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Abstract
We consider the treatment of uncertainty in models of the effects of benefits on incentives to work. We review literature in which benefit entitlement and labour market prospects are treated as uncertain. We then further illustrate the issues when we present a two-period model of the participation decision of a woman married to an unemployed man who receives benefit which is means-tested on his wife's income. Allowing for the possibly temporary nature of the husband's unemployment and the uncertainty in the wife's future job prospects we demonstrate how participation of the wife can be explained despite an implicit 100% marginal rate of tax applied to her income, something that cannot be explained in a static model.

(Chapter for <u>Current Issues in Welfare Economics</u>, edited by Nicholas Barr and David Whynes, forthcoming Macmillan.)

1.   INTRODUCTION

The effects of cash benefit programmes on individual behaviour in market economies has been the subject of enormous - and continuing - attention in the literature. This alone provides sufficient motivation for periodic reviews. At the present time, a most important additional motivation is the economic transformation of Eastern European economies - a "current issue" not just in welfare economics but in every other aspect of economic analysis. What will be the effect of existing benefit programmes in Eastern Europe in the changed economic climate, for example the relatively generous family allowance programmes?   What will be the effect of new programmes, most notably unemployment compensation schemes (not previously present due to the official absence of open unemployment in command economies and the incentives for enterprise managers to hoard labour)?

We do not attempt answers to these questions. Nor do we provide a comprehensive review of the huge body of theoretical and empirical evidence from Western market economies on the incentive effects of cash benefits. This would take far more space than we have and moreover there are available extensive recent reviews e.g. Atkinson (1987), Hurd (1990), Atkinson and Micklewright (1990). Important current issues in the literature identified by these reviews cover a variety of areas. These include (i) the need to consider the impact of the full set of institutional details of a particular benefit programme (there is much more to be considered than simply the level of benefit), (ii) the implication for behaviour of the difference in operation between social insurance benefit and means-tested assistance benefit, and (iii) the difficulties involved in practice in separating the pure effect of benefit schemes on behaviour from unobserved characteristics which both affect behaviour and benefit entitlement.[1]

In this chapter we highlight one aspect of the literature which we feel deserves more analysis: the treatment of uncertainty. Uncertainty with respect to benefit entitlements and labour market prospects can be expected to be present in both established market economies and the transitional former command economies. In section 2 we consider the impact of uncertainty surrounding entitlement to benefit. This is not allowed for in the great majority of analyses of disincentive effects of benefits. Although uncertainty is at the root of several models of the labour market that have been used to consider benefit effects - for example the job search model - the

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benefits themselves are typically viewed as certain. In reality, entitlement to benefit may not be known in advance with any precision, as anyone who has claimed any but the most simple cash benefit knows. The details of real world benefit schemes are typically very complex and it is often the case that the potential claimant cannot be sure about his or her entitlement. There may be uncertainty about the rules and/or uncertainty about the way the rules are applied by the authorities responsible for the administration of benefits. This can be expected to affect individuals' behaviour. Section 2 draws on the small literature in this area to show that the picture of disincentive effects obtained from standard textbook analysis with certain benefit entitlements can be quite misleading.

In Section 3 we consider the situation where benefit entitlement is certain but labour market prospects are uncertain; this also contrasts with the standard labour-leisure choice analysis. In this section we consider the impact of a given benefit system on the behaviour of the individual attempting to optimise in the presence of labour market uncertainty. This behaviour contrasts with that which one would find under certainty. In Section 4 we present an analysis in which uncertainty is again about labour market prospects rather than the operation of benefit schemes but where we focus on family decisions. We consider the impact of benefit schemes where entitlement depends on the income of a claimant's family, i.e. a "means-tested" benefit. This is an important institutional feature of many benefit schemes but the implications of this means-test for the labour supply of other family members has received relatively little attention. Our analysis extends a recent small literature on this issue which has been based on a static analysis. We show how the picture changes when intertemporal aspects in the presence of uncertainty are considered.

2.   UNCERTAINTY OF ENTITLEMENT AND INDIVIDUAL BEHAVIOUR

The absence of uncertainty about benefit entitlement in much analysis of impact of benefits on work incentives may be illustrated by considering the job search model.[2] In the standard model an unemployed individual is seen as searching for work across a known distribution of wage offers. Uncertainty is at the root of the model. The distribution of wages is assumed to be known but the searcher is assumed not to know the level of the wage in any given

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offer from this distribution; it is uncertain (hence the "search"). Furthermore, the model allows for the receipt of a job offer (at any wage level) in a given period to be uncertain. In some extensions of the basic model the duration of a job which is accepted is additionally assumed to be uncertain (e.g. Hey and Mavromaras, 1981). The model defines a "reservation wage", the wage at which the individual is indifferent between accepting a job and continuing search. The level of the reservation wage determines whether the individual accepts a particular job offer and this level is influenced by all the uncertainty just described (and if applicable any benefits paid when in work).

However, the uncertainty applies only to <u>jobs and wages</u> and, in contrast, the entitlement to the unemployment <u>benefits</u> in the model (which also determine the reservation wage) is almost invariably considered to be known. The searcher is assumed to know with certainty the future stream of unemployment benefits.

The treatment of unemployment benefits in the job search model is representative in that the vast bulk of literature on the disincentive effects of cash benefit schemes assumes that claimants know their benefit entitlements with certainty. There is good reason to believe that in practice some considerable uncertainty may surround benefit income.

As far as unemployment benefit is concerned this uncertainty may arise for a number of reasons. Firstly, when an individual makes an initial claim for benefit it may take some time to assess entitlement; about 1 in 10 of all persons in the registered unemployed stock in Britain in 1988 were waiting for their unemployment insurance entitlement to be determined, with the figure very much higher in short durations (Micklewright, 1990). Secondly, in most unemployment compensation schemes there exists the possibility that refusal of a job offer may result in disqualification from benefit; the individual will be uncertain whether this sanction will apply in his particular case or not. Thirdly, the duration of benefit entitlement is finite in the typical unemployment insurance programme and in some countries' schemes the entitlement cannot be predicted with certainty at the start of the unemployment spell. For example, the period of entitlement to unemployment insurance in the US is extended if the state unemployment rate rises above a certain threshold. This extension applies both to new claimants and to those whose spell of unemployment is already in progress; the latter group could not be expected to have foreseen such an extension with certainty. Even in

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countries where the entitlement period is fixed, and where claimants are fully informed about this period, there may be considerable uncertainty surrounding the entitlement to any means-tested benefits which may follow unemployment insurance (means-tested benefit being more complex).

The evidence just given on uncertainty of unemployment benefit entitlement related to Western economies. Nagy (1990) provides an example of uncertainty surrounding this type of benefit in transitional economies. He finds that there was a considerable lack of information and administrative error in the operation of new Hungarian unemployment benefit scheme during 1989. Evidence of uncertainty surrounding entitlement to other types of benefit may be seen. The divergence between actual and anticipated state pension benefits in the US is described by Bernheim (1987). (Mitchell, 1988, finds ignorance of private pension entitlement to be widespread.) The receipt of means-tested benefit is particularly subject to uncertainty. This may arise for a number of reasons. Claimants may be uncertain of getting an accurate assessment according to the rules of what may be a complex benefit; in the UK in 1975, an investigation showed that 17% of a sample of Supplementary Benefit claims contained some kind of administrative error (Supplementary Benefits Commission, 1976, p.184). Furthermore, entitlement to means-tested benefits may be strongly influenced by the decisions of officials administrating benefit programmes with considerable discretion over awards made.

All this suggests the need for the introduction of entitlement uncertainty into models of the disincentive effects of benefits. We illustrate the impact of benefit uncertainty on the analysis of incentives in a static model. This will show how the standard labour-leisure choice analysis can be very misleading. We take two examples from the small literature which has relaxed the assumption of certain entitlement.

Transition from Unemployment

The uncertainty surrounding benefits which may be received by unemployed family men forms the focus of the analysis by Jenkins and Millar (1989). The uncertainty considered does not relate to the benefit receipt when unemployed which Jenkins and Millar argue "in the near future is relatively certain" (p.138). Rather, there is assumed to be uncertainty about the means-tested benefits which may be received on return to work. In Britain, the country

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motivating their analysis, employed family heads on low income may apply for means-tested benefits and,

> "on return to work, total family income can come from earnings, child benefit, family credit, and housing benefit, and at the time of the participation decision, the amount to be received from these various sources is relatively uncertain, primarily because the transition into work implies reassessment for means-tested benefits" (Jenkins and Millar, 1988, p.138).

The authors go on to point out that although the out-of-work benefits may be just as complex, the change in status by moving into work implies that in-work income is more uncertain.

The implications of this source of uncertainty is analysed by Jenkins and Millar in a static model. Individuals choose between certain income when unemployed and an uncertain in-work income. The latter is made up of three parts: (i) earnings which are assumed to be known, (ii) benefits received with certainty, and (iii) means-tested benefits received with uncertainty. Uncertainty surrounding means-tested in-work benefits is simplified so that there are only two possibilities, a relatively high benefit, F_1, and a relatively low one, F_2 ($= F_1 - d$), where d is simply the difference between benefits received in the favourable and unfavourable cases. The relatively lower benefit F_2 is received with probability p and F_1 with probability 1-p, these being the probabilities which the individual perceives (i.e. subjective probabilities). Gross earned income in work is given by W times H where these refer to the wage and hours of work, respectively. When this form of income exceeds a tax-free allowance, A, it is assumed to be subject to a single marginal tax rate, t. A universal child benefit of B per child is paid in work and not included in the means-test for the in-work benefit described above but is assumed to be means-tested away when out of work. Income when out of work is given by C_0. Assuming W.H > A, income in work for a person with n children is given by

$$C_1 = (1-t)W.H + t.A + n.B + F_1 \qquad \text{with probability 1-p} \qquad (1)$$

and by

$$C_2 = C_1 - d \qquad \text{with probability p.} \qquad (2)$$

If individuals maximise expected utility, the individual will work if

$$(1-p).U[C_1,L_e] + p.U[C_2,L_e] > U[C_0,L_u] \qquad (3)$$

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where L_e and L_u are leisure when employed and unemployed respectively and where the utility function U[..] is assumed to display risk aversion.

This framework is used to derive a number of results concerning the effects of different policy parameters on the decision to work. For example, the authors compare the effect on the participation decision of measures designed to reduce the degree of uncertainty surrounding means-testing via a reduction in d, with those measures increasing certain income out of work via child benefit, B, or subsidies to the wage, W. Jenkins and Millar stress that their analysis of policy options is "speculative rather than conclusive". However, their model shows the richer view of disincentive effects that can be obtained by considering income risk related to benefit entitlement.

Disability Insurance and Leaving the Labour Force

When an individual with a disability applies for a disability pension the receipt of that pension is not certain: it depends on a medical assessment of the degree of disability. Why should this uncertainty be of any behavioral significance? One possibility is the stigma or "hassle" associated with the process of application, this resulting in a failure to apply for benefit. In the model presented by Halpern and Hausman (1984, 1986), the impact of uncertainty surrounding entitlement stems from the fact that workers must quit work before they can apply for benefit. This requirement is present in the disability insurance system in the US which motivated Halpern and Hausman's model. In 1980 only 22% of applications for disability benefit were immediately granted (although the figure rose as a result of appeals against the initial decision) indicating a substantial degree of uncertainty concerning the outcome of an application (Halpern and Hausman, 1986, Table 14.1).

Halpern and Hausman assume that if the claim is unsuccessful the wage that the individual may then command in the labour market is less than if no application for benefit had taken place. In other words, the applicant cannot return to a job at the previous wage. The authors argue that this assumption may be justified on a number of grounds: human capital may erode during the wait for the application to be processed; the employer may believe that the disability that led to the benefit claim will result in a further quit in the near future.

The problem for the claimant in a single period framework is illustrated

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in Figure 1. Let Y equal non-labour income and D a means-tested disability benefit; W is the wage in the job occupied at the time the decision to apply is taken and W^* the wage that will be on offer if a claim for benefit is made and is rejected. The probability of a claim being accepted is p. The individual must therefore choose between facing on the one hand budget constraint OYA at wage W with certainty, and on the other ODB with probability p and OYC at wage W^* with probability (1-p).

FIGURE 1 ABOUT HERE

In order to illustrate the argument we have represented preferences in the diagram (indifference curve U^0) such that the individual would be indifferent between continuing in work and applying for benefit if the latter were certain. The individual has however to take into account the possibility that a claim for benefit will be rejected which would result in him facing a lower wage rate than before. If the individual in the diagram believes that there is any uncertainty about the outcome of his application (p < 1) then no claim will be made.

In general, an individual will chose to apply for disability benefit if

$$p.U[D] + (1-p).V[W^*,Y] > V[W,Y]. \tag{4}$$

U[D] is the value of the direct utility function at zero hours of work in the event of a successful claim and V[..] is the indirect utility function evaluated at the relevant wages and unearned income if the individual does not claim, or claims and is refused. Uncertainty implies that an individual cannot make a simple choice between two certain alternatives and the standard labour-leisure analysis would be misleading, as we have described above.

Empirical Analysis

So far we have considered the disincentive effects of benefits when entitlement uncertainty is introduced into theoretical analysis. However, this type of uncertainty should also be considered in empirical analysis. Again, in general this is not done. For example, empirical analysis of unemployment duration which specifies the probabilities of leaving unemployment in a given week typically defines this probability as a function of the ratio of current out-of-work income to that which would be received in

work; the latter includes entitlement to means-tested benefits assumed to be received with certainty, see e.g. Nickell (1979), Atkinson et al (1984).

That uncertainty about benefit entitlement _does_ appear to effect behaviour in practice is suggested by the empirical work on unemployment duration by Katz and Meyer (1990). This research used microdata from administrative records on individual spells of unemployment from the US. The authors model the individual's probability of leaving unemployment in a given week as a function of not only his current unemployment insurance (UI) benefit level but also the remaining weeks of a finite entitlement period to UI. The sample was drawn during a time of rising unemployment d of UI entitlement being triggered for some individuals present in the data, this happening after they had entered unemployment. The impact of real-world uncertainty is suggested by the coefficient of a dummy variable taking the value one in the week when UI entitlement would have ended were it not to have been extended. The probability of leaving unemployment is estimated to be sharply higher in this week suggesting that the subjective probability attached to an extension of entitlement was low; the extension was not seen as certain by the individuals (or by their former employers).[3]

Halpern and Hausman (1984, 1986) empiricise their theoretical model of uncertainty and disability benefit entitlement which was outlined above by assuming an explicit functional form for the labour supply equation. They then recover the corresponding indirect and then direct utility functions (V[..] and U[..] in equation (4)) via Roy's Indentity (see Hausman, 1981). The sample survey used to estimate the model includes both claimants and non-claimants for disability benefit and contains information on the outcome of claims and on wages (W, and W^* in the case of an unsuccessful claim). A binary model of the probability of a claim being successful is used to calculate predicted values of p; the information on post-claim wages for unsuccessful applicants provides the basis for predicting W^* for all individuals. These predictions are then used in the estimation of the empirical version of equation (4) above explaining the probability of applying for benefit.

.   The results of Halpern and Hausman's empirical model enable them to assess the effect of a change in p on the decision to apply for benefit. This effect varies with the degree of risk aversion assumed in the utility function; the greater the risk-aversity the greater is the effect of changes in the probability of claim acceptance. The authors conclude that changes in

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this probability do have an important effect but note that since the data do not appear consistent with much risk aversion, the effect of changes in disability benefit level (D in equation (4)) are probably more important.

3.   UNCERTAIN LABOUR MARKET PROSPECTS

The type of uncertainty considered in the last section was exclusively related to benefit prospects, but not to wages or employment opportunities. We now turn to an analysis of the problem from another viewpoint: how do incentive effects of a given benefit scheme change if wages and employment prospects are uncertain? We restrict our attention to a static model of labour-leisure choice.

The issue was investigated in detail by Cowell (1981). He distinguishes between two types of wage uncertainty. Firstly, uncertainty with respect to the wage rate itself. For a given supply of labour H, the individual will obtain an uncertain return W, but he will be employed with certainty. Secondly, for a given wage of level W and desired hours H, it is uncertain whether he will be employed. Cowell investigates the impact of different tax and benefit schemes on the optimal supply of labour.

In his basic model the combined tax and income maintenance system has the following form:

$$T = (t.W.H) - B; \tag{5}$$

t is a uniform marginal tax rate levied on all earned income, W is the wage rate, H is the amount of time offered to the market. B are benefits which in the basic model are assumed to be universal, depending neither on the individual's choices nor on the outcome of any uncertain event (an example of such a benefit would be Child Benefit in the UK). T may be positive or negative, depending on whether the individual pays more tax then he receives in benefit or vice versa. In contrast to the standard labour-leisure choice analysis, the wage W is a stochastic variable, depending on the state of nature. To keep the model simple, there are only two states of the world: a favourable one in which $W = W^1$, with probability (1-p), and an unfavourable one, in which $W = W^2$, with probability p. If $W^2 = 0$ this generalises the analysis to the second type of uncertainty mentioned above. Disposable income

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is then given by W.H - T.

The individual maximizes a specific form of utility function with leisure and consumption as its arguments; this function exhibits decreasing absolute risk aversion. Maximisation is subject to the stochastic budget constraint described above. Cowell now investigates separately the impact of changes in the transfer B or the marginal tax rate t on the supply of labour under the assumption that the disutility of work is equal to the disutility of involuntary unemployment. He first confirms if there is <u>no</u> uncertainty (p = 0), both an increase in B for constant t and an increase in t for constant B will decrease the supply of labour (assuming leisure is a normal good). These are the conventional results: both policies are found to provide a disincentive effect.

However, in the case of uncertainty, the impact of both policies on labour supply is ambiguous. An increase in the lump sum transfer B or the marginal tax rate t may <u>increase</u> labour supply for certain values of p and of the elasticity of utility with respect to consumption. These effects are due to the uncertainty reducing role of the tax and income maintenance scheme. An increase in the tax rate t reduces the dispersion of possible returns from the supply of labour to the market. An increase in the transfer B increases the guaranteed income of the individual. Cowell points out that standard portfolio theory would suggest that either policy would encourage risk-taking, in this case supplying labour in return for the uncertain W.

When undertaking policy reform, governments may change both taxes and benefits at the same time. They are also interested in defining particular target groups. Thus for policy purposes, two questions arise: firstly, is it possible to increase the progressivity of the tax and income maintenance scheme and to raise work incentives without changing expected ex-post consumption or expected tax liabilities? Secondly, is it possible to identify the segment of the population for which the positive incentive effect is likely to occur? Cowell confirms that the first of these questions can be answered in the affirmative, the occurrence of the incentive-increasing effect depending on the degree of risk aversion, probabilities of the state of the world p, and on the ratio of transfer income to net earnings. Regarding the second question, he identifies the segment of the population for which the incentive-increasing effects are most likely to occur as being characterized

"by relatively high risk aversion, significant but not enormous wage risk, and not too high a ratio of non-employment income to earnings" (p.

People with these characteristics may be fairly poor with little income other than earnings, high income variability and with quite strong risk aversion. Cowell's analysis shows that the introduction of uncertainty with repsect to labour market prospects may change the perception of an optimal tax and benefit scheme.

4.   MEANS-TESTED BENEFIT AND INTERTEMPORAL UNCERTAINTY

To this point we have considered the decisions of <u>individuals</u> in the presence of uncertainty. In this section we introduce uncertainty into the analysis of the effect of benefits on <u>family</u> labour supply. We do this by considering the impact of a benefit in which entitlement depends on family income, in other words there is a family means-test. We look at the impact of the means-test not on the benefit claimant's behaviour but on the labour supply of other members of the claimant's family.[4] This serves two purposes. Firstly, we highlight an area of the literature on disincentives which we believe deserves more attention; there has been surprisingly little recognition of the need to look at the effect of means-testing the benefit of one person in the family on the labour supply of other members whose income is included in this means-test. Secondly, we show how the presence of uncertainty can rationalise empirical facts that are inconsistent with the predictions of the few studies of this issue to date; these are based on a static model with no uncertainty. The uncertainty we are concerned with in this section relates to job prospects, as in Section 3; we assume that the operation of the means-test and the administration of benefit is itself certain.

Discussion of the distinction between the impact on the labour market of insurance and means-tested unemployment benefit often neglects the fact that the latter imposes a high marginal rate of tax on family income. Consider the situation of an unemployed man receiving means-tested benefit with maximum entitlement (if no other family income is present) of b. If his wife works, her earnings reduce her husband's benefit £ for £, once they exceed a disregarded level k. In other words, family income is subjected to an implicit 100% marginal rate of tax when her earnings are in the range [k, b + k]; the upper threshold applies since the husband's benefit entitlement

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expires at this point. This system is essentially that which applies in the UK benefit Income Support, received by some two-thirds of men in the registered unemployed stock; the system also describes the essentials of the German Unemployment Assistance benefit (Arbeitslosenhilfe).

The resulting budget constraint in a static labour-leisure choice diagram is shown in Figure 2. We assume that the family has no sources of income other than the means-tested unemployment benefit and the wife's earnings, earned at the wage rate W" (we ignore explicit income taxes). The budget constraint in Figure 2 is flat along the segment AB. With conventional preferences, no woman should locate along this part of the budget constraint in a simple labour-leisure choice model.

FIGURE 2 ABOUT HERE

The impact of the means-test in practice has been investigated in Britain by Garcia (1989, 1991) and Kell and Wright (1990). Both estimate econometric models of female labour supply in which the current period labour supply of women married to unemployed men is related to their current period budget constraint of the type shown in Figure 2. The results of both studies suggests that the Income Support means-test has a significant impact on the behaviour of married women.

However, it remains the case that, in defiance of the prediction of the simplest theoretical model, some women married to unemployed men in Britain are observed to be supplying hours at a level which suggest that they are located along the flat segment in Figure 2 (Dilnot and Kell, 1987). This may be because work itself yields utility or because constraints placed by employers on hours worked rule out location at the kink point B. But in our view an important possible explanation involves the introduction of uncertainty into the analysis as we show in the rest of this section.

A static framework in which current wife's labour supply is modelled as a function of the current budget constraint neglects the fact that the disincentive from means-testing is only temporary, lasting just as long as the husband is unemployed. What difference should the recognition of the temporary nature of the budget constraint make to the analysis? If the wife was not working prior to the husband's unemployment then no changes are

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needed. But if the wife does have a job when her husband enters unemployment then she needs to consider whether quitting to avoid a temporary disincentive is the right long-run strategy - she may want her job back when the husband leaves unemployment and the disincentive from means-testing is removed.

In what follows we set-up a simple two period model assuming that the husband is unemployed in the first period but may or may not be in the second period. The wife has to decide whether to quit in the first period in the face of the means-test applied to her earnings as part of her husband's unemployment benefit assessment. If she does quit we assume that her job prospects in the second period are uncertain; if she stays in her job in the first period we assume that she can retain it with certainty in the second period. This is the key assumption of the model; uncertainty about her future job prospects reduce the wife's propensity to quit in the first period (the uncertainty about the husband's employment prospects is not in fact important to the main result).

This feature is similar to an important aspect of the Halpern and Hausman model of disability benefit and participation which was discussed in Section 2. Just as we assume that quitting reduces future employment prospects, Halpern and Hausman assumed that quitting and making an application for disability benefit would reduce the wage the individual could command in the labour market if the application were to be rejected. (Note that Halpern and Hausman collapse their model onto one period but the same intertemporal considerations are implicitly present.)

In period one the husband is unemployed with <u>potential</u> benefit entitlement b; the actual benefit amount received depends on the operation of the means-test. In the second period the husband will be offered with probability, p, a job paying E^H, where $E^H > b$. The wife, who prior to the husband's unemployment has been working, must decide in the first period whether to quit or to carry on in her job. Her working results in a level of earnings, E^W; if she works in the second period she also receives this level of earnings since we assume that the wage rate is the same in both periods and that constraints on the demand side of the labour market are such that hours are not variable (a single hours-wage package is all that is available). She cannot make marginal changes to her hours in period one (or period two) - she simply has to decide whether to work, and receive E^W, or to quit, in which case we assume she receives c, the equivalent of the opportunity costs of her employment; these may comprise travel-to-work costs and child care expenses,

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and where $c < E^w$. (We assume that she receives no unemployment benefit herself, being disqualified from receipt for voluntarily leaving her job). If she quits in the first period she receives a job offer in the second period with probability q.

The wife's earnings are disregarded for the purpose of the benefit means-test up to a level k. We assume that if she works her earnings exceed this disregarded level ($E^w > k$). Between k and [k + b] her earnings result in an implicit 100% marginal rate of tax on her husband's benefit. Accordingly, if the husband is unemployed and the wife employed, the net contribution of her work to family income in that period is equal to s, where

$$s = k \qquad \text{if } E^w < b + k \qquad (6)$$
$$= k + E^w - (b + k) \qquad \text{otherwise.}$$

The opportunity costs of the wife working are assumed to exceed the income she can contribute if the husband is unemployed ($c > s$).

To derive results we need to specify how the couple takes decisions and what yields them utility. We assume that neither husband nor wife derive utility from leisure; if the wife quits work in the first period it is because she wishes to gain c and not because she enjoys leisure. For simplicity we assume that the couple operate as a unit and are risk-neutral. This implies that their aim is simply to maximise their total joint two-period income (we ignore discounting).[5] Given those assumptions we have made already, this specific optimising behaviour has two implications for the couple's labour supply decisions. Firstly, the husband will always accept a job offer in period two. Secondly, if her husband is employed in period two, the wife will work if she can in that period but she will not if he is still unemployed.

The only decision variable in the model is the wife's decision as to whether to quit or not in the first period. If she does quit, total two-period income is given by the following expression:

$$I^1 = b + c + E^H + E^W \qquad \text{with probability p.q}$$
$$I^2 = b + 2.c + E^H \qquad \text{with probability p.(1-q)}$$
$$I^3 = 2.[b + c] \qquad \text{with probability (1-p);}$$

and by the following if she does not quit:

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$$I^4 = b + s + E^H + E^W \quad \text{with probability } p$$
$$I^5 = 2.b + s + c \quad \text{with probability } (1-p).$$

The wife will quit in period one if expected two-period income stemming from this decision exceeds that if she continues to work despite the means-test. She will quit if:

$$[p.q.I^1 + p.(1-q).I^2 + (1-p).I^3] > [p.I^4 + (1-p).I^5] \tag{7}$$

Equation (7) can be used to show that the decision to quit in the first period depends positively on the opportunity cost of her working, c, and on her second period probability of a job offer if she quits in the first period, q. The decision depends negatively on her earning power E^W, the lower threshold for the means-test, k, her husband's benefit, b (in the case that $E^W > [b + k]$), and his second period probability of a job, p.

This simple model has several undesirable features (including the absence of any utility derived from leisure). Nevertheless, we feel that even the risk-neutral version described above offers useful insights into the potential effect of a common form of benefit system and gives a richer view of its implications for incentives to work in the family-decision making context than would be obtained from a static model. The richer view stems from the introduction of uncertainty about the wife's future job prospects. As with the introduction of entitlement uncertainty in the models reviewed in Section 2, we believe that this adds a realism to the analysis of the disincentive effects of benefit systems which has been too often missing in much of the literature.

5. SUMMARY

In this chapter we have argued for more attention to be paid to certain forms of uncertainty in the analysis of the disincentive effects of benefits. In Section 2 we reviewed research which has allowed for the important real world feature of uncertainty surrounding entitlement to benefits. As the awareness of the complexity of benefit schemes increases among those doing research on incentives so should the need to consider entitlement uncertainty. This uncertainty is present in well-established benefit programmes in Western economies; it seems not unreasonable to suppose that it is even more prevalent

in certain benefit programmes in the transition economies of Eastern Europe, notably those which are entirely new such as unemployment benefit. Uncertainty of this form implies that the standard analysis of incentive effects which assumes certain benefit entitlement may lead to misleading results. It may also imply that incentives could be improved in some cases by simply reducing uncertainty, although in some cases the opposite may be true.

In Section 3 we considered the impact of a given benefit system if uncertainty about labour market prospects is introduced in a simple static model. The paper which we reviewed showed that conclusions under uncertainty could be rather different from those when labour market prospects are certain. Section 4 also focused on uncertainty of labour market prospects but in the context of family rather than individual labour supply. Looking at couples where the husband is unemployed, we analysed the effect on the wife's labour supply of including her income in a means-test for her husband's benefit. We used a simple two period model of family behaviour. When the future probability of a job is considered we showed how a static model's prediction that a married woman would quit in the face of a 100% implicit marginal tax rate on her earnings is too simple a representation of the situation. This again shows how consideration of uncertainty modifies one's conclusions about benefit effects. We hope that research of the type we have considered in this chapter will feature prominently in the literature on incentives in the future.

1.   Some notable recent papers in this literature are Meyer (1989), Mofitt (1989), and Atkinson (1990). A now rather old important survey paper is that by Danziger et al (1981). See also references to more recent surveys in Barr (1990).

2.   For a discussion of the job search model see Lippman and McCall (1976), Hey (1979), Pissarides (1985).

3.   Katz and Meyer argue that the impact of this dummy variable could represent the actions of employers with pre-planned policies of re-calling previously laid-off workers at the end of their benefit period.

4.   This section draws on a more extended analysis in Dustmann and Micklewright (1991).

5.   In the fuller analysis on which we have drawn here we consider both risk aversion and discounting. Note that uncertainty is not technically essential to our results in a risk-neutral framework; the same results could be achieved with a certain job for the wife in the second period but at a lower wage.

Figure 1: Labour Supply and Disability Benefit
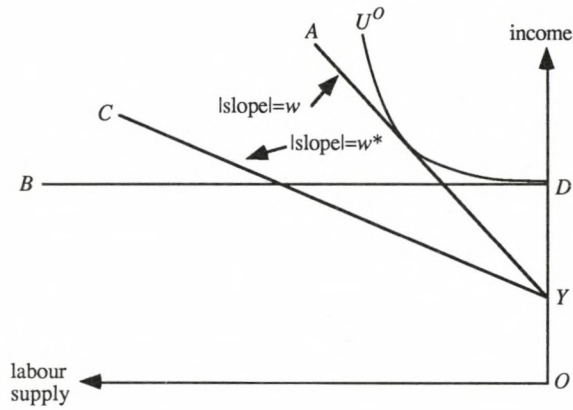
Figure 2: Budget Constraint for Wife with Husband Unemployed
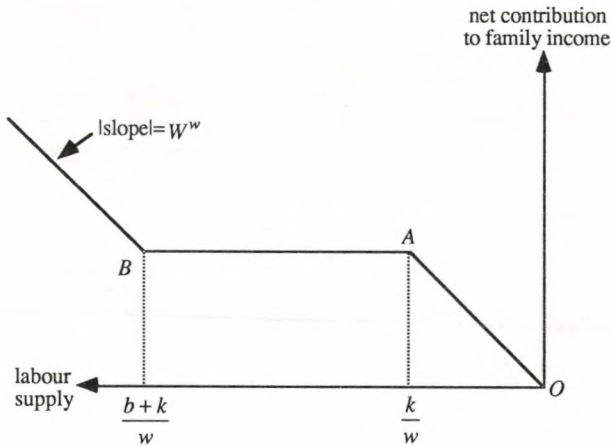
References

Atkinson, A.B. (1987), "Income Maintenance and Social Insurance", in Auerbach A.J. and Feldstein M.J. (editors), Handbook of Public Economics, volume 2, Amsterdam, North-Holland.

Atkinson, A.B. (1990), "Institutional Features of Unemployment Insurance and the Working of the Labour Market", Welfare State Programme Discussion Paper 50, STICERD, London School of Economics.

Atkinson A.B. and Micklewright J. (1990), "Unemployment Compensation and Labour Market Transitions: A Critical Review", TIDI Programme paper 143, STICERD, London School of Economics, and European University Institute Working Paper ECO 90/9 (Journal of Economic Literature, forthcoming).

Atkinson, A B, Gomulka, J, Micklewright, J and Rau, N R, (1984), "Unemployment Benefit, Duration and Incentives in Britain: How Robust is the Evidence ?", Journal of Public Economics, 23, 3-26.

Barr, N. (1990) "Economic Theory and the Welfare State: A Survey and Reinterpretation", Welfare State Programme paper 54, STICERD, London School of Economics.

Bernheim, B D. (1987) "Social Security Benefits: An Empirical Study of Expectations and Realisations", NBER Working Paper 2257.

Cowell, F. (1981), "Income Maintenance Schemes under Wage-Rate Uncertainty", American Economic Review, 71, 692-703.

Danziger, S, Haveman, R H and Plotnick, R, (1981), "How Income Transfer Programs Affect Work, Savings, and the Income Distribution: A Critical Review", Journal of Economic Literature, 19, 975-1028.

Dilnot, A and Kell, M, (1987), "Male Unemployment and Women's Work", Fiscal Studies, 8, 1-16 (reprinted in A Dilnot and I Walker, editors, (1989), The Economics of Social Security, Oxford, Oxford University Press).

Dustmann C. and Micklewright J. (1991), "Means-tested Unemployment Benefit and Family Labour Supply: An Intertemporal Analysis", European University Institute, mimeo.

Garcia, J, (1989), "Incentive and Welfare Effects of Reforming the British Benefit System: a Simulation Study for the Wives of the Unemployed" in S Nickell, W Narendranathan, J Stern and J Garcia, The Nature of Unemployment in Britain, Oxford, Oxford University Press.

Garcia, J, (1991), "A Participation Model with Non-Convex Budget Constraints: the Case of the Wives of the Unemployed in Great Britain", Applied Economics, 23, 1401-1416.

Halpern J. and Hausman J. (1984), "Choice under Uncertainty: A Model of Applications for the Social Security Disability Insurance Program", mimeo, MIT.

Halpern J. and Hausman J. (1986), "Choice under Uncertainty: Labour Supply and

the Decision to Apply for Disability Insurance", in Blundell, R. and Walker I. (editors), <u>Unemployment, Search and labour Supply</u>, Cambridge, Cambridge University Press.

Hausman, J. (1981), "Exact Consumer Surplus and Deadweight Loss", <u>American Economic Review</u>, 71,

Hey, J. (1979), <u>Uncertainty in Microeconomics</u>, Oxford, Martin Robertson.

Hey, J. and Mavromaras, K. (1981), "The Effect of Unemployment Insurance on the Riskiness of Occupational Choice", <u>Journal of Public Economics</u>, 31, 105-129.

Hurd, M D, (1990), "Research on the Elderly: Economic Status, Retirement and Consumption and Saving", <u>Journal of Economic Literature</u>, 28, 565-637.

Jenkins, S. and Millar, J. (1989), "Income Risk and Income Maintenance: Implications for Incentives to Work", in A Dilnot and I Walker, editors, <u>The Economics of Social Security</u>, Oxford, Oxford University Press.

Katz, L F and Meyer, B D, (1990), "The Impact of Potential Duration of Unemployment Benefits on the Duration of Unemployment", <u>Journal of Public Economics</u>, 41, 45-72.

Kell, M. and Wright, J. (1990), "Benefits and the Labour Supply of Women Married to Unemployed Men", <u>Economic Journal</u>, 100 (Conference 1990), 119-129.

Lippman S A and McCall, J J. (1976), "The Economics of Job Search: A Survey. Part 1: Optimal Job Search Policies", <u>Economic Inquiry</u>, 14, 155-189.

Meyer, B. (1989), "A Quasi-Experimental Approach to the Effects of Unemployment Insurance", NBER Working Paper 3159.

Micklewright, J. (1990), "Why do Only a Quarter of the Unemployed in Britain Receive Unemployed Insurance?", TIDI Programme paper 147, STICERD, London School of Economics, and European University Institute, Florence, Working Paper ECO 90/17.

Mitchell, O S. (1988), "Worker Knowledge of Pension Provisions", <u>Journal of Labor Economics</u>, 6, 21-39.

Moffitt, R. (1989), "Demographic Behaviour and the Welfare State: Econometric Issues in the Identification of the Effects of Tax and Transfer Programs", <u>Journal of Population Economics</u>, 1, 237-250

Nagy, G. (1991), "Unemployment Benefits in Hungary - First Experiences", <u>Mozgo Vilag</u>, January, 96-103 (in Hungarian).

Nickell, S. J. (1979), "The Effect of Unemployment and Related Benefits on The Duration of Unemployment", <u>Economic Journal</u>, 89, 34-49.

Pissarides, C A (1986) "Job Search and the Functioning of Labour Markets", in D Carline, C Pissarides, W S Siebert and P J Sloane, <u>Labour Economics</u>, London, Longman.

Supplementary Benefits Commission, (1976), <u>Annual Report</u>, London, HMSO.

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