# The Effects of Unemployment Insurance on the Duration of Unemployment and Labor Force Participation

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## I. Introduction

As is common in any social insurance program, problems of "moral hazard" of unemployment insurance(UI) benefits program have been raised and subject to extensive empirical investigation. Proponents of the hypothesis argued that UI benefits provide a disincentive to work by lowering the return to an additional supply of work and the price of leisure. The reduction in the private cost of unemployment induces unemployed workers to choose a higher reservation wage and lower search intensity. The result is to increase the average duration of existing unemployment spells as well as the number of unemployment spells. Many of past studies of the impact of UI have found evidence that UI benefits result in longer durations of unemployment(see Table 1 ). This consequence was predicted early by W. H. Beveridge who had contributed to the establishment of modern welfare programs.[1)]

On the other hand, Mortensen(1970, 1977) argued that higher UI benefits per period or a longer duration of such benefits will raise the potential gains to being employed because employment is associated with a

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positive probability of being unemployed in the future and receiving UI benefits. For those currently receiving UI benefits search intensity tends to rise and the reservation wage tends to fall in response to an increase in the amount of UI benefits as the time left to receive the benefits approaches to zero. Here, UI is seen to contribute allocative efficiency in the labor market. Hamermesh (1979,1980) has directed attention to the entitlement effect of the UI program, that is, the UI benefits will induce increases in labor supply as workers seek to become eligible or increase their potential benefits amount under the program. UI is hence expected to reduce the likelihood of dropping out of the labor force and encourage participation in the labor force. The literature concerning UI's impact on labor supply behavior is less extensive.

This paper reports the result of estimating the impact of state UI benefits on unemployment duration and labor force participation rates. Section II describes the effect of UI benefits on the work-leisure tradeoff. Section III examines the effect of UI on unemployment duration. In section IV the effect of UI on labor force participation rates are examined. Section V contains a summary and concluding remarks.

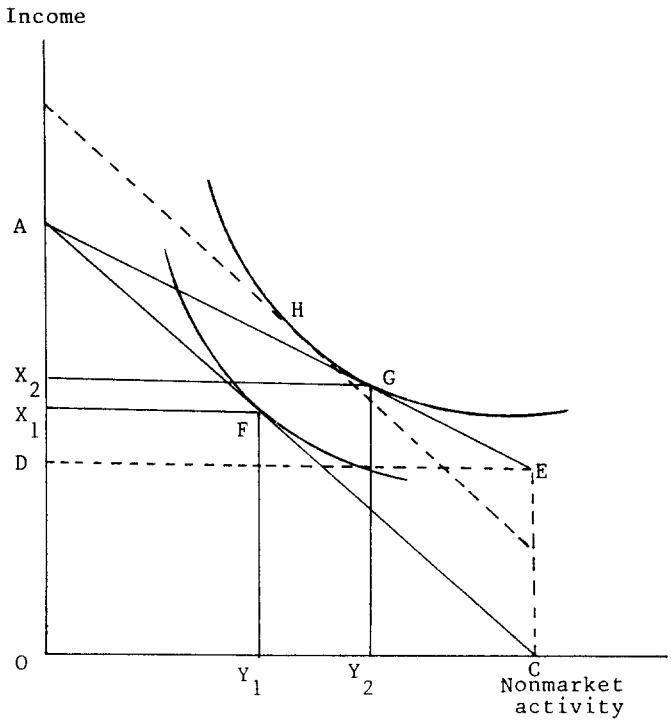
## Ⅱ. Unemployment Insurance and the Work-Leisure Choice

The effect of UI benefits on the choice between work and leisure of an average worker is shown in Figure 1. The individual is assumed to maximize utility which is a function of total net income over the period and of weeks of unemployment. In Figure 1 the vertical axis measures income per period and the horizontal axis the number of weeks spent on non-income earning activities over the year. In the absence of UI benefits the tradeoff line between income and nonmarket activity over the year is given by the budget constraint AC, the slope of which is determined by the individual's after-tax weekly wage, W. The line AC indicates that an additional week of unemployment lowers income by W. If there is a weekly UI benefit amount, B, equivalent to an annual sum OD which is equally distributed over OC weeks, his tradeoff is modified to the line AE. The line AE portrays that each additional week of unemployment lowers income by only W - B. This amount can also be written as W(1-R), where R=B/W

is the UI replacement ratio. Along with the shift of the tradeoff line from AC to AE the most preferred income-leisure combination moves from the point F to the point G.

The shift from F to G may be decomposed into two components. First, the UI benefit increases the potential welfare of the worker(even if the relative income derived from work and unemployment remains the same). Being better off, he will normally consume more of each of the "goods," income and leisure (unemployment). The additional consumption of unemployment due to income effect is shown by the movement from the point F to the point H. Second, the introduction of UI benefit lowers the price of work. This change of the relative rewards to work and leisure induces a substitution of leisure for work. This is shown by the movement from the point H to the point G. These two effects normally reinforce one ano-

Figure 1. Effect of Unemployment Benefits on the Work-Leisure Choice



ther in increasing the amount of unemployment. The shift from the point F to the point G in Figure 1 indicates that the presence of UI increases both income and unemployment.

## Ⅲ. The Effect of Unemployment Insurance on the Duration of Unemployment

This section tests the hypothesis that UI benefits were to a certain extent responsible for the increase in unemployment duration. The hypothesis will be tested using pooled data of cross-section U.S. states over the period 1976-1980. If the hypothesis were to be supported, unemployment duration will be highest in states where unemployment and earning-related benefits are most generous. Therefore, a positive relationship is expected between the UI benefits variables and the duration of unemployment.

Most of previous empirical studies of UI benefit effects on unemployment duration used samples on individual recipients.[2] Some of them are summarized in Table 1.[3] Almost all of these studies found that UI benefits result in longer durations of unemployment. The aggregate data lack demographic and sociological information appeared in many of individual data. However, some evidence indicates that the explanatory power of such variables as age, sex, race, marital status, skill, schooling, and assets, is weak.[4] It will be of interest to see whether the findings from the aggregate data confirm the findings from the individual data on the impact of UI benefits on unemployment duration.

### 1. The Model

The hypothesis that UI increases unemployment duration may be formulated either from a neoclassical work-leisure choice framework or from a job search unemployment framework. A standard regression equation used in estimating the relationship between unemployment duration and UI benefits is of the form : $D = a_0 + a_1 R + \sum_{i=2}^{n} a_i X_i$ (1)

where D is the duration of unemployment, R is a UI benefit measure, and $X_i$ is

Table 1. A Summary of Empirical Studies on the Effects of UI on Unemployment Duration

| Study | Effects on the Duration of Unemployment |
|---|---|
| Ehrenberg and Oaxaca(1976) | An increase in the replacement ratio from .4 to .5 raises the expected duration of unemployment by amounts varying from .2 weeks for young men to 1.5 weeks for older men. |
| Holen (1977) | A $12 rise in weekly benefit amount (WBA) increases mean spell duration by about 1 week. |
| Welch (1977) | A $10 rise in WBA increases the duration by 1.5 weeks. |
| Hamermesh(1978) | A 10% rise in the replacement ratio increases mean spell duration by about .5 weeks. |
| Newton and Rosen(1979) | The Ehrenberg and Oaxaca (1976) equivalent expected duration of unemployment is 1.8 weeks. |
| Burgess and Kingston(1981) | (1) A $10 rise in WBA increases compensated unemployment by about .5 weeks.<br>(2) A 1 week increase in the maximum duration of benefits increases compensated unemployment by 0.15 weeks. |
| Moffitt and Nicholson(1982) | A 10% increase in the net replacement ratio increases the duration of unemployment by about .8-1.0 week, and an increase of 1 week in the potential duration increases the duration by .1 week. |

is a vector of variables other than R which intend to capture the structural, cyclical, and demographic determinants of unemployment duration.[5] In this paper the basic form of regression equation to be estimated is given by :

$$D_{it} = b_0 + b_1 X_{it} + b_2 R_{it} + b_3 W_{it} \qquad (2)$$

where $D_{it}$ is the average duration of unemployment in state i in year t, $X_{it}$ is a measure of aggregate demand condition in state i in year t, $R_{it}$ is a UI benefits measure in state i in year t, and $W_{it}$ represents a measure of wage level in state i in year t.

In equation (2) the variable of primary interest to this analysis is R, which intends to determine the length of benefits-induced duration of unemployment and expected to show a positive functional relationship with the average duration of unemployment. The weekly benefit amount(WBA) and the benefit-wage ratio(B/W) are alternately used for the UI variable. The wage component in B/W is not adjusted for varying marginal tax rates across states because of data limitations. Other UI variables which might affect unemployment duration, e.g., the potential duration of benefits and eligibility requirement, are suppressed in equation(2).[6] The impact of this simplication should not be too severe because this study is primarily interested in the changes in unemployment duration that are due to cyclical variations in the state UI system. Evidence shows that other UI variables besides the replacement ratio did neither significantly improve explanatory power of the model nor prove to be statistically significant.[7]

The demand variable is represented by state unemployment rate ($U_{it}$) and state employment-population ratio($E_{it}/P_{it}$)alternately. The latter variable is computed as the ratio of employed persons to civilian noninstitutional population of 16 years or over. Unemployment duration will vary directly with the unemployment rate and inversely with the employment-population ratio. The wage variable is represented by average hourly earnings of production workers in manufacturing in state i in year t ($HE_{it}$). When the UI variable is represented by the weekly benefit amou-

nt in regression, average weekly earnings of production workers in manufacturing in state i in year t($WE_{it}$) are used for the wage variable to directly compare the quantitative impacts of UI benefits and wage level on unemployment duration. Sources of these variables are given in Appendix.

2. Empirical Results

Results of estimating equation(2) using pooled data of cross-sectional U.S. states for the years 1976-1980 are presented in Table 2. In equation 1 of Table 2 B/W is statistically significant and has the estimated coefficient of 7.7. This value implies that a 10 percent points increase in the benefit-to-wage ratio increases the unemployment duration by about 8/10 of a week with the margin of error of about 3/10 of a week. In equation 3 of Table 2 WBA is highly significant and has the estimated coefficient of .06. This value suggests that a $10 increase in the weekly benefit amount increases the unemployment duration by about 6/10 of a week with the margin of error of about 1/10 of a week. These results are generally consistent with the results of other studies. Hamermesh (1977), reviewing the twelve empirical studies of UI impact on unemployment, estimated that, of the average duration of insured unemployment 11.6 weeks in 1969, 2.5 weeks can be attributed to UI so that UI benefits raise the average duration of insured unemployment by 27 percent. This figure adds an extra 0.51 percentage points to the average unemployment rate.[8] The present estimation results are also numerically comparable with the results summarized in Table 1.

In equation 4 of Table 2 where both WBA and WE appear in explanatory variables the coefficient on WBA has a positive sign and is highly significant while the coefficient on WE is statistically insignificant. The results of coefficient estimates are more or less unaltered in equations where employment-population ratio replaces the unemployment rate for the demand variable. Empirical evidence presented in Table 2 indicates that state subsidies to unemployed workers are likely to result in a longer duration of unemployment.

Table 2. Estimates of the UI Impact on the Duration of Unemployment

| | Constant | U | E/P | B/W | HE | WBA | WE | $R^2$ |
|---|---|---|---|---|---|---|---|---|
| 1. | 4.4146 | 91.4371 | | 7.6895 | | | | .313 |
| | (3.11) | (10.66) | | (2.55) | | | | |
| 2. | 1.0899 | 89.3477 | | 10.1478 | .4135 | | | .343 |
| | (.68) | (10.42) | | (3.32) | (3.58) | | | |
| 3. | 3.0726 | 84.8848 | | | | .0557 | | .382 |
| | (3.28) | (11.07) | | | | (5.95) | | |
| 4. | 3.0979 | 85.5188 | | | | .0700 | -.0052 | .383 |
| | (3.25) | (10.69) | | | | (5.30) | (1.35) | |
| 5. | 21.3402 | | -13.6382 | -0.1416 | | | | .040 |
| | (8.22) | | (3.12) | (.04) | | | | |
| 6. | 19.3086 | | -21.0028 | 6.6759 | .6316 | | | .127 |
| | (7.66) | | (4.75) | (1.87) | (4.59) | | | |
| 7. | 20.2825 | | -22.2644 | | | .0738 | | .177 |
| | (8.66) | | (5.41) | | | (6.48) | | |
| 8. | 20.9163 | | -23.4923 | | | .0793 | -0016 | .196 |
| | (8.89) | | (5.67) | | | (5.10) | (.36) | |

Notes : Dependent variable is the average duration of unemployment.

Numbers in parentheses are absolute values of t-statistics.

It has been cautioned that investigating work-disincentive effects using the equation of the form (2) suffers from one or more of several difficulties, namely, the specification of "the correct model," the "correct" measurement of variables, and the appropriate level of aggregation on which estimation will be performed. [9] Though existing evidence appears to find a significant work-disincentive effect of UI benefits, these findings could be modified in the light of subsequent research.

## Ⅳ. The Effect of Unemployment Insurance on Labor Force Participation

Most of previous studies of the impact of unemployment insurance have focused on its influence on the rate and duration of unemployment. Fluctuations in labor force participation have been approached primarily from the neoclassical labor supply hypothesis, the discouraged or additional worker effects, or demographic shift explanations. While UI benefits may have quantitatively important effects on labor supply behavior, relatively little effort has been directed at linking changes in labor force participation rates and variations in UI benefits to explain cyclical behavior of labor supply. Hamermesh (1979) pointed out that the source of UI's incentive effect on labor supply is the entitlement effect, that is, the possibility of qualifying UI by occasional work will induce workers to supply more labor to the market than they would in the absence of UI. Hamermesh (1980) has given some evidence to show that UI benefits have some, though small, effects on the labor force participation rates married women. In this section labor force participation is linked to UI benefits among other factors.

### 1. The Model

There have been two basic approaches to the study of time-series evidence on labor force participation. The first is known as the discouraged worker hypothesis and is usually estimated in the form :

$$LFPR = a_0 + a_1 U + a_2 T \qquad (3)$$

where LFPR, U, and T stand for labor force participation rate, unemployment rate, and time trend, respectively. Two possible effects may represent the response of labor supply to demand conditions in the labor market. The discouraged (additional) worker effect hypothesizes that a fall in labor market activity will reduce (increase) labor force participation rates and hours.

The second approach is based on the neoclassical theory of intertemporal substitution between work and leisure. The neoclassical labor supply model may be estimated in the form :

$$LFPR = c_0 + c_1 w + c_2 w^* \qquad (4)$$

where w is the current real wage and w* is the expected future real wage. Equation (4) may be written as :

$$LFPR = c_0 + c_1(w - w^*) + (c_1 + c_2)\, w^* \qquad (5)$$

which as the implication that a surprise rise in real wages boosts the supply of labor.

Much of the empirical literature estimates either of the two models or their combinations to examine time-series evidence of the participation behavior. The above two models may not be suitable for the purpose of estimating participation behavior on pooled cross section data for a short interval of time. The trend variable (T) in equation (3) intends to capture the effect of exogenous, socio-demographic changes on participation. Expected future real wage (w*) measures the desired standard of living. These variables appear to be unnecessary for the present purpose. Because price level is more or less the same across states the real wage may be replaced by money wage (W). This adjustment is necessary because the replacement ratio (B/W) is computed from money wages. The participation model to be estimated is the following :

$$LFPR_{ijt} = b_0 + b_1 U_{it} + b_2 (B/W)_{it} + b_3 HE_{it} \qquad (6)$$

where $LFPR_{ijt}$ is the labor force participation rate of the demographic group j in the state i in the year t. In equation(6) the UI variable is represented by the replacement ratio (B/W) and the wage variable by hourly earnings (HE).

The state unemployment rate in equation(6) aims to capture the effect of changes in the labor market condition on the participation. The obtained $b_1$ reflects the prevalence of the discouraged worker effect ($b_1 < 0$) or the additional worker effect ($b_1 > 0$). The estimated coefficient of the replacement ratio will be positive to the extent that increases in the benefit-to-wage ratio induce increases in labor force participation. The wage variable intends to estimate the shape of the usual labor supply curve or the underlying work-leisure tradeoff. The estimate of $b_3$ will be positive if substituation effect dominates income effect.

2. Empirical Results

The labor force model is estimated for the aggregate labor force participation rate and the participation rates of major demographic groups : males, females, males age 20+, females age 20+, and both sexes age 16-19. Results of estimating equation (6) on pooled data of cross-section U.S. states for the period 1976-1980 are shown in Table 3. In the aggregate participation equation the estimated coefficient of the unemployment rate is -.60. A one percentage point increase in the unemployment rate reduces the participation rate by about 6/10 of a percentage point. This indicates the prevalence of discouragement effect in labor force behavior. The estimate on B/W has the value of .15, which implies that a 10 percentage points increase in B/W raises aggregate labor force participation rate by about $1\frac{1}{2}$ percentage points. This result indicates that UI has an incentive effect on labor force participation. The coefficient of HE has an estimated value of .01, which implies that a $1 increase in the hourly earnings increases the

Table 3. Estimates of the UI Impact on Labor Force Participation Rates

| | Constant | U | B/W | HE | $R^2$ |
|---|---|---|---|---|---|
| Total | .5599 | -.5980 | .1502 | .0096 | .222 |
| | (23.17) | (4.59) | (3.24) | (5.45) | |
| Males | .7451 | -.6832 | .1191 | .0056 | .210 |
| | (33.86) | (5.76) | (2.82) | (3.47) | |
| Females | .4005 | -.4371 | .1699 | .0114 | .151 |
| | (12.78) | (2.59) | (2.83) | (5.02) | |
| Males 20+ | .7656 | -.5562 | .1006 | .0052 | .147 |
| | (33.36) | (4.50) | (2.29) | (3.10) | |
| Females 20+ | .3977 | -.2794 | .1369 | .0118 | .110 |
| | (11.56) | (1.51) | (2.07) | (4.73) | |
| Both Sexes 16-19 | .4357 | -1.5351 | .3939 | .0151 | .314 |
| | (9.48) | (5.99) | (4.39) | (4.63) | |

Notes : Dependent variables are labor force participation rates of each demographic group.

Numbers in parentheses are absolute values of t-statistics.

participation rate by a percentage point.

The coefficients of U vary considerably across demographic groups. The discouraged worker effect is strongest for young workers and it is stronger for adult males than for adult females. The coefficient estimates of B/W indicate that females are more responsive to changes in the replacement ratio than males in their participation decision. This outcome confirms other evidence. Benjamin and Kochin (1979) and Hamermesh (1980) suggested that liberal UI benefit structures induce women to substitute production in the market for work at home. The estimate on B/W is the largest for the youth 16-19. Many of the youth operate in the market covered by low wages and the benefits constitute a relatively high proportion of their wage income. Insomuch that many of the youth do not quality the unemployment benefits because UI benefits are paid only to those with a certain level of prior work experience and earnings, teenagers would likely to enter the labor market to entitle themselves to the UI benefits. Estimates on HE show that younger workers are highly susceptible to changes in the wage rate and that females are more responsive than males to wage variations.

## V. Summary and Concluding Remarks

This study analyzed the labor market effects of unemployment insurance benefits. Based on data from state UI system the results show that a higher UI benefits produce a longer average duration of unemployment and higher labor force participation rates. The results suggest that the state UI system encourages unemployed workers to become more selective in their choice of employment by subsidizing search costs and induces out-of-labor-force population to participate in the market and attach themselves to requirements for the benefit eligibilities. The incentive effect of UI on labor force participation and the disincentive effect of UI on job search outcome may have conflicting implications on the merit of UI benefits. It is shown that the incentive effect of UI is strong for females and teenagers who otherwise remain out of

the labor force. It may be possible that where the UI benefits are generous secondary workers enter the labor force faster than they can be employed. Thus, a UI-induced participation in the labor force may result in an unemployment. The numerical importance of these two offsetting effects warrants further research.

## Notes

1) Beveridge (1930), p. 412.

2) Chapin (1971) and Grubel and Maki (1976) used cross-section state data in their study of UI impact on unemployment.

3) See Hamermesh (1977) for a summary of empirical studies prior to 1976.

4) Amemiya and Boskin (1974) and Ehrenberg and Oaxaca (1976).

5) Some studies, e.g., Ehrenberg and Oaxaca(1976) and Classen(1977), estimate UI's impact on unemployment duration and postunemployment wages simultaneously. Data limitation on postunemployment wages does not permit to adopt this approach.

6) Regression results which include the potential duration of benefits in the right-hand-side of equation (2) show that the potential duration variable is statistically insignificant.

7) Ehrenberg and Oaxaca (1976) and Benjamin and Kochin (1979).

8) This calculation is based on the ratio of insured unemployment to total unemployment of 47 percent in 1969 and on a hypothetical total unemployment rate of 4 percent (4.0 x .47 x .27 = .51).

9) For a clear exposition on this point, see Joll, McKenna, McNabb, and Shorey (1983), p. 327.

## Appendix

### Sources of Variables

Unemployment rate (U), labor force participation rate (LFPR), and employment-population ratio (E/P) by state : Geographic Profile of Employment and Unemployment (U.S. Department of Labor, Bureau of Labor Statistics), various issues.

Average weekly benefit amount (WBA) and the ratio of average weekly benefit amount to average weekly total wage (B/W) by state : Social Security Bulletin, Annual Statistical Supplement (U.S. Department of Health and Human Services, Social Security Administration), various issues.

Average hourly earnings of production workers in manufacturing (HE), average weekly earnings of production workers in manufacturing (WE) by state : Employment and Earnings, States and Areas (U.S. Department of Labor, Bureau of Labor Statistics), various issues.

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