

IMF WORKING PAPER

© 1995 International Monetary Fund

This is a Working Paper and the author(s) would welcome any comments on the present text. Citations should refer to a Working Paper of the International Monetary Fund, mentioning the author(s), and the date of issuance. The views expressed are those of the author(s) and do not necessarily represent those of the Fund.

WP/95/65

INTERNATIONAL MONETARY FUND

Research Department

Unemployment Benefits Versus Conditional Negative Income Taxes

Prepared by Dennis J. Snower¹

Authorized for Distribution by David T. Coe

July 1995

Abstract

The paper analyzes the wage-employment effects of replacing unemployment benefits by negative income taxes. It first surveys the major equity and efficiency effects of unemployment benefits versus negative income taxes, and summarizes the salient features of many European unemployment benefit systems in this light. Second, it presents a simple theoretical model that focuses on the relative wage-employment effects of unemployment benefits versus negative income taxes. Finally, it provides some empirical groundwork for assessing this relative effect.

JEL Classification Numbers:

E62; H21, H23, H24, H31, H32; J23, J31, J64, J65

¹Department of Economics, Birkbeck College, University of London, and CEPR. The paper was written while the author was at the Research Department of the International Monetary Fund. It is the outcome of many lively discussions with David Coe, whose ideas and insights motivated me to provide a formal analysis of some major issues in this area. I am very grateful to Bob Ford for his insightful comments, and to Marika Karanassou and Luzmaria Monasi for their excellent research assistance. The views expressed in this paper do not necessarily represent those of the IMF or its member countries.

<u>Table of Contents</u>	<u>Page</u>
Summary	iii
I. Introduction	1
II. Equity and Efficiency Effects	2
1. Equity Under Unemployment Benefits	2
2. Efficiency Under Unemployment Benefits	3
3. Unemployment Benefits Versus Conditional Negative Income Taxes	4
III. A Simple Model	6
1. Flat-Rate Unemployment Benefits	7
2. Proportional Unemployment Benefits	9
3. Negative Income Taxes	10
4. Comparing the Policies	11
IV. Empirical Considerations	12
V. Concluding Remarks	16
<u>Table</u>	
1. The Impact on Income Support and Unemployment from Replacing Unemployment Benefits by Negative Income Taxes	15
References	18

Summary

Unemployment benefit systems have two main drawbacks: they are often costly to employers, employees, and the state; and, while they reduce the hardship of unemployment, they also tend to augment the underlying unemployment problem. This paper considers the alternative of moving from an unemployment benefit system to a system in which people receive conditional negative income taxes. The conditions that would be attached to the proposed negative income taxes are analogous to those attached to current unemployment benefits.

The main equity and efficiency effects of unemployment benefit systems are summarized and contrasted with those of a negative income tax system. It is argued in the paper that unemployment benefits are an ineffectual way to achieve equity goals, as not all the unemployed are poor, and unemployment benefits discourage the unemployed from looking for work and the firms from hiring them. It is more effective to use income, rather than employment status, as the criterion for redistribution, as is done under a negative income tax system.

A simple model is presented to highlight the effect of the two systems on wages and thereby on employment. The results indicate that, for a given expenditure by the government on either unemployment benefits or negative income taxes, a negative income tax system is associated with a higher level of employment than is an unemployment benefit system. Preliminary calculations are presented that suggest that a switch from unemployment benefits to negative income taxes in European countries would raise the average income of those receiving support by about 8 percent while reducing the number of unemployed by roughly 7 percent.

The paper does not argue that replacing unemployment benefits by conditional negative income taxes is an "optimal" policy. Like unemployment benefit systems, conditional negative income tax schemes are associated with significant efficiency losses and are an imperfect redistributive tool. However, these same disadvantages are less than those associated with an unemployment benefit system. The advantages of a conditional negative income tax system compared with an unemployment benefit system are particularly pronounced in the area of redistribution.

I. Introduction

In recent years many European governments have become increasingly sensitive to two main drawbacks of unemployment benefit systems: (i) they are often costly to employers, employees, and the state; and (ii) in reducing the hardship from unemployment, they tend to augment the underlying problem itself. Needless to say, these drawbacks have become progressively more severe as European unemployment has grown over the past two decades. So it is not surprising that there is growing interest in achieving the objectives of unemployment benefit systems through alternative policy instruments.

This paper considers one such alternative: moving from an unemployment benefit system to a system in which people receive conditional negative income taxes. The conditions attached to the proposed negative income taxes are analogous to those attached to current unemployment benefits. If, under the current unemployment benefit system, people must provide evidence of serious job search in order to qualify for unemployment benefits, then they must be required to provide such evidence under the conditional negative income tax system. If unemployment benefits decline with unemployment duration under the current benefit system, then so too must the negative income taxes. The broad argument in favor of this policy switch, put simply, is that this alternative could meet the equity and efficiency objectives of current unemployment benefit systems more effectively than the unemployment benefit systems themselves.

Section II summarizes the main equity and efficiency effects of unemployment benefit systems, and contrasts these with the effects of a conditional negative income tax system. Many of these effects are straightforward and well-known. What remains largely unexplored in the existing literature is the influence of the two policies on wage formation and thereby on employment. This is an important omission, since the prevalence of imperfect competition, imperfect information, turnover costs, and strategic complementarities in many labor markets tends to make wage-employment decisions particularly sensitive to the choice between an unemployment benefit system and a conditional negative income tax system.¹ Accordingly Section III presents a simple model that highlights the effect of the two systems on wages and thereby on employment. Section IV then takes a preliminary step towards quantifying this effect. Finally Section V concludes.

¹For example, the greater are labor turnover costs (*ceteris paribus*, the greater will be the bargaining power of insiders and the more sensitive their wages will become to their fallback positions, which depend on the choice between the two systems. In an efficiency wage context, wages are sensitive to the ability of employers to motivate, attract, and retain employees through wage variations, and this ability is clearly influenced by the two systems. Strategic complementarities in job search depend, in part, on employers' and employees' income streams when they fail to make matches, and the latter in turn is sensitive to which system is in operation.

II. Equity and Efficiency Effects

1. Equity Under Unemployment Benefits

The equity goal of unemployment benefit systems is to redistribute income from rich to poor, but unemployment benefits are a singularly ineffectual way of doing this. The reason is that (i) the fit between unemployment and poverty is far from perfect, and (ii) unemployment benefits discourage the unemployed from looking for work and the firms from hiring them.

Although unemployed people on average tend to be poorer than employed people, some employed people are poor (viz, the "working poor") and some unemployed ones are well off (e.g., those with substantial savings or those from affluent families).¹ If the objective is to level incomes, it is clearly more effective to use income, rather than employment status, as the criterion for redistribution. Unemployment benefits are manifestly inferior to negative income taxes on this front.

If the poor are to be encouraged to work their way out of poverty, a policy that depresses labor demand and discourages job search is scarcely desirable. In these respects, a conditional negative income tax system is potentially more effective: income is the redistributive criterion and the employment disincentives are generally weaker than those associated with unemployment benefits.

The other main equity issue concerns leveling the employment opportunities of the long-term unemployed vis-à-vis the short-run unemployed and current employees. The longer people are unemployed, the more discouraged they become and the less intensively they search for jobs, the less appropriate their skills become to the available jobs, and the more wary firms are of hiring them. On account of these discouragements, obsolescence, and stigmatization effects, the long-term unemployed face far less favorable employment opportunities than their employed or short-term unemployed counterparts. Unemployment assistance, which is of unlimited duration in many European countries, gives the long-term unemployed no countervailing incentives to find jobs. On the contrary, they actively discourage job acquisition, since unemployment assistance is withdrawn as soon as jobs are found. Since the long-term unemployed are more likely to be offered part-time, temporary jobs than their more fortunate competitors, the effective tax on job acquisition is particularly high. Negative income taxes generally create less of a disincentive to find jobs and thus are less inequitable to the long-term unemployed.

It is often argued that unemployed people are more likely to be credit constrained, and thus are under pressure to accept the first job offers they receive. Unemployment benefits, it is alleged, improve their employment

¹Evidence, for example, is given by Feldstein (1974).

opportunities by enabling them to wait for more appropriate job matches. But if that were the overriding problem that the unemployed faced, their unemployment durations would be too short, whereas there is general agreement that European unemployment durations are excessively long.¹

2. Efficiency Under Unemployment Benefits

The efficiency objective of unemployment benefit systems is to correct for market failures in the provision of unemployment insurance. In so doing, unemployment benefits create various policy inefficiencies. Thus, evaluating the efficiency case for unemployment benefits clearly involves assessing the market failures that are mitigated versus the policy inefficiencies that are created.²

The main reasons why free market activity does not yield an efficient amount of unemployment insurance are moral hazard and adverse selection. The moral hazard reason is that since the suppliers of insurance have less information about workers' job search intensities than the workers themselves, unemployment insurance contracts cannot make the payout depend on search intensities. The more fully insured workers are, the lower their search effort becomes; thus the insurers will use the level of insurance as a screening device for search effort. Under these circumstances the market outcome is inefficient, and the government may be able to improve social welfare by providing unemployment insurance directly. The adverse selection problem runs along analogous lines. Moreover, the credit constraints mentioned above can also be responsible for inefficient behavior, but we have already argued that they are not likely to play a major role in explaining European unemployment. And even if they were important, the way to get people to internalize the costs and benefits from job search is to enable them to borrow when they are unemployed and repay when they become employed (e.g., through limited government loan guarantees for the unemployed),³ not to give them unemployment benefits.

The gains from mitigating these market failures, however, must be set against some potentially serious efficiency losses.⁴ First, unemployment benefits reduce people's willingness to engage in purposeful job search and reduce the probability of accepting job offers. The greater the benefits from unemployment insurance, the longer will unemployed people search and

¹In addition, if credit constraints were important it would be difficult to account for the available evidence in a number of European countries that the unemployed tend to spend few hours per week on job search and there is little correlation between search intensity and unemployment duration.

²The literature on this subject is not large. See, for example, Baily (1978), Ehrenburg and Oaxaca (1976), Feldstein (1974, 1976), Fields (1977), Flemming (1978), Holen (1977), Maki and Spindler (1975), and Marston (1975).

³See, for example Snower (1993).

⁴It is interesting to note that these efficiency losses are closely related to the equity losses above.

the less likely they are to accept jobs at lower wages.¹ Since the unemployed worker receives all of his benefits but pays only a fraction of the taxes needed to finance these benefits, the social cost of unemployment exceeds the private cost.

Second, unemployment benefits make it easier for firms to dismiss employees. The greater the unemployment insurance benefits, the easier it becomes for firms to lay off workers without becoming involved in litigation and other expensive firing processes, the costs of which fall at least partly on the firms themselves. Since the firms receive the full benefit from avoiding these costs, but pay only a fraction of the taxes that finance the unemployment benefits, unemployment insurance drives a wedge between the social and private costs of dismissals to the firms.

Third, unemployment benefits put upward pressure on wages and thereby discourage employment. There is good reason to believe that this upward pressure is inefficient, since there are a variety of forces operative under free-market conditions--efficiency wages, insider-outsider interactions, job search externalities, and union distortions--that tend to drive wages above their market-clearing levels, and unemployment benefits simply magnify these inefficiencies.

3. Unemployment Benefits Versus Conditional Negative Income Taxes

Conditional negative income taxes generally involve such policy inefficiencies as well, but clearly not to the same degree. For example, they discourage job search, but by less than unemployment benefits do, for when a worker finds a job, he loses all his unemployment benefits, but only a fraction of his negative income taxes.² It is worth noting that a major criticism of traditional negative income tax schemes--that they make people's material well-being less dependent on employment and thereby discourage employment--obviously doesn't apply to conditional negative income taxes, since these taxes are conditional on the same thing (viz, evidence of job search) as are unemployment benefits.³

Furthermore, conditional negative income taxes also tend to be more effective than unemployment benefits in overcoming inefficiencies generated by credit constraints, since the presence of these constraints is more closely associated with low incomes than with unemployment. Finally,

¹See, for example, Feldstein (1974, 1976).

²More generally, the effective tax rate on finding a job is higher under unemployment benefit system than under negative income taxes schemes that require the same budgetary outlay.

³For this to be so, the conditional negative income taxes need also to depend on unemployment duration in the same way as unemployment benefits do. When, for example, unemployment benefits decline as the unemployment spell lengthens, negative income taxes need to do the same.

conditional negative income taxes drive up wages, but by less than unemployment benefits, for workers' fallback positions in wage negotiations depend on aggregate production and income under negative income tax schemes, but not under unemployment benefit systems.

Against this, conditional negative income taxes are by their nature less effective than the theoretician's socially optimal unemployment insurance schemes in overcoming the problems of moral hazard and adverse selection in the unemployment insurance market. The reason, of course, is that conditional negative income taxes are designed to reduce people's risk of poverty, rather than their risk of unemployment. It is arguable that unemployment imposes psychic costs on individuals that are quite distinct from and independent of the costs associated with poverty and that unemployment insurance, as distinct from poverty insurance, fulfills a significant social function.

However, the practical significance of comparing conditional negative income taxes with socially optimal unemployment insurance schemes is probably small, since the unemployment benefit systems operative in Europe and elsewhere tend not to have much in common with the central features of optimal unemployment insurance. One reason is that most of the existing unemployment insurance schemes either impose ceilings on benefits or pay these benefits as flat rates,¹ while optimal unemployment insurance does not have this property. In many European countries, the duration of unemployment benefits is not closely tied to the previous span of employment,² which optimal unemployment insurance would clearly do. Moreover, the relative contributions of employers, employees, and the government to the current unemployment insurance schemes bear little if any relation to the social costs that these agents fail to internalize.

Given that unemployment benefit systems in practice have little in common with the main features of optimal unemployment insurance, the efficiency case for unemployment benefit systems is considerably weakened. What remains, then, is the equity case; but here--as we have

¹For example, the unemployment insurance packages in Denmark, Germany, Luxembourg, Portugal, and Spain set ceilings on benefits. Unemployment insurance takes the form of flat-rate benefits in France (as "*allocation de fin de droits*," while the "*allocation de base*" grants a flat-rate plus about 40 per cent of previous wages), Great Britain, and in Ireland (as "unemployment benefit," but there is also a small "pay-related benefit").

²The benefit duration is indefinite in Belgium (although the benefits fall through time), 2.5 years in Denmark (which may be extended to 7 years), 3-45 months in France, 156-832 days in Germany, 5-10 months in Greece, up to 390 days in Ireland, up to 180 days in Italy (with a possible extension of another year), 6 months to 6 years in the Netherlands, 10-30 months in Portugal (with possible extensions for people nearing retirement), and 3-24 months in Spain (with benefits falling through time).

seen--unemployment benefits tend to be less effective than conditional negative income taxes.

Finally, the unemployment benefit system has the well-known advantage that since it is more narrowly targeted than a conditional negative income tax system that provides a similar level of support for the target group, the unemployment benefit system tends to be less expensive. In other words, the unemployment benefit system requires a lower level of tax revenue to finance a given level of support than does the conditional negative income tax system. This advantage of unemployment benefits versus conditional negative income taxes must be set against disadvantages noted above.

The following section does this with respect to one particular, and largely neglected, disadvantage of unemployment benefits: namely, that they put more upward pressure on wages and thereby depress employment more than do conditional negative income taxes.

III. A Simple Model

The virtue of the model lies in the extreme simplicity with which it captures the relative wage and employment effects of unemployment benefits versus conditional negative income taxes. The upshot of the analysis is that when wages are the outcome of negotiations between employers and their employees, a linear negative income tax schedule puts less upward pressure on wages and generates more employment than a constant unemployment benefit.¹

The model economy has a fixed number of firms and workers. There are constant returns to labor, with each worker having a marginal product of a (a positive constant). Thus the labor demand curve is flat:

$$w = a \tag{1}$$

where w is the real wage.

Wage and employment decisions are made in two stages: first the wage is negotiated, taking the employment repercussions into account; then firms set employment, taking the wage as given. The wage is the outcome of a Nash bargaining process. For simplicity, let the bargaining be "individualistic," between each firm and each of its employees. The worker's bargaining power may be conceived as arising from labor turnover costs, which take the following simple form: to dismiss a worker, the employer must pay a firing cost of f .

¹It is easy to show that this result is robust with regard to numerous extensions of the model, such as allowing for diminishing returns to labor, rising marginal disutility of labor, and additive random error terms in the labor demand or wage setting functions.

Under bargaining agreement, the worker receives the real wage w and the firm receives the profit $a-w$. Under disagreement, the worker achieves the fall-back utility $V(y, E)$, where y is his income and E is his marginal utility of leisure under disagreement. Workers are assumed to differ in terms of their marginal utility of leisure. Ordering workers from lowest to highest utility from leisure, we express the marginal employees' utility of leisure as $E = E(L)$, $E' > 0$, where L is the level of employment. For simplicity, let the fall-back utility of the marginal employee take the form $V(y, E) = y + e \cdot L$.

Furthermore, under disagreement the worker engages in disruptive activity, which is assumed to be costly to the firm but costless to the worker. Since the negotiated wage depends positively on the loss that the firm sustains under disagreement (as shown below), the worker will set the level of disruptive activity so that the firm loses the amount f under disagreement. This is the maximum loss that the firm will accept without firing the worker.

Consequently the Nash bargaining problem is

$$\underset{w}{\text{Maximize}} (w - y + e \cdot L)^\mu \cdot (a - w + f)^{1-\mu} \quad (2)$$

where μ is the bargaining strength of the worker relative to the firm (μ a constant, $0 < \mu < 1$). If the fall-back income y is independent of the wage w , then the negotiated wage that solves the bargaining problem is

$$w = \mu \cdot (a + f) + (1-\mu) \cdot (y + e \cdot L) \quad (3)$$

The labor market equilibrium is the wage-employment combination (w^*, L^*) that solves the system comprising the labor demand function (1) and the wage setting function (3).

In consonance with much of the literature on wage bargaining,¹ let us assume that the worker's fall-back income y is equal to the income he would receive when unemployed. Then the simple model is particularly convenient for comparing the employment effects of unemployment benefits with those of a negative income tax scheme, since these two policies differ only in terms of the resulting income y .

1. Flat-Rate Unemployment Benefits

Let us consider two types of unemployment benefit systems, one that offers a flat-rate benefit and the other that provides a benefit proportional to the wage.

¹See, for example, Layard, Nickell, and Jackman (1991, p. 101).

When the unemployment benefit is a flat rate,

$$y = b \quad (4)$$

where b is a positive constant, then, by (1), (3), and (4), the equilibrium level of employment, for any given level of the benefit b , is

$$L = \frac{1}{e} \cdot \left((a-b) - \frac{\mu}{1-\mu} \cdot f \right) \quad (5)$$

To determine the level of the unemployment benefit, let the government budget constraint be

$$b \cdot U = c \quad (6)$$

where U is the level of unemployment and c is a positive constant (i.e., the funds financing the unemployment benefit payments).¹ This form of the government budget constraint is clearly convenient for a comparison of unemployment benefits and negative income taxes which provide the same level of support. Assuming that the labor force is constant at N , the unemployment level is simply

$$U = N - L \quad (7)$$

By the equilibrium employment level (5), the government budget constraint (6), and the unemployment level (7), we obtain the general equilibrium level of the unemployment benefit:

$$b^* = \frac{e}{2} \cdot \left[- \left(N - \frac{a}{e} + \frac{\mu}{1-\mu} \cdot \frac{f}{e} \right) + \sqrt{\left(N - \frac{a}{e} + \frac{\mu}{1-\mu} \cdot \frac{f}{e} \right)^2 + \frac{4c}{e}} \right] \quad (8)$$

The corresponding general equilibrium level of employment is

$$L_{fu}^* = \frac{1}{2} \cdot \left(\frac{a}{e} - \frac{\mu}{1-\mu} \cdot \frac{f}{e} \right) + \frac{1}{2} \cdot N - \frac{1}{2} \cdot \sqrt{\left(N - \frac{a}{e} + \frac{\mu}{1-\mu} \cdot \frac{f}{e} \right)^2 + \frac{4c}{e}} \quad (9)$$

where the subscript "fu" stands for "flat-rate unemployment benefits".

¹The qualitative conclusions of this analysis continue to hold if the unemployment benefit payments are assumed to be financed through a proportional income tax (with the income tax receipts depending, obviously, on the level of production and thereby on the level of employment), but the algebra is somewhat more involved.

Note that a technological improvement, in the form of an increase in the coefficient a , raises both the employment level and the unemployment benefit in the general equilibrium. The reason is that since firms have some market power in the wage negotiation process ($\mu < 1$), the incumbent workers cannot appropriate all the gains from the technological advance. Thus employment rises and unemployment falls. This permits the funds c to finance a higher level of unemployment benefits. On the other hand, an increase in the firing cost f or an increase in workers' bargaining strength μ leads to a rise in the negotiated wage and a fall in employment. Thus unemployment rises, so that the funds c can now finance a lower level of unemployment benefits.

2. Proportional Unemployment Benefits

Now consider an unemployment benefit that is proportional to the wage:

$$y = \beta \cdot w \quad (10)$$

where the replacement ratio β is a constant ($0 < \beta < 1$).

For a given replacement ratio, the equilibrium employment level then becomes

$$L = \frac{1}{e} \cdot \left[a(1-\beta) - \frac{\mu}{1-\mu} \cdot f \right] \quad (11)$$

by (1), (3), and (10).

The government budget constraint now is

$$(\beta \cdot w) \cdot U = c \quad (12)$$

By (1), (11), (12), and (7), the general equilibrium replacement ratio is

$$\beta^* = \frac{1}{2} \cdot \frac{e}{a} \left(- \left(N - \frac{a}{e} + \frac{\mu}{1-\mu} \cdot \frac{f}{e} \right) + \sqrt{\left(N - \frac{a}{e} + \frac{\mu}{1-\mu} \cdot \frac{f}{e} \right)^2 + \frac{4c}{e}} \right) \quad (13)$$

and the associated general equilibrium employment level is

$$L_{pu}^* = \frac{a}{e} - \frac{\mu}{1-\mu} \cdot \frac{f}{e} + \frac{1}{2} \left[\left(N - \frac{a}{e} + \frac{\mu}{1-\mu} \cdot \frac{f}{e} \right) - \sqrt{\left(N - \frac{a}{e} + \frac{\mu}{1-\mu} \cdot \frac{f}{e} \right)^2 + \frac{4c}{e}} \right] \quad (14)$$

where the subscript "pu" stands for "proportional unemployment benefits."

As with flat-rate unemployment benefits, a technological improvement (i.e., an increase in a) leads to a rise in the general equilibrium level of employment, as well as an increase in the replacement ratio. An increase in the firing cost f or an increase in workers' bargaining strength μ has the opposite effect.

3. Negative Income Taxes

Under a linear negative income tax scheme,

$$y = -T + t \cdot Q \quad (15)$$

where T and t are a positive constants, $0 < t < 1$ and Q is aggregate output (equal to gross national income).

Given these tax parameters, the equilibrium employment level is

$$L = \frac{(a-T) - \frac{\mu}{1-\mu} \cdot f}{e-a \cdot t} \quad (16)$$

by (1), (3), and (15).

The government budget constraint now ensures that the difference between the sum of the positive tax receipts and the sum of the negative ones is equal to the fixed amount c that was previously available for funding the unemployment benefits:

$$-T + t \cdot Q = c \quad (17)$$

Since $Q = a \cdot L$, the government budget constraint may be expressed as

$$L = \frac{c+T}{a \cdot t} \quad (17a)$$

Let the tax rate t be held constant at whatever its value was before negative income taxes were introduced. Then the equilibrium employment level (16) and the government budget constraint (17a) can be used to derive the general equilibrium tax parameter T :

$$T^* = \frac{1}{e} \cdot \left[a^2 \cdot t - \frac{\mu}{1-\mu} \cdot a \cdot f \cdot t - c \cdot (e - a \cdot t) \right] \quad (18)$$

The corresponding general equilibrium level of employment is

$$L_{nt}^* = (1-e) \cdot \frac{c}{a \cdot t} + (c + \frac{a}{e}) - \frac{\mu}{1-\mu} \cdot \frac{f}{e} \quad (19)$$

where the subscript "nt" stands for "negative income taxes".

Observe that a rise in funds c available to finance the negative income taxes leads to a decline in the tax parameter T . This puts downward pressure on the negotiated wage, and thereby raises the employment level. By contrast, an increase in the funds financing unemployment benefits leads to a rise in the benefit level b or the replacement ratio β , and this reduces the employment level.

As for the unemployment benefit schemes, a rise in the firing cost f or a rise in workers' bargaining strength μ leads to a fall in the equilibrium level of employment.

4. Comparing the Policies

The main implication of the analysis above is clear on inspection:

Proposition: Given the fixed sum c available to fund either the unemployment benefits or the negative income taxes, the linear negative income tax scheme is associated with a higher level of employment than the flat-rate and proportional unemployment benefit schemes: $L_{nt}^* > L_{fu}^*, L_{pu}^*$.

To see this, observe that $L_{nt}^* > (a/e) - (f/e) \cdot [\mu/(1-\mu)]$, by (19); but $L_{fu}^*, L_{pu}^* < (a/e) - (f/e) \cdot [\mu/(1-\mu)]$, by (9) and (14).

It is also interesting to note that since the real wage is at $w = a$ regardless of which policy is implemented, a switch from the unemployment benefit schemes to the negative income tax scheme is Pareto improving: the additional workers who are employed under the negative income tax scheme are made better off, and no one is worse off. This result, however, is crucially dependent on the assumption of constant returns to labor. Under diminishing returns, it is clear that the additional employment created through the negative income tax scheme will drive the real wage down, thereby making the newly employed workers better off and the incumbents worse off.

It can, however, be shown that if the unemployment benefit payments are financed through proportional income taxes (specifically, if $b \cdot U = t \cdot Q$ under the flat-rate scheme and $\beta \cdot w \cdot U = t \cdot Q$ under the proportional scheme) and the negative income tax scheme finances itself ($t \cdot Q = T$), then the incumbents will generally fare better under the negative income tax.

Furthermore, if the model is extended to include workers with heterogeneous productivities and correspondingly heterogeneous wages, it is

clear that a linear negative income tax schedule that offers the same payout as a constant unemployment benefit will leave the poorest workers worse off. Specifically, under a linear schedule, workers receiving the mean negative income tax payout are equally well off as under the corresponding unemployment benefit, poorer workers (viz, workers receiving less than the mean negative income tax payout) are worse off, and richer workers (those receiving more than the mean payout) are better off. The degree of this inequity clearly depends on the slope of the negative income tax schedule.

IV. Empirical Considerations

I now extend the simple model above to provide a preliminary empirical basis to help assess possible implications of a partial shift from unemployment benefits towards negative income taxes. My point of departure is a corollary of the proposition above: if unemployment benefit levels were reduced by $\hat{b} = \Delta b/b$ and if the funds thereby released were used to shift the income tax schedule downwards (providing negative income taxes at low income levels), then there would be downward pressure on real wages and consequently employment would be stimulated.

The rise in employment has two important effects on the government's ability to provide for the unemployed: (1) it leads to a reduction in the number of unemployed people who need to be provided for, and (2) it is associated with a rise in production and thereby with a rise in tax receipts, which in turn would permit the government to provide more generous negative income tax support. For this purpose, we need to quantify the reduction in unemployment and the rise in income support that could be generated by a shift from unemployment benefits to negative income taxes.

The first step is to express the government budget constraint in terms of proportional changes.¹ Let \hat{c} be the proportional increase in tax receipts arising from the shift from unemployment benefits to negative income taxes, normalized by the size of the shift. Let $\hat{\Omega}$ be the proportional rise in the number of people receiving negative income taxes. Finally, let $\hat{\gamma}$ be the proportional rise in income support, i.e., the difference between the amount paid out in negative income taxes and the amount previously paid out in unemployment benefits. Then the government budget constraint may be expressed as

$$\hat{\gamma} + \hat{\Omega} = \hat{c} \quad (20)$$

Let $\eta = -(\Delta L/\Delta w) \cdot (w/L)$ be the elasticity of employment with respect to the real wage and $\sigma = (\Delta w/\Delta b) \cdot (b/w)$ be the elasticity of the real wage with respect to the unemployment benefit. Then the proportional rise in employment $(\Delta L/L)$ generated by a proportional fall in unemployment benefits $(\Delta b/b)$ is

¹For any variable χ , we denote the proportional change $(\Delta \chi/\chi)$ by $\hat{\chi}$.

$$\frac{\Delta L/L}{\Delta b/b} = \frac{\Delta w/w}{\Delta b/b} \cdot \frac{\Delta l/l}{\Delta w/w} = -\sigma \cdot \eta \quad (21a)$$

Furthermore, let the proportional fall in employment $(-\Delta L/L)$ coming from a proportional rise in the average level of negative income tax payouts $(\Delta T/T)$, be

$$\frac{\Delta L/L}{\Delta T/T} = -\lambda \cdot \sigma \cdot \eta \quad (21b)$$

where λ is a constant. In accordance with the analysis of the previous section, we let $0 < \lambda < 1$.

This implies that a proportional fall in unemployment benefits combined with an equal proportional rise in the average level of negative income tax payouts (normalized for the size of these changes) will increase employment proportionately by $-(1-\lambda) \cdot \sigma \cdot \eta$, and thus reduce unemployment proportionately by $(1-\lambda) \cdot \sigma \cdot \eta$.

Supposing that the number of people receiving negative income taxes is proportional to the number of people unemployed, the proportional fall in the number of people receiving negative income taxes is

$$\hat{\Omega}_d = (1-\lambda) \cdot \sigma \cdot \eta \quad (22a)$$

where the $\hat{\Omega}_d$ stands for the direct effect of the proportional shift from unemployment benefits to negative income taxes.

But there is also an indirect effect: the shift increases the government's tax receipts and thus makes more funds available for the negative income tax scheme, thereby permitting an increase in the size of negative income tax payouts. If the average rise of the negative income tax payouts is γ , then employment will fall by $\lambda \cdot \sigma \cdot \eta \cdot \gamma$, and the associated rise in the number of people receiving the negative income tax payouts is therefore

$$\hat{\Omega}_i = -\lambda \cdot \sigma \cdot \eta \cdot \gamma \quad (22b)$$

Consequently, the sum of the direct and indirect effects of the shift on the number of people receiving negative income taxes is

$$\hat{\Omega} = \hat{\Omega}_d + \hat{\Omega}_i = \sigma \cdot \eta \cdot (1-\lambda) - \sigma \cdot \eta \cdot \lambda \cdot \hat{\gamma} \quad (23)$$

The shift also has a direct and indirect effect on the government's additional tax receipts, which (along with the positive income taxes paid to the government) help finance the negative income taxes.

The direct effect may be captured as follows. Given that the employment effect of the shift is $-(1-\lambda) \cdot \sigma \cdot \eta$, let the associated increase in output be $-\alpha \cdot (1-\lambda) \cdot \sigma \cdot \eta$, where α is the elasticity of production with respect to employment. For a linear tax schedule, the resulting increase in the government's tax receipts is

$$\hat{c}_d = -t \cdot \alpha \cdot (1-\lambda) \cdot \sigma \cdot \eta \quad (24a)$$

where t is the tax rate.

The indirect effect is straightforward: if the shift increases the average rise of the negative income tax payouts by $\hat{\gamma}$, then the government's tax receipts will fall by

$$\hat{c}_i = t \cdot \alpha \cdot \lambda \cdot \sigma \cdot \eta \cdot \hat{\gamma} \quad (24b)$$

Thus the sum of the direct and indirect effects of the shift on the funds available to finance the negative income taxes is

$$\hat{c} = \hat{c}_d + \hat{c}_i = -t \cdot \alpha \cdot (1-\lambda) \cdot \sigma \cdot \eta + t \cdot \alpha \cdot \lambda \cdot \sigma \cdot \eta \cdot \hat{\gamma} \quad (25)$$

By (20), (23), and (25), the general equilibrium effect of the shift on the average income support is

$$\hat{\gamma} = -\frac{\sigma \cdot \eta \cdot (1-\lambda) \cdot (1+\alpha \cdot t)}{1-\sigma \cdot \eta \cdot \lambda \cdot (1+\alpha \cdot t)} \quad (23)$$

and the general equilibrium effect on unemployment is

$$\hat{U} = \sigma \cdot \eta \cdot (1-\lambda) \cdot \left[1 + \frac{\sigma \cdot \eta \cdot \lambda \cdot (1+\alpha \cdot t)}{1-\sigma \cdot \eta \cdot \lambda \cdot (1+\alpha \cdot t)} \right] \quad (24)$$

Using the elasticities of labor demand (η) reported in Layard, Nickell, and Jackman (1991), letting t be given by the OECD figures for the ratio of household taxes to disposable income, and setting $\lambda = 0.5$, $\sigma = 0.5$, and $\alpha = 0.75$, we obtain provisional estimates of how a shift from unemployment benefits and negative income taxes may affect average income support and unemployment, as shown in Table 1. Here $\hat{\gamma}$ is the percentage rise in the average level of income support that results when unemployment benefits are replaced by the linear negative income tax scheme. Analogously, $-\hat{U}$ is the

percentage fall in unemployment resulting from this shift. (A 10 percent reduction in unemployment benefits, matched by a corresponding downward shift of the negative income tax schedule, would affect the level of income support by 0.1γ and the level of unemployment by $0.1U$.)

Table 1. The Impact on Income Support and Unemployment from Replacing Unemployment Benefits by Negative Income Taxes¹

Country	η	t	In percent	
			$\hat{\gamma}$	\hat{U}
Austria	-0.37	0.1762	9.48	-8.37
Belgium	-0.30	0.1845	7.87	-6.91
Canada	-0.61	0.2259	15.13	-12.94
Denmark	-0.49	0.4459	14.05	-10.53
France	-0.17	0.0886	4.34	-4.07
Germany	-0.53	0.1493	12.84	-11.55
Ireland	-0.30	0.1897	7.89	-6.91
Italy	-0.182	0.1505	4.82	-4.33
Netherlands	-0.18	0.1947	4.90	-4.28
Norway	-0.18	0.2579	5.10	-4.27
Spain	-0.71	0.1277	16.28	-14.86
Sweden	-0.12	0.4225	3.80	-2.89
Switzerland	-0.32	0.2208	7.41	-7.41
United Kingdom	-0.29	0.1611	7.52	-6.71

¹The labor demand elasticities for Austria, France, Ireland, Italy, the Netherlands, and Norway are taken from Bean, Layard, and Nickell (1986).

The table tells us, for example, that in Denmark the switch from unemployment benefits to negative income taxes would raise the average income of those receiving support by 14.05 percent and at the same time reduce unemployment by 10.53 percent; whereas in the United Kingdom it would raise the average level of support by 7.52 percent and reduce unemployment by 6.71 percent.

Needless to say, these figures are merely suggestive. The estimates of labor demand elasticities are subject to considerable uncertainty. Low values for these elasticities would yield smaller percentage changes in income support and unemployment. It is important to note, however, that the quoted elasticities are short-run (annual) elasticities; the long-run elasticities are substantially higher. The calculations presented in the

table are merely an opening shot, an invitation for future empirical research, particularly in estimating the elasticities σ and α , and the parameter λ .

Moreover, we must keep in mind that the shift from unemployment benefits to a linear negative income tax scheme will generally not be Pareto improving. A 10 percent rise in the average level of income support, for instance, will not raise everyone's income above the level previously achieved by unemployment benefits. The poorest individuals may well lose from the shift. To avoid this loss, nonlinear negative income tax schemes will generally be required. What Table 1 gives us, however, is a very rough, preliminary estimate of what the listed countries are giving up, in terms of average income support and unemployment, by retaining their unemployment benefit systems.

V. Concluding Remarks

This paper suggests that, although conditional negative income tax schemes are associated with significant efficiency losses and are a manifestly imperfect redistributive tool, these disadvantages tend to be outweighed by those of unemployment benefit systems. The advantages of conditional negative income taxes over unemployment benefits are, as we have seen, particularly pronounced in the area of redistribution. This is important, because--as argued above--redistributive features predominate in most of the current European unemployment benefit systems, so that if these systems were stripped of all their redistributive elements, they would change out of all recognition. The paper has also argued that unemployment benefits also create a variety of inefficiencies that conditional negative income taxes generate only to a much lesser degree.

The paper is not meant to suggest that replacing unemployment benefits by conditional negative income taxes is in any sense an "optimal" policy. As is well-known, conditional negative income taxes have some manifestly undesirable features. Like unemployment benefits, they adversely affect people's incentive to work and acquire skills and they are costly, on account of their "deadweight" (i.e., people receiving tax refunds who are in no danger of unemployment). All that the paper suggests is that these disadvantages are generally less than the ones associated with unemployment benefit systems. Nevertheless, it must be emphasized that the replacement of unemployment benefits by negative income taxes is certainly no panacea; many European countries may well need to implement other measures in addition before their unemployment problems are reduced to tolerable proportions.

Furthermore, the paper does not claim that the replacement of unemployment benefits by conditional negative income taxes is invariably desirable. Clearly, the desirability of such a policy shift in a particular country will depend on the features of the unemployment benefit system in place as well as the social safety net provided by other welfare programs.

The analysis here does imply, however, that when unemployment benefits are generous and of long duration, when other social programs provide generously for people in need regardless of whether they are unemployed, and when the combination of support for the unemployed and job security provisions for the employed put upward pressure on wages and discourage employment, then a reduction of unemployment benefits balanced by conditional negative income taxes may play a useful role in stimulating employment, and thereby promoting efficiency and equity. And since these conditions prevail in many western European countries, this policy may have substantial potential there.

Naturally, conditional negative income tax schemes are themselves fraught with the danger of providing substantial disincentives to work, it is therefore important that they be designed with care.¹ But it is clear that, when it comes to work incentives, a carefully designed negative income tax scheme has considerable advantages over unemployment benefits. The reason, quite simply, is that a person needs to be unemployed in order to qualify for unemployment benefits, but not to qualify for conditional negative income taxes. Thus when an unemployed person finds a low-paying or part-time job (as many unemployed people do), his unemployment benefits are withdrawn but his conditional negative income taxes continue (albeit at lower rates). This means that the effective tax rate for finding a low-paying or part-time job is inherently higher under an unemployment benefit system than under a conditional negative income tax system.

Finally, the paper is not meant to suggest that conditional negative income tax systems become a substitute for the welfare state provisions unrelated to unemployment, thereby becoming a mechanism for dismantling of the Welfare State. To the contrary, I would argue that the alleged equity objectives underlying unemployment benefit systems may be attainable only through conditional negative income taxes in combination with various welfare measures, but not in isolation. There is no reason to rely exclusively on conditional negative income tax systems to provide an adequate "social safety net" against poverty, illness, old age, and economic insecurity. Other welfare state measures--such as government support for, or even provision of, education, health, training, and pensions--may well be required for this purpose. But since the availability of these measures is generally not restricted to those who are unemployed, they do not create the powerful disincentives to work, and the resulting inefficiencies and inequities, that are associated with unemployment benefit systems.

¹For example, it may be desirable not to permit young entrants to the labor market to be eligible for negative income taxes, in order to give them a strong incentive to become integrated in the working labor force.

Reference

- Baily, M.N., "Some Aspects of Optimal Unemployment Insurance," *Journal of Public Economics*, 10(3) (1978), pp. 379-402.
- Ehrenburg, R.G., and R.L. Oaxaca, "Unemployment Insurance, Duration of Unemployment and Subsequent Wage Gain," *American Economic Review*, (December 1976), pp. 756-66.
- Feldstein, Martin S., "Unemployment Compensation: Adverse Incentives and Distributional Anomalies," *National Tax Journal*, 37 (June 1974), pp. 231-44.
- , "Temporary Layoffs and the Theory of Unemployment," *Journal of Political Economy*, 84 (October 1976), pp. 937-59.
- Fields, G.S., "The Direct Labor Market Effects of the U.S. Unemployment Insurance System: A Review of Recent Evidence," *Industrial Relations* (February 1977).
- Flemming, J.S., "Aspects of Optimal Unemployment Insurance: Search, Leisure, Saving and Capital Market Imperfections," *Journal of Public Economics*, 10(3) (1978), pp. 403-25.
- Holen, A., "Effects of Unemployment Insurance Entitlement on Duration and Job Search Outcome," *Industrial and Labor Relations Review*, 30(4) (1977), pp. 445-50.
- Layard, Richard, Stephen Nickell, and Richard Jackman, *Unemployment: Macroeconomic Performance and the Labour Market* (Oxford: Oxford University Press, 1991).
- Maki, O.R., and Z.A. Spindler, "The Effect of Unemployment Compensation on the Rate of Unemployment in Great Britain," *Oxford Economic Papers*, 27 (November 1975), pp. 440-54.
- Marston, S.T., "The Impact of Unemployment Insurance on Aggregate Unemployment," *Brookings Papers on Economic Activity*, 1 (1975), pp. 13-48.
- Snower, Dennis, J., "The Future of the Welfare State," *Economic Journal* (1993).