer spells have a better chance of getting into the survey sample, it oversamples long spells. The first flaw tends to make the average duration less than the expected duration, while the second tends to make it greater. It is not difficult to show that, as long as the fraction of a cohort of workers leaving unemployment each week diminishes as their unemployment lengthens, the average duration will be greater than the expected duration.[23] Furthermore, the average duration for one group of unemployed can be longer than that of another group at the same time that its expected duration is shorter than the other's.[24] Clearly, average duration is an unreliable indicator of expected duration.

22. Hyman B. Kaitz, "Analyzing the Length of Spells of Unemployment," *Monthly Labor Review*, vol. 93 (November 1970), pp. 11–20.

23. Stephen W. Salant, "Search Theory and Duration Data: A Theory of Sorts," Special Studies Paper 42 (Federal Reserve Board, Division of Research and Statistics, 1974; processed), p. 3.

24. For examples of this behavior among industrial groups, see ibid., p. 19.

Figure 1. Comparison of Two Measures of the Average Duration of Unemployment: Length to Time of Survey and Length to Completion of Spell[a]



Source: Adapted from Stephen W. Salant, "Search Theory and Duration Data: A Theory of Sorts," Special Studies Paper 42 (Federal Reserve Board, Division of Research and Statistics, 1974; processed). See discussion in the text.

a. Six spells of unemployment are shown: C measures their completed length and T measures their length to the time of the survey.

Expected duration has the meaning intuitively associated with "average duration of unemployment" and should be used in comparisons. Average duration appears to have little to recommend it beyond its simplicity in calculation.

Comparison of Expected Durations for the Insured and All Unemployed

Unemployment insurance might cause insured workers to remain unemployed longer than they otherwise would, for two reasons: they could become more selective about the jobs they will accept or they could postpone withdrawing from the labor force longer. One way to make a quantitative assessment of the impact of unemployment insurance is to compare the expected duration of insured unemployment (ED_I) with the expected duration of uninsured unemployment (ED_N).

Because there are no data that identify the uninsured as an explicit group, I measure the expected duration for all unemployed (ED_T) and for the insured unemployed and infer that of the uninsured as a weighted difference between the two. The data for all unemployed come from the Current Population Survey and the data for the insured from administrative records of unemployment insurance claimants at state employment agencies. The experiment is focused on 1969.

The method for estimating the expected duration for the total population is presented in appendix A. Since one must control for demographic influences on expected duration, ED_T is estimated separately for each of twelve demographic groups (male and female, six age groups). The data used for this purpose are the familiar duration groupings published by BLS in *Employment and Earnings*.[25] They give the number of workers in the survey who reported an unemployment spell of a length falling within a given interval of weeks. These are lengths of still incomplete spells, so that one must estimate the mean length of completed spells. The method uses a model of unemployment to infer the statistical process that generates the BLS data on incomplete spells, which is then integrated to derive the mean of completed spells.

The mean expected duration for the insured unemployed is more difficult to calculate. The available national averages merely count the number of benefit weeks claimed per spell of unemployment (or, even less useful, per year of benefits) without allowing for exhaustion of benefits, time unemployed before benefits begin, or the differences that arise from the multiplicity of unemployment insurance systems and that are concealed in the national average. I decided to calculate expected duration of insured unemployment from a series of unemployment insurance claims over time, by a method presented in appendix B. The data source identifies initial claims for unemployment insurance—the number of people first entering employment offices after losing their jobs—and continued claims—the number of people returning to employment offices each week to collect benefits. The method uses the two series to estimate continuation rates (the fraction of insured workers remaining unemployed each week) and from them derives

25. I obtained a slightly finer breakdown of duration groups directly from BLS.

ED_I. This number naturally varies with the tightness of the labor market, so it is expressed as a function of an observable proxy for labor market tightness labeled E_t. In effect, I estimate a function, $ED_I = f(E_t)$.

The necessary series of unemployment insurance claims are collected on a state or local basis because the systems are organized and administered by state. I use the series from the Detroit standard metropolitan statistical area, because Michigan had a fairly representative unemployment insurance system and Detroit a fairly representative labor market during the sample years (1966–71), despite heavy reliance upon the automobile industry. The basic rules of eligibility and potential duration of benefits are similar to those of other states, although the maximum benefit is slightly higher than average among the states, in line with Michigan's slightly higher wages. In 1969, insured unemployment accounted for 36.4 percent of total unemployment in Michigan, comparing closely with 38.8 percent in the nation.[26] The labor market was only very slightly looser in Detroit (3.7 percent unemployment rate) than in the nation (3.5 percent). Hall's study of labor turnover in twelve metropolitan areas puts Detroit among the looser of the labor markets (in 1966), but the city came nowhere near the worst.[27]

Nevertheless, precise equality between the labor market "tightness" in the city and in the nation is necessary for comparisons of durations. This equality is accomplished by setting the "tightness" variable, E_t, the argument variable of the insured duration in Detroit, equal to its value in the nation in 1969. The resulting $ED_I = f(E_{1969})$ can be compared with ED_T because the latter was estimated in the 1969 national labor market.[28]

26. *Manpower Report of the President, March 1973*, table D-3, p. 205; table D-5, p. 207; table A-14, p. 145. These numbers exclude insurance programs for veterans and federal workers, for which comparable data were not available.

27. Robert E. Hall, "Turnover in the Labor Force," *BPEA* (3:1972), p. 735.

28. To show this to be true, I first define E_t as the rate of accessions to jobs divided by the unemployment rate. This variable was selected as the argument for ED_I because it gave close statistical fits, but it also turns out to be close to proportional to the reciprocal of ED_T. The number of job accessions is equal to the number of spells of unemployment in an economy in static equilibrium with no one dropping out of the labor force. Dividing the number of unemployed by the number of spells of unemployment yields, by definition, the expected duration of unemployment. The variable chosen as E_t is seen to be roughly the reciprocal of this result, although the variables are expressed in units that deprive them of direct comparability with ED_T. The utility of making E_t the same in the two samples is now seen to be that it forces ED_T to be the same in the Detroit and national samples.

The tabulation below gives a hypothetical example of the adjustment procedure. Both the nation and Detroit are assumed to have equal numbers of spells of insured and uninsured unemployment, so that the simple average of ED_I and ED_N must equal ED_T. It is

The Increase in Unemployment Duration Attributable to Unemployment Insurance

The models presented in the appendixes provide an overall estimate of expected duration for insured unemployment and values of expected duration for total unemployment, for twelve demographic groups. The estimated duration for insured unemployment is 5.62 weeks with a standard error of 0.314 week, while the expected duration of total unemployment, aggregated from the twelve values with weights corresponding to each group's share of insured unemployment,[29] is 5.00 weeks with a standard

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also assumed that unemployment insurance has an effect such that ED_I is twice ED_N, although this fact is unknown before estimates are made. The first estimate yields ED_T of 6 weeks from the U.S. sample and labor market "tightness," E, of 0.6. Suppose next that ED_I is estimated at 10 weeks from the Detroit sample with an E of 0.75. If ED_I and ED_T are incorrectly thought to come from economies with similar total labor market conditions and therefore to be comparable, ED_N will be—from $(10 + ED_N)/2 = 6$—2 weeks, giving an apparent increase in duration due to unemployment insurance of 400 percent, rather than the correct value of 100 percent. The error lies in allowing E to be different in the two samples, so that ED_T is different. Suppose, instead, that an equation of the form $ED_I = \alpha E$ is estimated from Detroit data, and α is estimated to be 13.33. Then an E of 0.6 is substituted, giving an estimated ED_I of 8 weeks for a labor market of tightness comparable to that of the observed U.S. market with its ED_T of 6 weeks. Then, from $(8 + ED_N)/2 = 6$, ED_N is calculated as 4 weeks. This method correctly gives an expected increase in duration of 100 percent due to unemployment insurance.

	Expected duration of unemployment (weeks)			
Description of original sample	*Insured unemployment* ED_I	*Uninsured unemployment* ED_N	*Total unemployment* ED_T	*Labor market tightness* E
United States, total[a]	8[b]	4[b]	6[a]	0.60[a]
Detroit[a]	10[a]	5[b]	7.5[b]	0.75[a c]
Detroit[d]	8[d]	4[d]	6[d]	0.60[e]

Notes: a. Observed. b. Unobserved. c. Not comparable to United States. d. Calculated. e. Assumed; comparable to United States.

29. The correct weights for aggregating durations of unemployment are the shares of spells of unemployment in each group. This is equivalent to aggregating the reciprocals of durations by group shares of unemployment. The importance of weighting durations by insured proportions can be appreciated by comparing the expected duration of total unemployment aggregated with insured weights, above, with the expected duration of total unemployment aggregated with total weights, 4.40 weeks. If the demographic disaggregation had not been done, the difference between these two would have been attributed to the influence of unemployment insurance rather than to demographic influences.

error of 0.063 week (see table 1). The duration for the uninsured must also be less than that for the insured.

The durations for individual groups permit more precise comparisons. The following table presents the basic identity of static equilibrium: unemployment, U, for any group is equal to its number of spells of unemploy-

Demographic group	*Insured status*		
	Uninsured N	*Insured* I	*Total*
1	$U^{\dagger}_{1N} = (S_{1N})(ED_{1N})$	$U^{*}_{1I} = (S_{1I})(ED_{1I})$	$U^{*}_{1} = (S^{\dagger}_{1})(\widehat{ED}_{1})$
2	$U^{\dagger}_{2N} = (S_{2N})(ED_{2N})$	$U^{*}_{2I} = (S_{2I})(ED_{2I})$	$U^{*}_{2} = (S^{\dagger}_{2})(\widehat{ED}_{2})$
.	.	.	.
.	.	.	.
.	.	.	.
12	$U^{\dagger}_{12,N} = (S_{12,N})(ED_{12,N})$	$U^{*}_{12,I} = (S_{12,I})(ED_{12,I})$	$U^{*}_{12} = (S^{\dagger}_{12})(\widehat{ED}_{12})$
Total	$U^{\dagger}_{N} = (S^{\dagger}_{N})(ED^{\dagger}_{N})$	$U^{*}_{I} = (S^{\dagger}_{I})(\widehat{ED}_{I})$	$U^{*} = (S^{\dagger})(ED^{\dagger})$

ment, S, multiplied by its expected duration, ED. Twenty-four groups are identified, the insured and uninsured subgroups of the twelve demographic groups. The variables marked with an asterisk are observed directly, those with a circumflex are estimated from unemployment models, and those with a dagger are easily calculated from the other variables. The numbers are expressed as fractions of total unemployment: $U = 1$ by definition; U_i is the fraction of unemployment in demographic group i in 1969, calculated from data provided by BLS; U_I is the fraction of insured workers labeled F in equations (12) and (13) below; U_{iI} is the fraction of unemployed workers insured in group i, calculated from data provided by the Michigan Employment Security Commission. Both the numbers of spells and the numbers of unemployed sum vertically and horizontally. For example,

(1) $$\sum_{i=1}^{12} S_{iI} = S_I$$

is the vertical sum of insured spells, and

(2) $$S_{iN} + S_{iI} = S_i, \qquad i = 1, \ldots, 12$$

is the horizontal sum of spells. Up to this point, the important variables

Table 1. The Expected Duration of Unemployment for Selected Groups in 1969
Weeks

Group	Expected duration of unemployment ED	Standard error
Insured unemployed, by maximum period of benefits		
26 weeks	5.62	0.314
39 weeks	6.02	0.312
52 weeks	6.38	0.484
65 weeks	6.57	0.484
Total unemployed		
Age-sex composition of total unemployed	4.40	0.047
Age-sex composition adjusted to that of insured unemployed	5.00	0.063

Sources: Unemployment models described in appendixes A and B. The sources of the basic data are given in the section above, "Comparison of Expected Durations for the Insured and All Unemployed."

ED_{iN} and ED_{iI}, whose comparison is necessary for evaluating the impact of unemployment insurance on job search, remain unknown. However, since all of the U_{iN} and U_{iI} are known, only the S_{iN} and S_{iI} are required to calculate the ED_{iN} and ED_{iI}. Equations (1) and (2) represent thirteen linear equations in the twenty-four unknowns S_{iN} and S_{iI}. Insufficient information exists to distinguish the separate incentive effects in each demographic group, so I require that unemployment insurance cause a proportional increase in duration in each group. A new variable, P, is defined as the constant ratio of insured to uninsured durations:

$$P \equiv \frac{ED_{iI}}{ED_{iN}} = \frac{S_{iN}}{S_{iI}} d_i, \qquad i = 1, \ldots, 12, \tag{3}$$

where

$$d_i \equiv \frac{U_{iI}}{U_{iN}}, \qquad i = 1, \ldots, 12. \tag{4}$$

Equation (3) supplies twelve linear equations in the unknowns S_{iI} and S_{iN} and requires only one new unknown, P. With twenty-five equations in twenty-five unknowns, it is possible to solve for every variable in the text table on page 14. Substitution gives one equation in the unknown, P,

$$\sum_{i=1}^{12} \frac{d_i S_i}{P + d_i} - S_I = 0, \tag{5}$$

the root of which is calculated numerically.

This computation can be clarified by a simple example, laid out in the table below. Take a hypothetical world with only two demographic groups: young and old. Each group contains some insured and some uninsured unemployed workers, and the former remain unemployed twice as long as the latter. That insurance was the source of the difference would be obvious if the duration in each of the cells could be observed; however, from the totals it is unclear whether the expected duration for insured workers (9.6 weeks) exceeds that of uninsured workers (4.2 weeks) because the insured are older or because they have a different job-search strategy.

Group	*Not insured* *N*	*Insured* *I*	*Total*
	$U = S \cdot ED$	$U = S \cdot ED$	$U = S \cdot ED$
Young (*Y*)	$160 = 40 \cdot 4$	$80 = 10 \cdot 8$	$240 = 50 \cdot 4.8$
Old (*O*)	$50 = 10 \cdot 5$	$400 = 40 \cdot 10$	$450 = 50 \cdot 9$
Total	$210 = 50 \cdot 4.2$	$480 = 50 \cdot 9.6$	$690 = 100 \cdot 6.9$

From equation (4),

$$(4') \qquad d_Y = \frac{80}{160} = \frac{1}{2}$$

$$d_O = \frac{400}{50} = 8.$$

Substituting into equation (5),

$$(5') \qquad \frac{\frac{1}{2}(50)}{P + \frac{1}{2}} + \frac{8(50)}{P + 8} - 50 = 0.$$

This equation is easily solved to give $P = 2.0$, implying the correct answer that insured workers remain unemployed twice as long as uninsured workers in the hypothetical world.

In the real world the estimated value, P, is a random variable, since $\hat{S}_i (= U_i/\widehat{ED}_i)$ and $\hat{S}_I (= U_I/\widehat{ED}_I)$ are random variables, giving P a standard error of estimate, which is also calculated numerically.[30] The param-

30. $\hat{S}_i$ and $\hat{S}_I$ were assumed to have normal distributions of estimated mean and variance. Five hundred values were drawn from these distributions and P calculated from (5) in each case. The dispersion of P was assumed to be its variance. All other standard deviations in this paper are calculated from first-order Taylor series approximations.

eter P is estimated at 1.314, with a standard error of 0.199. This is interpreted to mean that the expected duration for the insured is 31.4 percent greater than that for the uninsured in each demographic group. The increase is larger than the standard error of the increase, but not quite twice as large, giving significance to the increase at not quite the 5 percent level.

Table 2 presents the expected durations for the individual demographic groups, each separated into an uninsured and an insured subgroup. They are calculated from

$$D_{iI} = \frac{P + d_i}{d_i S_i} U_{iI} \tag{6}$$

and

$$D_{iN} = \frac{D_{iI}}{P}, \tag{7}$$

both of which are easily derived from equations (2) and (3). The total expected duration for each group is closer to that for the insured the larger the fraction of total unemployment accounted for by the insured.

All of the above estimates are made under the assumption that unemployment insurance causes the same percentage increase in expected duration in each demographic group. But perhaps the incentive effects of unemployment insurance are more powerful for secondary workers than for primary workers, who are obligated by custom and family position to find a job as quickly as possible.[31] If so, expected duration would increase more in demographic groups with more secondary workers. To test this alternative assumption, I have allowed the percentage increases in duration to differ by group. Defining P_i as the percentage increase of duration in each group ($= ED_{iI}/ED_{iN}$), I specify that

$$P_i = K_i P, \tag{8}$$

and choose values of K_i that are larger for groups with more secondary workers; P becomes the weighted average increase of all groups, and K_i the constant of proportionality that separates each group from the average.[32]

31. Some empirical support for this hypothesis is provided by Lininger, *Unemployment Benefits and Duration*, p. 59.

32. If the K_i are chosen so that

$$\sum_i (f_i/K_i) = 1,$$

where f_i is the fraction of insured unemployment in group i,

$$\sum_i f_i = 1,$$

then P, the root of equation (5), is automatically the weighted average of P_i.

Table 2. Expected Duration of Unemployment by Age, Sex, and Insurance Status, 1969

Weeks

Age group (years)	Uninsured ED_{iN}	Insured ED_{iI}	Total ED_i
	Male		
16–24	3.74	4.92	3.90
	(0.75)	(0.65)	(0.08)
25–34	3.81	5.01	4.91
	(0.60)	(0.20)	(0.19)
35–44	4.34	5.71	5.52
	(0.69)	(0.28)	(0.25)
45–54	5.87	7.72	7.39
	(0.93)	(0.38)	(0.31)
55–64	5.66	7.44	6.93
	(0.93)	(0.49)	(0.34)
65 and over	5.98	7.86	7.41
	(1.06)	(0.73)	(0.64)
	Female		
16–24	3.74	4.92	3.85
	(0.77)	(0.68)	(0.08)
25–34	3.46	4.55	3.84
	(0.64)	(0.48)	(0.14)
35–44	3.90	5.13	4.37
	(0.71)	(0.53)	(0.19)
45–54	4.05	5.32	4.73
	(0.70)	(0.44)	(0.22)
55–64	5.65	7.43	6.48
	(1.03)	(0.76)	(0.41)
65 and over	5.84	7.68	6.85
	(1.18)	(1.03)	(0.79)

Sources: Column 1, equation (7), and column 2, equation (6), discussed in the text; column 3 is from the model described in appendix A. The sources of the basic data are those given in the section above, "Comparison of Expected Durations for the Insured and All Unemployed"; information provided by the Bureau of Labor Statistics; and information from the Michigan Employment Security Commission. The numbers in parentheses are standard errors of estimate.

Estimation is almost identical to that above, except that P_i takes the place of P in equation (3) and consequently d_i becomes

$$d_i = \frac{U_{iI}}{U_{iN}K_i}: \tag{9}$$

Three sets of K_i have been chosen, identifying different groups as secondary workers: in the first set women are classified as secondary workers; in the second, youth; and in the third, both women and youth. In all cases the secondary workers are assumed to have an increase in expected duration,

Table 3. Measures of Increase in Expected Duration of Unemployment Attributable to Unemployment Insurance, 1969

Group assumed to be secondary workers[a]	*Ratio of expected duration of insured to uninsured workers*[b] *P*	*Standard error of P*
None	1.314	0.199
Women	1.215	0.187
Youth[c]	1.220	0.197
Women and youth	1.157	0.185

Source: Derived as explained in accompanying text.
a. Secondary workers, *s*, in each group, *i*, are assumed to have an increase, P_i, in expected duration, *ED*, 37 percent larger than the percent increase in *ED* for primary workers, *p*: $P_s/P_p = 1.37$.
b. In the last three rows, the ratio P_i differs by demographic group, *i*, so a weighted average is presented.
c. Aged 16 to 24.

P_i, 37 percent larger than the percent increase in that for primary workers; that is,

$$(10) \qquad P_s = 1.37P_p,$$

where P_s and P_p are duration ratios for secondary and primary workers, respectively. This 37 percent difference is the largest that can be assumed without causing duration for the insured to be shorter than that for the uninsured in primary demographic groups.

Table 3 presents the estimated *P* under each of the above assumptions, as well as under the original assumption of equal increases in expected duration for each demographic group. The new assumptions lower the weighted average, *P*, as compared with *P* estimated under the original assumption, because they attribute more of the increase in expected duration to demographic groups containing a smaller fraction of the insured unemployed. In the last case unemployment insurance would lengthen expected duration by only 15.7 percent instead of 31.4 percent. This assumption is an extreme case, which gives a lower bound for *P*. Expected duration can safely be assumed to increase between 15.7 percent and 31.4 percent as a result of unemployment insurance.

The apparent conclusion from this table is that duration for the insured is longer than that for the uninsured, but not much.[33]

Moreover, not all of this increase is due to the first lengthening effect that

33. This conclusion agrees with Lininger's findings that unemployment insurance lengthens duration for only a small part of the labor force; see *Unemployment Benefits and Duration*, p. 59.

unemployment insurance has on duration of unemployment—the effect that arises because an insured worker feels less pressure to take a new job quickly. A significant part of the estimated 15.7 to 31.4 percent lengthening of expected duration is attributable to the reduction, promoted by unemployment insurance, in the number of departures from the labor force. This closer attachment to the labor force is explored below.

A further caveat on this estimate concerns other possible biases between the sample of insured and total unemployment. Probably the most important is attributable to the higher proportion of job losers among the insured unemployed than among all the unemployed. Because job losers have a longer expected duration of unemployment than do job leavers, new entrants, or reentrants,[34] some of the longer duration of the insured, compared with the uninsured, is due to the reason for their unemployment, not to unemployment insurance itself. The estimated increase becomes an upper limit; this reinforces the conclusion that the effect of unemployment insurance on duration is small.

The Increase in Unemployment Due to Unemployment Insurance

How much unemployment results from the longer expected duration estimated in the previous section? The answer to this question cannot come entirely from the information gathered so far, because it depends upon the entire workings of the economy, especially the price elasticity of the aggregate demand for labor. If unemployment insurance were abolished, unemployed workers could not be as choosy in searching for jobs; but if the number of job vacancies did not rise, they could succeed in obtaining employment sooner only by squeezing the formerly uninsured out of job opportunities. Thus, the expected duration for the formerly insured might fall at the cost of longer duration for the formerly uninsured. Another possibility is that the number of layoffs, and hence of spells of unemployment, might increase because employers could hire workers more easily. In any case, the Phillips curve would shift toward the origin; whether the result would be less unemployment or less wage inflation would depend upon

34. Calculations from data in *Employment and Earnings*, vol. 16 (January 1970), Table A13, p. 25, indicate that the expected duration for job losers is greater than that for other unemployed. Some of this increase, of course, is due to the higher proportion of insured workers among the job losers. Also, the difference between the duration of job losers and job leavers may trace partly to their demographic differences.

Table 4. Unemployment Rates under Alternative Unemployment Insurance Systems, 1969

Unemployment insurance system	*Unemployment rate (percent)*	*Standard error*	*Change in unemployment rate from actual (percentage points)*
Actual (26 weeks of benefits)	3.5	...	...
No UI; $P = 1.314$[a]	3.16	0.164	−0.34
No UI; $P = 1.157$[a]	3.31	0.197	−0.19
39 weeks of benefits	3.60	0.117	0.10
52 weeks of benefits	3.69	0.153	0.19
65 weeks of benefits	3.74	0.155	0.24

Sources: Actual—official U.S. unemployment rate for 1969, from *Economic Report of the President February 1975*, p. 276; other—calculated from table 3, above, and equations (12) and (13) discussed in the text.

a. For definition of P, see table 3.

factors beyond the scope of this paper, including the stabilization policy of the government.

In calculating the lessening in unemployment from the elimination of unemployment insurance, I assume (1) that the number of spells of unemployment does not change and (2) that the expected duration of uninsured workers does not change. These assumptions correspond to a very elastic aggregate demand for labor. The only thing that changes is that all unemployed workers become uninsured, so that everyone remains unemployed ED_N weeks. The amount of unemployment among formerly insured workers decreases by the divisor P, the proportion calculated for the weighted average of expected duration:

$$U_I^N = U_I/P. \tag{11}$$

The superscript on U denotes unemployment after unemployment insurance has been abolished. Since unemployment in the uninsured sector remains the same, total unemployment becomes

$$U^N = U_N^N + U_I^N = U\left(1 - F + \frac{F}{P}\right), \tag{12}$$

where U is unemployment with the insurance system in effect and F is the fraction of unemployed workers who are insured. In 1969, F was 40.8 percent,[35] giving the values of U^N in the second and third rows of table 4. The unemployment rate in 1969 would have been between 0.19 and 0.34 per-

35. This number includes unemployment insurance programs for veterans and federal employees as well as state programs.

centage point lower had unemployment insurance not existed. These figures fall short of the 0.75 percentage point that was Feldstein's minimum guess for the decrease in the unemployment rate of 1971 that might come from reducing the duration of unemployment by improving the unemployment insurance system.[36]

Extended Benefits

During periods of high unemployment a system of federal extended benefits automatically lengthens the period of benefits by 13 weeks. As of January 1, 1975, 13 further weeks of benefits were added (temporarily), raising the maximum duration to 52 weeks in most states; the 1975 tax reduction law added still another 13 weeks, bringing the maximum to 65 weeks. What is the impact on unemployment of these extensions in benefits?

To estimate the rise in unemployment, I assume that the continuation rates for the insured, estimated using the model of appendix B, can be extrapolated beyond 26 weeks to the new duration with the functional form estimated over the shorter period. Further, I assume that the continuation rate for the insured, rather than dropping back to that for the uninsured after 26 weeks, remains at its previous level through the maximum benefit period. In other words, the escape rate for the insured does not rise to match that for the uninsured after 26 weeks, but remains at its own, lower, level through 39, 52, or 65 weeks.

Tables 1 and 4 present the results. Under a 39-week system, the expected duration of insured unemployment would increase to 6.02 weeks. Assuming that the proportion of spells of unemployment that were insured was the same as that in 1969, this increase would raise the total unemployment rate to 3.60 percent.[37]

36. *Lowering the Permanent Rate of Unemployment*, p. 48. Note that Feldstein's guess applies to 1971, rather than 1969. However, the impact on employment would be no more in 1971 than in 1969 for reasons discussed below in the section on looser labor markets.

37. The mathematical formulation is

$$U_+ = \left[F\frac{ED_+}{ED_I} + (1 - F)\right] U_I, \tag{13}$$

where U_+ and ED_+ are the unemployment rate and expected duration of insured unemployment for the extended system; ED_+ is calculated from equation (B-11) under the new assumptions about continuation rates.

Similarly, for a 52-week system the expected duration of insured unemployment may increase to 6.38 weeks, raising the unemployment rate to 3.69 percent; a 65-week system would increase ED_I to 6.57 weeks, raising the unemployment rate to 3.74 percent. These increases are also modest, and indicate that the present extended benefits do not seriously threaten an increase in the unemployment rate.

The Impact of Unemployment Insurance in Looser Labor Markets

All of the results derived so far are predicated upon the extremely tight labor market of 1969. Four factors made 1969 a logical choice for analysis. First of all, 1969 was a peak year of economic activity during which unemployment was neither rising nor falling. This static condition is necessary for the statistical method of appendix A to be precisely correct. Second, labor demand was at such a high level in 1969 that the increase in the offering of labor consequent upon the abolition of unemployment insurance would probably have been absorbed. Thus, the "experiment" reported in table 4 makes more sense, and the calculated decreases in the unemployment rate are more accurate, for 1969 than any other recent year. Third, the nation came very close to the "permanent rate of unemployment" in 1969, so comparisons with Feldstein are more meaningful. Finally, the data are available for 1969.

Unfortunately, the labor market of 1975, when the unemployment rate is forecast at about 8.8 percent, is far removed from the labor market of 1969. This section discusses the likely role of unemployment insurance in the current recession.

In general, a looser labor market will be associated with a smaller "reemployment" effect from unemployment insurance and a larger "labor force participation" effect. Any worker who made himself more readily available because unemployment insurance was eliminated would be less likely to find vacancies and employment in a looser labor market. And those workers who were able to shorten their unemployment would do so probably by displacing other workers. But more workers would stop searching for work in discouragement if it were not for their weekly visit to the Employment Service. In a loose labor market, then, unemployment insurance has less reemployment effect than it does in a tight one, but more participation effect. Even if these two shifts in effect balanced each other, so that the impact on unemployment were similar in loose and tight labor markets, less employment (and income) would be lost in loose labor markets with unemployment insurance operating, because more of its impact would be concentrated on labor force participation than on employment.

Both the coverage and duration of unemployment benefits have been extended since 1969. The system automatically expands to cover a larger fraction of unemployment during a recession, because of the larger proportion of job losers at such times. In February 1975, 72.3 percent of the unemployed were insured, compared with 40.8 percent in 1969.[38] Together with the extension of the benefit period from 26 to 65 weeks, this increase suggests a larger impact of unemployment insurance in 1975 than in 1969, other things equal.

The "automatic stabilizing" effects of unemployment insurance cannot be neglected in the 1975 recession. With aggregate demand for goods and services falling away to an extent unforeseen by planners, this feature of the system, whereby, during a recession, expenditures for benefits increase more rapidly than the payroll taxes that support them, probably outweighed the adverse effects of the system on duration. Without unemployment insurance, total expenditures, and hence employment, would have fallen even further than they have in 1975.

In a world of feeble labor demand and limited job vacancies, the inflationary impact of unemployment insurance seems more relevant than its unemployment impact. The system imparts an inflationary bias to the labor market aside from the automatic increase in government expenditures that it causes. If unemployment insurance did not exist to provide income support to the unemployed, a given amount of unemployment would have a greater downward pressure on wages than now obtains, because workers would be more inclined to accept low-paying jobs. This tendency is not an additional effect of the system, but the upward-rightward shift of the short-run Phillips curve viewed from the perspective of inflation. In 1975 the impact of unemployment insurance is probably manifested in less deceleration in wages and prices than would have been achieved in its absence, rather than in a big increase in unemployment.

38. These percentages include programs for veterans and federal employees, and extended benefits, as well as state programs. *Employment and Earnings*, vol. 21 (March 1975), p. 124, gives data for state unemployment insurance. Data for the other groups were gathered directly from the U.S. Unemployment Insurance Service.

All of these differences between 1969 and 1975 preclude a quantitative estimate of the impact of unemployment insurance in 1975. Although the extended benefits and greater coverage are not difficult to fit into the analysis of the previous sections, other changes in the labor market make it hazardous to extrapolate the results of 1969 to 1975. Further research will be required to evaluate the quantitative importance of unemployment insurance in weak labor markets.

Job Search and Benefit Exhaustion

In order to develop another view of the impact of unemployment insurance on job search in a way that avoids the sampling problems associated with the differences between the insured and uninsured unemployed, I now compare the labor market behavior of insured workers before and after they exhaust their benefits. "Post-exhaustion" studies are conducted by a number of state employment agencies, mostly to determine the adequacy of the benefit period. As such they are not perfectly suited to studying the incentive effects of unemployment insurance. However, they do provide data for calculating continuation rates and even reemployment rates of workers whose benefits have run out—so-called "exhaustees." The data are collected in a household survey of exhaustees, determining their labor market status in the months after exhaustion.

Unfortunately, Michigan did not conduct this kind of survey, so that a precise comparison between pre- and post-exhaustion continuation rates is not available. Of the states that do conduct such surveys, Pennsylvania has the most nearly comparable sample.[39] In addition, the Michigan pre-exhaustion continuation rates are adjusted to reflect the unemployment rate and labor turnover rates prevailing in Pennsylvania during the survey years, 1966 and 1967.[40] The monthly continuation rates of the post-exhaustion study are reported in weekly terms to achieve comparability with the pre-

39. Commonwealth of Pennsylvania, Department of Labor and Industry, Bureau of Employment Security, "Labor Force and Claim Status of Workers during the Twelve Months Following Exhaustion of Unemployment Compensation Benefits in Pennsylvania, 1966–1967" (no date; processed).

40. The unemployment rate is set at 3.4 percent and the accession rate at 3.5 percent; both are 1966–67 averages. Thus, in equation (B-9) E is set at 1.03; D, of course, is set at zero.

exhaustion rates.[41] The point of exhaustion is assumed to occur at the average duration of benefits of exhaustees in Pennsylvania in 1966 and 1967.

If these adjustments achieve comparability between the two samples, figure 2 can be viewed as a record of the continuation rates of a cohort of unemployed workers who file their initial claims for unemployment insurance in week zero and exhaust their benefits after 27.3 weeks. Each point on the curve r_j represents the fraction of unemployed workers who will remain unemployed at least one more week. The figure shows the normal rapid rise in insured continuation rates during the pre-exhaustion period. After exhaustion, continuation rates fall precipitously; equivalently, escape rates rise dramatically from 1.1 percent just before exhaustion to 13.4 percent just afterward. The new escape rate is divided about equally between reemployment (6.9 percent) and departures from the labor force (6.5 percent). Beyond the first month after exhaustion the escape rate approaches its pre-exhaustion level, although it is still a few percentage points lower than its level extrapolated from pre-exhaustion rates. In this third period, workers escape unemployment primarily by finding jobs rather than by leaving the labor force.

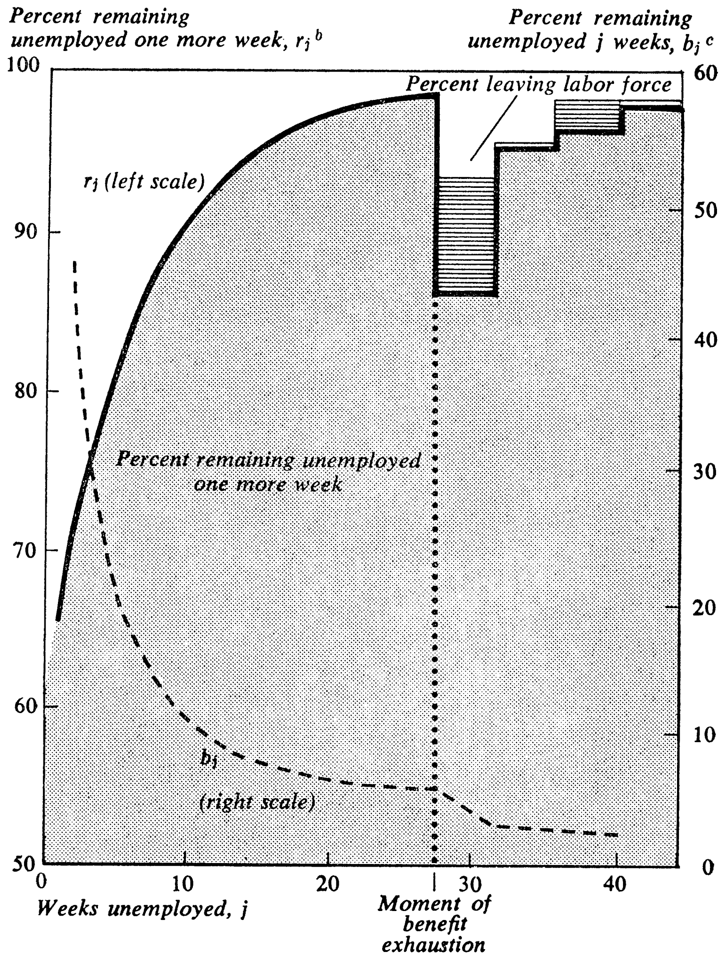
This is precisely the behavior to be expected if unemployment insurance does work some effect during the insured weeks, both against employment and in favor of remaining in the labor force.[42] After payments are cut off, some workers take jobs they would have rejected or failed to find before that. The steep increase in reemployment after exhaustion, followed by a renewed decline beyond the following month, probably indicates that some workers took jobs that became acceptable only after their benefits ran out. This tendency creates the abnormal bunching of job matches immediately after exhaustion. The similar time pattern in withdrawals from the labor force probably indicates that some workers who would have left the labor force held out until their benefits were exhausted. This may be only a semantic distinction: the recipients may actually have given up job search before that time, while maintaining a pretense for employment counselors.

This pre- and post-exhaustion comparison offers very strong evidence of incentives from unemployment insurance, but little help in judging their magnitude. First, as curve b_j in figure 2 indicates, after 27.3 weeks only

41. The monthly rates have been raised to the power 1/4.3.

42. My discussion of these points benefits from Merrill G. Murray, *The Duration of Unemployment Benefits* (Kalamazoo: Upjohn Institute for Employment Research, 1974), p. 23.

Figure 2. Labor Force Transition Rates for Insured Workers before and after Exhaustion of Unemployment Insurance Benefits, 1966–67[a]



Sources: Basic data are from Commonwealth of Pennsylvania, Department of Labor and Industry, Bureau of Employment Security, "Labor Force and Claim Status of Workers during the Twelve Months Following Exhaustion of Unemployment Compensation Benefits in Pennsylvania, 1966–1967" (no date; processed); and tabulations provided by State of Michigan, Michigan Employment Security Commission.

a. The post-exhaustion rates are for Pennsylvania in 1966–67; and the pre-exhaustion rates are from the author's unemployment insurance model, adjusted to the labor market conditions prevailing in Pennsylvania in 1966–67.

b. Continuation rate for persons unemployed j weeks, r_j.

c. Initial claimants still unemployed after j weeks, b_j.

about 6 percent of the original cohort are still unemployed, a very small, and not necessarily representative, sample. Second, the first month after exhaustion contains an abnormal bunching of exits from unemployment. The later continuation rates more nearly reflect the labor market behavior of uninsured unemployed workers. There are so few data points in that range of duration, however, that I have resisted an inclination to fit some curve through them in order to derive an estimate of impact. The strongest conclusion that can be justified from the post-exhaustion study is that unemployment insurance does indeed significantly extend unemployment, through its effects on both reemployment and labor force participation.

Conclusion

This paper provides an empirical study of an important policy question in manpower economics—how much the government exacerbates unemployment problems through the unemployment insurance system. It introduces new econometric methods to establish the extent to which the system encourages longer unemployment. In particular, it clarifies the meaning of "average duration of unemployment," a concept that has been abused in previous studies, and sets out methods for calculating a better mean duration from administrative data. The expected duration of unemployment for insured workers is found to exceed that of uninsured workers, to a statistically significant, if relatively small, degree.

The paper also analyzes for the first time the behavior of unemployed workers as they exhaust their unemployment insurance benefits. Some workers appear to "ride along" near the end of the benefit period and to take jobs only after their benefits have been cut off. This represents further evidence for a statistically significant, but small, work disincentive exerted by unemployment insurance.

The implications for policy are fairly clear: neither the boosters of unemployment insurance, who deny that it offers any disincentive, nor the attackers, who blame it for a large amount of unemployment, are persuasive. Although the study demonstrates that the existing system causes a perceptible, but small, amount of unemployment in the United States—between 0.2 and 0.3 percent of the labor force—that is not a figure that supports the notion of armies of unemployed malingerers and chiselers.

The advocates of unemployment insurance quite probably could justify this small cost in terms of income redistribution and the more efficient job matches that longer searches permit. After all, the value of employment is in producing income; and the improvement in labor productivity resulting from better job matches will partly compensate for the loss of income due to longer unemployment. The welfare ramifications of the increases in unemployment induced by unemployment insurance are, however, beyond the scope of this paper.

Among the various forms of income support for the unemployed, unemployment insurance stands out as the most successful and the least controversial. The experience-rating method of financing the system has helped to make it self-policing and relatively free of scandal. The system provides income support with dignity, without a humiliating means test. It should not now be attacked by exaggerated claims of work disincentives. If further research warrants it, possibly the "work test" should be more diligently and firmly administered, or the experience-rating system perfected. Otherwise, the unemployment insurance system can be left intact without severely prejudicing the nation's chances for full employment.

APPENDIX A

Cross-Section Model for Estimating Expected Durations of Unemployment

ASSUME a heterogeneous labor supply.[43] Job search is conducted in continuous time, with the escape rate, p, characterizing a searcher's chance of leaving unemployment.[44] Variations in acceptance wages and personal characteristics give unemployed workers different escape rates. But a particular individual is assumed to have a fixed escape rate, irrespective of his

43. This model was developed by Salant in "Search Theory and Duration Data," although it appears to have some similarity to a model of employment developed by H. Silcock, "The Phenomenon of Labour Turnover," *Journal of the Royal Statistical Society*, vol. 117 (pt. 4, 1954), pp. 429–40.

44. The continuous-time escape rate, p, in this cross-section model is related to the discrete continuation rate, r, in the time-series model by the equation $e^{-p} = r$. The rate p varies between zero and infinity as r varies between 1 and 0.

duration of unemployment. Assume further that escape rates are distributed among unemployed workers according to a gamma distribution:[45]

$$dG(p) = \frac{a^b p^{b-1} e^{-ap}}{\Gamma(b)}, \tag{A-1}$$

where $p > 0$, $a > 0$, and $b > 0$ are fixed but unknown parameters. Also,

$$\Gamma(b) = \int_0^\infty x^{b-1} e^{-x}\, dx.$$

From this expression is derived the distribution of (1) the unobserved completed spells of unemployment, and (2) the observed incomplete spells of unemployment. The mean of the distribution of completed spells is the object of this estimation and it is found to be given simply by

$$ED = \frac{a}{b-1}. \tag{A-2}$$

The parameters a and b must be estimated from the data on unemployment spells by the Bureau of Labor Statistics from its Current Population Survey. The distribution of incomplete spells is derived using the information that the probability of being included in the household sample as an unemployed worker is proportional to the duration of unemployment. The distribution turns out to have the density

$$g(T) = (b-1)\, a^{b-1}\, (a+T)^{-b}, \tag{A-3}$$

where T is the duration of an interrupted spell of unemployment. Equation (A-3) can be integrated over any time interval ($t_1 \leq T \leq t_2$) to find the number of spells caught within that interval by the survey:

$$N(t_1, t_2) = \int_{t_1}^{t_2} g(T)\, dT = \left(\frac{a}{a+t_1}\right)^{b-1} - \left(\frac{a}{a+t_2}\right)^{b-1}. \tag{A-4}$$

The Bureau of Labor Statistics collects data on the number of unemployed workers with incomplete spells within specified intervals (t_1, t_2), and groups them into categories as follows:[46]

45. The gamma distribution is arbitrary but very convenient.

46. The divisions are halfway between the groups, so that the boundaries are 0, 4.5, 6.5, and so forth.

Weeks	*Weeks*
0–4	11–14
5–6	15–26
7–10	27–51
	More than 52

A maximum-likelihood method was used to fit equation (A-4) to the data. This method provides asymptotically unbiased estimates of the parameters and of the covariance matrix of the parameters. The derivatives of the log-likelihood function are nonlinear in the parameters, so a numerical search procedure was used to find the optimum parameters, $\hat{a}$ and $\hat{b}$. The last column of table 2 presents the estimated expected durations computed from equation (A-2), together with their asymptotic standard errors.

This method for estimating expected durations from BLS data differs from that used with unemployment insurance data because the data sets differ substantially. However, the two models are consistent in their assumptions about unemployment. The cross-section model makes stronger assumptions about escape rates than does the time-series model. The first assumes that individual escape rates are constant, with heterogeneity leading to sorting and to falling cohort escape rates. The second makes no assumption about individual escape rates, but assumes exponentially rising continuation rates for each cohort. It can be shown that the cross-section model also implies such exponentially rising rates.

APPENDIX B

A Model for Estimating Insured Continuation Rates and Expected Duration

CONSIDER the problem of expressing insured unemployment as a function of job layoffs and recent continuation rates.[47] Let t represent the current week. Suppose S_{t-1} workers began insured unemployment spells last week,

47. Further details of this model can be found in Stephen T. Marston, "An Econometric Analysis of the Unemployment Insurance System in a Local Urban Labor Market" (Ph.D. dissertation, University of Michigan, 1974).

in most cases because they were laid off from their previous jobs. The number of workers unemployed this week who have been unemployed just one week is the number of the S_{t-1} workers who remain unemployed this week:

(B-1) $$U_{t,1} = r_{t,1}S_{t-1}.$$[48]

Similarly, the number of workers unemployed j weeks is equal to the number laid off j weeks ago who have remained unemployed during all of the intervening weeks:

(B-2) $$U_{t,j} = r_{t,j}r_{t-1,j-1} \ldots r_{t-j+1,1}S_{t-j}$$

(B-3) $$U_{t,j} = \left(\prod_{m=0}^{j} r_{t-m,j-m}\right)S_{t-j},$$

where $r_{t-j,0}$ is defined as 1.

The total number of insured unemployed workers in the current week is the sum of the number of workers still unemployed from layoffs in each of the previous weeks up to the 26-week maximum duration of unemployment insurance benefits:

(B-4) $$U_t = \sum_{j=0}^{26} U_{t,j}$$

(B-5) $$U_t = \sum_{j=0}^{26}\left(\prod_{m=0}^{j} r_{t-m,j-m}\right)S_{t-j}.$$

Not all insured workers are eligible for 26 weeks of benefits. With δ_j defined as the fraction of initial claimants with a potential period of benefits of at least j weeks,

(B-6) $$U^*_{t,j} = \delta_j U_{t,j}$$

represents the number of insured unemployed workers who are still eligible for benefits—that is, who have not yet exhausted their benefits. Here, U^*_t is again the sum of the insured unemployed with duration up to 26 weeks.

(B-7) $$U^*_t = \sum_{j=0}^{26} \delta_j\left(\prod_{m=0}^{j} r_{t-m,j-m}\right)S_{t-j}.$$

This equation relates the level of insured unemployment to the flow of job

48. The first subscript on the continuation rate, r, represents the week of unemployment the cohort of workers is passing through with a probability r, and the second subscript represents how long they will be unemployed at the completion of that week.

losers. It can be estimated if a functional form is specified for the continuation rates. In view of the many studies that have been made of labor market transition rates,[49] it is possible to specify a precise form that includes beforehand the known information about continuation rates. The probability of a worker remaining unemployed during the current week must be a random function of the length of his unemployment and the aggregate excess demand for labor:

$$r_{t,i} = a_1 - a_2 e^{-a_3 i} - a_4 e^{-a_5 i} E_t + a_6 D_t + \epsilon_t. \tag{B-8}$$

In this equation, $a_1, \ldots, a_6$ are fixed but unknown parameters, the exogenous variable E_t is a proxy for the excess demand for labor,[50] D_t is a dummy variable for the automobile model changeover in Detroit, and ϵ_t is an independent, identically distributed random disturbance. As can be seen in figure B-1, the form allows the continuation rate to rise (the escape rate to fall) the longer a worker has been unemployed, but the rate of increase declines so that the continuation rate stays within the acceptable bounds for a probability.[51] Further, the curve shifts down when the demand for labor rises, and up when it falls. The three curves in figure B-1 are drawn for three different values of E. In the terminology of Markov chains, the probability of transition from unemployment to employment is nonstationary, because it varies with the duration of unemployment and the demand for labor.

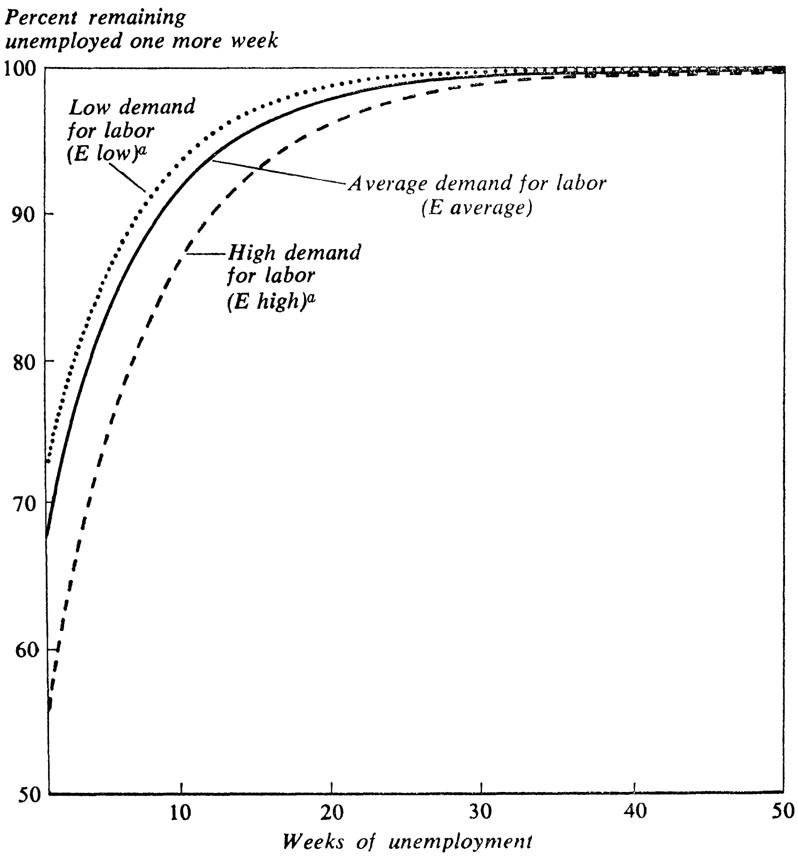
Equation (B-8) is substituted into equation (B-7), expressing U_t as a nonlinear function of the known variables S_t and E_t, and the parameters $a_1, \ldots, a_6$. The δ_j are taken to be constants and estimated directly from the Michigan data on potential duration. The parameters $a_1, \ldots, a_6$ are estimated by a least-squares algorithm, which minimizes the squared error about the dependent variable, U_t, over the space of allowable parameters. The algorithm allows for autocorrelation of the residuals. The estimated equation for the continuation rate, with standard errors in parentheses, is

49. George L. Perry, "Unemployment Flows in the U.S. Labor Market," *BPEA* (2:1972), pp. 245–78; Kaitz, "Analyzing the Length of Spells of Unemployment"; and Hall, "Turnover in the Labor Force."

50. Several definitions for E_t have been discussed and tested. The best definition is the total rate of job accessions divided by the rate of unemployment; see Marston, "Econometric Analysis of the Unemployment Insurance System."

51. Continuation rates rise with duration for several reasons, but the most important is the sorting effect upon a heterogeneous labor pool. The longer a cohort of workers has been unemployed, the fewer easily employable workers remain in it and the smaller the fraction of the remaining workers who find jobs during a succeeding week.

Figure B-1. Insured Continuation Rates Estimated from Insured Unemployment Equation



Source: Equation (B-8), discussed in the text.
a. E = labor market tightness.

$$\text{(B-9)} \quad r_{t,i} = 1 - \underset{(0.128)(0.100)}{0.282e^{-0.173i}} - \underset{(0.073)(0.109)}{0.116e^{-0.0984i}E_t} + \underset{(0.065)}{0.146\,D_t}.$$

$R^2 = 0.966$, in terms of the error in predicting U_t from equation (B-7).

The method uses a priori information to minimize the number of parameters that must be estimated from the data. Standard distributed-lag models, such as those of Almon or Koyck, make inappropriate assumptions about the lag weights and are incapable of incorporating the special interaction between E_t and S_t. The resulting distributed-lag model with variable weights has been shown to generate accurate forecasts of insured unemployment.

Continuation rates can be forecast for any values of the independent variables by substituting them into equation (B-9). In this paper the values of E_t and D_t are taken as the values appropriate to the United States in 1969 to make the continuation rates for the insured unemployed comparable with the continuation rates for all the unemployed calculated from U.S. data for 1969.

The variables U_t and S_t are monthly administrative time series gathered in the Detroit SMSA over the years 1966 through 1971. The first, U_t, measures "continued claims," the number of workers declaring a week of unemployment under the unemployment insurance system; S_t measures "initial claims," the number of workers declaring a recent layoff from insured unemployment.

To calculate expected duration, assume all variables are constant over the year studied. Then equation (B-5) can be written in a steady-state form:

$$U = \left(\sum_{j=0}^{\infty} \prod_{m=0}^{j} r_m\right) S. \tag{B-10}$$

The expected duration of unemployment is given by the level of unemployment divided by the number of spells initiated (and completed) per week:

$$ED = \frac{U}{S} = \sum_{j=0}^{\infty} \prod_{m=0}^{j} r_m. \tag{B-11}$$

This is the mean for completed spells because it represents the total number of weeks of unemployment divided by the number of spells. This ratio is needed to deduce the impact of unemployment insurance on unemployment. Equation (B-11) shows that ED is calculable directly from continuation rates, r. It is used to calculate expected duration for the insured, ED_I: The continuation rates for the insured are substituted up to the maximum 26 weeks and the rates for the uninsured after 26 weeks, when benefits have been exhausted.[52] An earlier section provides evidence that a shift in transition rates does in fact occur. The only remaining task is to add a very small period, estimated to be the mean delay between the onset of unemployment

52. After 26 weeks no one is insured (in 1969), so the estimated continuation rates for all the uninsured can be used as the rates for the uninsured. These are provided by Kaitz, "Analyzing the Length of Spells of Unemployment," p. 13.

and the claiming of benefits. This period includes the mean delay between separation and initial claim both for claimants who file immediately and those who lag in filing. Since more than 90 percent of claimants file as soon as possible, the aggregate mean is only 1.10 weeks.[53]

53. William H. Andrews, "Time Lapses in Filing Employment Security Benefit Claims in Indiana," Prepared for the Indiana Employment Security Division and the U.S. Department of Labor (1958; processed).

Comments and Discussion

Robert E. Hall: This is a careful, thorough study of the issue of duration in the insured and uninsured groups of unemployed. I have no criticism of the calculations themselves, but I wonder how much can be learned from this comparison between the insured and the uninsured. Irrespective of any technical problems in such comparisons, I think Feldstein may have done a disservice in focusing on relative duration as a way of getting at the issue of the incentive effects of unemployment insurance. Marston has disposed of Feldstein's original estimates quite effectively, but I wonder whether analysis should have taken this approach in the first place.

The approach runs into problems because it is extremely difficult to disentangle the behavior of the insured from the behavior of job losers. Basically, most job losers are insured, while very few of the other unemployed workers are insured. Inspecting the data on continuation rates for people grouped according to the reason for their unemployment, I find that the rates are much higher among job losers than among job leavers: the monthly continuation rate is roughly 0.75 for losers and about 0.5 for leavers. Presumably, Marston's careful adjustments for the demographic composition of unemployment account for a big part of that difference. But setting aside the demographic problem, the higher continuation rates of the job losers imply that, for whatever reason, those that are insured take much longer to leave unemployment than those who are not.

While the paper adjusts for the demographic composition, it cannot adjust for this fundamental fact that most of the insured have lost their jobs while most of the uninsured have left their jobs or just entered the labor force. Moreover, the uninsured unemployed include only a special group of job leavers. Many job leavers never become unemployed at all, especially in a tight labor market like 1969. Only those who fall into the "Perry pothole" (as analyzed in *BPEA*, 2:1972) appear in the ranks of the unemployed.

Marston judges that, if anything, this comparison of durations overstates the difference caused by unemployment insurance, because job losers would normally have longer spells of unemployment aside from the effects of unemployment insurance. But I can think of several reasons why job losers might have shorter spells than the other unemployed, so that the measured difference might understate the true effects of unemployment insurance. First, the new entrants and reentrants have less information about the labor market, and it would be rational for them to look longer because they have to gather information that laid-off workers already have. Second, many workers who are laid off are ultimately recalled to their previous jobs, which means that much insured unemployment has fairly short duration. Furthermore, knowing that they can become eligible for unemployment benefits after a disqualification period may lead many job leavers to remain jobless longer than they otherwise would. This is an effect of the system on the duration of unemployment of uncovered workers, and it represents another bias concealing its true impact.

The study of post-exhaustion data is not well integrated into the rest of the paper. I agree with Marston that one learns little from these data, because the exhaustees represent only 6 percent of those who get into the unemployment insurance system. But, to the extent that they are believable, the results are alarming. Right after exhaustion, the rate of leaving unemployment shoots up (see Marston's figure 2). Part of that increase consists of people who leave the labor force, but part clearly consists of those who take jobs. If every insured worker were delaying his exit from unemployment to the same degree as, apparently, do those who have exhausted their benefits, unemployment insurance would be lengthening unemployment substantially.

This paper seems to assume the need for a policy that shortens unemployment. The "good" of unemployment insurance is taken to be the redistribution of income, and the "bad" is taken as the inefficiency of longer spells. These judgments presume that there are no external economies associated with unemployment. I have written a paper that suggests that unemployment has important external economies, because the unemployed act as a "spare tire" for employers. Thus, unemployment insurance may be just what is needed to compensate unemployed workers for providing that service.

Charles C. Holt: Stephen Marston's paper constitutes a significant piece of work, the best investigation yet on the effect of unemployment insurance on unemployment. I would like to raise some questions about the theoretical specification and the statistical methods and then comment on some policy issues that the paper helps to clarify.

First, I want to express my doubts about the formula for the continuation rate used in the paper, which makes that rate exponential with the duration of unemployment. Appendix A contains certain assumptions about the probability distributions of continuation rates for particular individuals having to do with the so-called sorting process, which the paper doesn't really discuss. The rigorous theory in that appendix has implications for the specification of the continuation rate, and I think that the question of the correct functional form for that rate justifies more attention.

As this paper clearly says, the continuation rate reflects a kind of residual category. The decision that people are making each month is to accept a job or, alternatively, to leave the labor force. If they do neither, they *continue* to be unemployed. The two decisions are subject to quite different considerations, so that a more correct and more adequate theoretical specification would be to estimate the two types of behavior independently. For practical estimation purposes, the form Marston has used is probably adequate, but that issue needs to be dealt with in further work.

The discussion in the paper of duration of unemployment as measured in the Current Population Survey does not capture all of the special features of that survey. The CPS is more complicated than a random sample that simply asks people whether they are unemployed and for how long. The sample is "reentrant": an individual is in the sample for four months, out for eight months, and back in for another four months. Autocorrelation will arise between successive months, because many of the individuals in the sample this month will be in it the next month. This process will not necessarily bias the results, but a procedure that explicitly accounts for the longitudinal aspects of the CPS could be more powerful.

Given that unemployment insurance increases unemployment, is this "good" or "bad"? The paper explicitly leaves this question to further study, but I will list some of the effects. Unemployment insurance will raise wages because of better job matching and enhanced productivity, and this result is certainly good. The production lost during longer search time could be considered bad, though the increase in leisure would be an offsetting good. Unemployment insurance inhibits withdrawal from the labor force, resulting in an increase in unemployment that is not associated with lost production, as Martin Feldstein implicitly assumes. The increase in labor force participation may lead to more output and so it is good, though the effect is probably small and costs something in leisure. The net social effect of this type of unemployment increase is very subtle, compared to the clear losses that result from deficient demand.

When unemployment is high, unemployment insurance is unlikely to have much effect on employment. Most of its effect on unemployment will be concentrated on labor force participation. So I don't think we have to worry that unemployment insurance significantly depresses output when we are concerned about very high levels of unemployment.

If the effects of unemployment insurance on the duration of unemployment are deemed undesirable, the remedy is not necessarily a cut in benefits. An alternative is institutionalizing job search; people who don't find work for themselves could be placed by an intensified employment-service effort.

The philosophy of the manpower programs that have been developed in Sweden is implicitly critical of U.S. practices regarding unemployment insurance. The Swedes argue that it is a great waste simply to pay an unemployed worker benefits that are almost as large as the cost of a training program. If the worker is quickly enrolled in such a program, the period of joblessness is used for building human capital and not lost. Whether this practice is desirable depends upon how much unemployment time is productively spent *searching* and how much time is lost in just *waiting*. But the Swedish approach highlights the need to examine the interaction between unemployment insurance and other kinds of manpower programs.

Martin S. Feldstein: Stephen Marston has given us a pioneering paper on an important topic. He applies imaginative statistical techniques to a wide range of data. The results represent the first estimates based on microeconomic data that are not vitiated by limiting the analysis to a single state.

Reasonable people can differ about the definition of "large" and "small" effects. To me, Marston's estimates imply that the unemployment insurance program has a "large" effect: its impact on duration alone would raise the annual number of unemployed workers (in a more typical year than 1975) by more than 500,000.

Unemployment compensation can affect the level of unemployment in two very different ways. First, for those who are already unemployed, it provides an incentive to lengthen unemployment. Second, for both employers and employees involved in unsteady work—seasonal, cyclical, and casual—it provides an incentive to organize production in a way that increases unemployment by aggravating seasonal and cyclical variations and by making casual and temporary jobs too common; it does so by raising the net wage to the employee relative to the cost to the employer. In particular, the current unemployment insurance system with untaxed benefits and imperfect experience rating of employers encourages temporary layoffs instead of the smoothing of production or variation in inventories and in average hours. The more I think about unemployment and about the unemployment insurance system, the more important I believe these temporary layoffs to be. Even in a year of relatively high unemployment like 1971 (when the unemployment rate was 5.9 percent), manufacturing firms were rehiring about 85 percent of the workers that they had previously laid off.

This effect of temporary layoffs is ignored by Marston's estimates, which deal exclusively with the effect of unemployment insurance on duration. Moreover, temporary layoffs may create a quite different problem in interpreting Marston's results on duration. If those temporarily laid off suffer shorter joblessness than others who must find a *new* job, an increase in the number of temporary layoffs would tend to lower the duration of insured unemployment relative to the duration of uninsured unemployment. Since 85 percent of those laid off in manufacturing are rehired by the same firms, this effect of induced layoffs could be large.

With these two caveats in mind, let me summarize Marston's estimates and their implications for the effect of unemployment insurance on the unemployment rate. After adjusting for demographic differences between the insured and the uninsured, Marston estimates that the average duration of completed spells of unemployment is 31 percent greater for the insured unemployed than for the uninsured unemployed. Since approximately 50 percent of the unemployed are covered by unemployment insurance, Marston's estimate implies that eliminating the system would reduce the mean duration of unemployment for *all* the unemployed by 12 percent. With the unemployment rate averaging 4.8 percent for the past twenty-five years, a

12 percent reduction would lower it by 0.58 percentage point. For the current labor force of approximately 90 million, this entails additional unemployment of 500,000 man-years annually. Furthermore, this calculation ignores the additional unemployment caused by more frequent layoffs and, because of the effect of temporary layoffs on the duration of insured unemployment, may understate even the duration component of the induced increase in unemployment.

This estimate is somewhat greater than Marston's. He ignores the covered unemployed during the period before they register. Since he estimates that this period averages 1.1 weeks out of the total mean duration of 5.6 weeks, the official number of covered unemployed must be increased by nearly one-fourth. Although this group is not receiving benefits, their behavior will be influenced by the knowledge that they can collect if they do not become employed. This element helps to reconcile Marston's estimate with my guess for the Joint Economic Committee that the lengthening of duration caused by unemployment insurance added 0.75 percentage point to the unemployment rate. My estimate was for 1971–72, when the unemployment rate was 5.75 percent. The 12 percent reduction implied by Marston's figures indicates a change of 0.69 percent. I am surprised at how close these two estimates are.

Although Marston has no specific data on the subject, he suggests that women and young people may be more sensitive to the incentives of unemployment insurance than adult males. Using an arbitrary procedure to choose a relative differential, he obtains a new estimate for the differential in aggregate duration of between 16 and 22 percent. He then uses 16 and 31 percent as lower and upper bounds on the differential attributable to unemployment insurance. I don't think that the lower bound deserves serious attention. The procedure of maximizing the differential subject to the constraint that the duration does not fall for men is purely arbitrary. Moreover, it could be argued that, with their family responsibilities, adult males, in the absence of unemployment insurance, would be forced to obtain a new job as quickly as possible while secondary workers could take their time. This line of reasoning suggests that primary workers may be more sensitive to unemployment insurance than secondary workers. Estimates based on this assumption would imply a greater differential in aggregate duration than 31 percent; if 16 percent is a plausible lower bound for the differential, the plausible upper bound is likely to be substantially higher than 31 percent. In the absence of any information to the contrary, it seems best to focus on the 31 percent estimate while acknowledging a range of possible values above and below it.

I turn now to some technical comments on Marston's method of estimating the effect of unemployment insurance on mean duration. He develops a useful statistical model of stochastic duration with which to calculate expected durations of completed spells. He tries hard to adjust for demographic and cyclical effects in order to make the durations for the insured and the uninsured as comparable as possible. Nevertheless, the computation has so many problems that I am frankly surprised that Marston's estimates are so plausible.

First, an insured unemployed individual and an uninsured one are very different from one another even after account is taken of demographic differences. The uninsured unemployed are mostly new entrants, reentrants without sufficient recent experience, workers who quit their previous jobs, and those who previously worked in uncovered employment in such atypical industries as agriculture and domestic service. In contrast, most of the insured unemployed are workers with sufficient employment in covered occupations to be insured, who have been temporarily or permanently laid off. Surely, the expected durations of unemployment for these two groups would be very different even if unemployment insurance had no effect.

Second, Marston's data on insured unemployed workers come from the Detroit SMSA, where the character of insured unemployment is bound to be heavily influenced by the auto industry. For example, because of their high wages, auto workers with seniority who are laid off are unlikely to look elsewhere for employment; their durations of unemployment are determined by their employer rather than by themselves. It is significant, therefore, that the unemployment insurance program in Michigan has an atypical experience rating. The 6 percent maximum tax on employers in 1971 was the highest in the country, nearly double the average of 3.5 percent. Baily recently reported that in 1967 only 14 percent of Michigan unemployment insurance benefits in manufacturing were charged to firms at the maximum tax (for which additional benefits therefore imply no additional costs), while the corresponding figure was 50 percent in Massachusetts and 59 percent in New York.[1]

Third, comparing the duration of insured unemployment in Detroit with

1. Baily, "Unemployment and Unemployment Insurance," p. 35.

that for the nation raises new problems of adjusting for labor market tightness. The national estimate is based on the 1969 Current Population Survey, while the estimate for the Detroit SMSA is based on time-series data for 1966 through 1971. During these years there was substantial variation in unemployment. Unfortunately, in the regression equation used for this adjustment the relevant coefficients are very imprecise: −0.098 with a standard error of 0.109 and −0.116 with a standard error of 0.073.

Fourth, as a further problem in measuring the duration of insured unemployment, Marston's data allow him to measure only the mean length of the insured spell from the time that the individual registers with the unemployment insurance agency. Some individuals will not register immediately after they have been laid off. The scheduling of unemployment claims apparently also involves a delay. Marston estimates that an additional 1.1 weeks must be added to the calculated Detroit mean to get a correct total duration for the insured unemployed. The only basis for this estimate appears to be a 1958 report by the Department of Labor based on Indiana experience; and it is nearly as large as the entire differential between insured and uninsured unemployment.

I am puzzled by Marston's conclusion that the average ratio of unemployment insurance benefits to lost net wages could be as low as 50 percent. As he notes, in my study for the Joint Economic Committee, I provided examples of "typical" situations in Massachusetts, where unemployment insurance would replace more than 80 percent of the net earnings lost by an additional week of unemployment. Because these results were criticized as reflecting atypical families in an atypical state, I prepared extensive calculations for all states and for thirteen family types.[2] For men with median earnings for their state, the national mean replacement rate exceeds 60 percent; for women with median earnings, the replacement is over 70 percent. The unemployed have earnings lower than the average; men with 70 percent of the earnings of their state have a national average replacement rate of 69 percent, while married women at that relative level have a 78 percent replacement rate. Marston reports that even the unemployment insurance service of the Department of Labor finds that benefits are in the range of 60 to 70 percent of net wages. His lower bound of approximately 50 percent appears to be a compromise between this evidence and the estimate of Munts and Garfinkel that the relevant replacement rate is only between 40

2. Feldstein, "Unemployment Compensation: Adverse Incentives and Distributional Anomalies."

and 50 percent.[3] The Munts-Garfinkel analysis suffers from at least two problems: First, they chose Ohio for their calculation. In 1971 (their sample covered 1971–72) only five states had a lower level of maximum unemployment insurance benefits than Ohio ($47) although over forty states had a lower average wage in covered employment. For states with comparable average wages ($155 to $165), maximum benefits were 20 percent higher including dependents' allowance and 50 percent higher for a worker with no dependents. Second, their "replacement ratio" is the ratio of unemployment insurance benefits to the sum of lost net wages plus fringe benefits. Since they estimate that these fringe benefits are approximately 25 percent of the gross wage and an even higher fraction of the net wage, this adjustment is very important. Because this relative value of fringe benefits relates to all workers, this figure no doubt overstates the benefits lost by the unemployed, many of whom have health and pension benefits that are poorer than the average. Moreover, a substantial portion of the fringe benefits—approximately one-third is accounted for by leave time including paid holidays and another third by retirement programs—may not be affected by temporary layoffs. I still believe that the best summary of this issue is that for most covered workers unemployment insurance now replaces approximately two-thirds of lost net earnings.

Marston carefully avoided discussion of the welfare effects of unemployment insurance and the policy implications of his findings. Nevertheless, he concluded that the "advocates of unemployment insurance quite probably could justify this small cost [of increased unemployment] in terms of income redistribution and the more efficient job matches that longer searches permit." Recall, however, that Marston's figures imply an extra 500,000 man-years of unemployment annually, and that this increment relates to only part—perhaps only a small part—of the extra unemployment induced by the current unemployment insurance system. Note also that my analysis of the Pechman-Okner MERGE file implied that in 1970, only one-sixth of unemployment insurance benefits went to families with incomes under $5,000 while one-sixth went to families with incomes over $20,000. Furthermore, does unemployment insurance increase the "efficiency" of job matches, or, instead, induce longer searches that, because they are subsidized, are wasteful for society even though they are economically rational for the individuals?

3. Munts and Garfinkel, *Work Disincentive Effects of Unemployment Insurance.*

Although I have stressed the limitations of Marston's analysis, it must be regarded as an important assault on a difficult problem. The substantial estimated effect of unemployment insurance on duration deepens my conviction that the time has come to consider ways of reducing the harmful disincentive effects of the system through such means as (1) including benefits in taxable income, (2) improving experience rating of employers by eliminating the minimum and maximum rates, and (3) using unemployment loans as well as nonrepayable benefits as part of the program. If the sources of adverse incentives are removed or reduced, the unemployment insurance program can be expanded and the benefits enlarged without fear of harmful effects.

Stephen T. Marston: Martin Feldstein identifies my estimate of the maximum impact on unemployment duration with the impact itself. Contrary to Feldstein, 31 percent is a high estimate of the expansion in unemployment duration due to unemployment insurance for at least two reasons: (1) My demographic adjustment assumes proportional increases in duration for each group, whereas a more realistic assumption of greater increases for secondary workers would lower the estimate. (2) Even after listening to Hall, I am convinced that job losers remain unemployed longer than other unemployed workers, other factors aside. If I were able to allow for the special problems of job losers, my estimate would be cut still further.

Moreover, my estimated 31 percent lengthening of unemployment will not necessarily translate into a similar expansion of unemployment unless the number of spells of unemployment and the behavior of uninsured unemployed workers do not change. But in a world of limited employment opportunities, some of the shortening of unemployment of insured workers would mean displacement of other workers, thus probably leading to an unemployment impact less than the estimated duration impact.

Finally, my estimated impact on unemployment has two parts: a weakening in employment and a strengthening of labor force participation. Only the former is likely to cut output; the latter, if it has any effect, must certainly be favorable to the Phillips curve.

The last two objections will be especially serious if one extrapolates my results to weaker labor markets, as Feldstein does. The impact on employment will not be proportionally increased with a hike in the unemployment rate; in fact, it will be reduced.

The issue of the mathematical form of the continuation rate mentioned by Charles Holt might be important for estimating the continuation rate itself, but not for estimating the expected duration of insured unemployment. I tried various alternative forms, including one derived from the theoretical specification of appendix A; they all fit slightly worse than the one I used, but gave similar expected durations.

General Discussion

The panel emphasized the impact of unemployment insurance upon both dimensions of the Phillips curve. Franco Modigliani viewed unemployment insurance as artificially increasing a variable that reflects labor market pressure, such as job vacancies. This process would have the effect—mentioned in the paper and emphasized by Michael Wachter—that wages would be pressed upward at the same time that unemployment swelled. Thus, even if output and employment were exogenous, a possibility discussed by Wachter and Barry Bosworth, unemployment insurance would still have the undesirable impact of increasing wage inflation. Nonetheless, Bosworth concluded from recent estimates of labor demand and wage elasticity that the increase in unemployment would be small, even if unemployment insurance pushed up wages significantly. Arthur Okun reminded the panelists that unemployment insurance has an effect that operates in the opposite direction—namely, that it keeps discouraged workers in the labor force where they exert downward pressure on wages.

Robert Hall reiterated his view that job losers might have a shorter duration of unemployment than other unemployed people if not for the impact of unemployment insurance. He cited a few examples; but Stephen Marston thought the reasons could not outweigh the special disadvantages faced by job losers in finding employment as compared with voluntary job leavers. Okun pointed out that job losers will have employment information inferior to that of job leavers, although perhaps better than that of new entrants into the labor force. Hall replied that conventional thinking on these points could not be relied upon and cited a surprising finding that job losers get a greater increment in wages moving from one job to the next than do voluntary job leavers.

Empirical evidence on this point is difficult to interpret because job losers and unemployment insurance recipients are so closely associated that it is nearly impossible to determine the separate contributions of the two factors to unemployment duration. George Perry, Martin Feldstein, and Hall agreed that Marston's data showing that the expected duration of unemployment of job losers was longer than that of other unemployed persons was indicative but not conclusive, in that this relationship could have been due to demographic factors or to unemployment insurance itself.

Lawrence Klein suggested a similar bias. If insured unemployed workers come from occupations and industries much different from those of the uninsured unemployed, these factors will be confused in Marston's analysis with the impact of unemployment insurance itself.

Responding to an issue raised by Feldstein, Marston defended his assumption that primary workers are no more susceptible to unemployment insurance incentives than are secondary workers, citing a study by Lininger and the force of custom on primary workers. Bosworth agreed, pointing to the findings of the New Jersey experiment with the negative income tax.

Bosworth also thought that that experiment supported Marston's general finding that the work-incentive effects of income subsidies are relatively small. But Hall disagreed with that interpretation, saying that the 50 percent marginal tax rate imposed by the experiment reduced labor supply by 8 percent.

Modigliani favored unemployment insurance policies that minimize the amount of unproductive unemployed time but do not cut into productive job-search time. He qualified that position, however, since both productive and unproductive extensions in time unemployed will have the effect of pushing up wage inflation. Like Charles Holt, Modigliani and Wachter both thought America had a lot to learn from Sweden in its programs for unemployed workers. R. J. Gordon considered the negative income tax as a substitute for unemployment insurance, whose income inequities it would repair.

Stanley Horowitz shed some light on the productivity of increased unemployment time resulting from unemployment insurance. Research by his colleague, Kathleen Classen, indicates that, although workers remain unemployed longer the more they receive in unemployment benefits, they do not find better jobs after their extended unemployment.