

# UNEMPLOYMENT: A REVIEW OF THE EVIDENCE FRQM PANEL DATA

Peder J. Pedersen and Niels Westergård-Nielsen

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## INTRODUCTION

The continued high unemployment in western Europe and North America has given rise to a discussion of the reasons for this persistence of unemployment. One hypothesis is that persistence is due to the depreciation of human capital in case of longer spells of unemployment. Another explanation discussed in the literature is a shortage of real capital due to longer periods of unemployment with a low level of investment activity. Insider-outsider theories for the determination of wages have also been used to analyse the labour market reaction to negative shocks, resulting in an increased number of outsiders without influence on the determination of wages. Other attempts to explain persistence concentrate on the impact from incentives in the unemployment insurance system on the behaviour of workers. On the employers' side of the market, rules about redundancy payments and other costs related to layoffs of workers can create incentives working against a reduction of unemployment. Finally, an obvious contribution in explaining the persistence of high unemployment, especially in Europe, comes from the demand side. The importance of demand, at least in the short to medium term, should be kept in mind when interpreting the results from the microeconomic studies surveyed below.

Discussions of these hypotheses are usually founded in aggregate data and are not particularly detailed when it comes to the underlying microeconomic model. However, it should be possible to discriminate with greater certainty between competing theories by using micro data. A substantial growth in micro data sets in recent years in most OECD countries have spurred a number of empirical studies drawing on micro evidence. The purpose of this paper is to survey the results from a number of microeconomic studies using panel data, and investigate if a common trend can be deduced from the results, that may be used for policy recommendations and as a guideline for further research.

The major part of empirical studies using panel data have appeared during the last 10-15 years. The statistical and econometric methods necessary to obtain reliable estimates have been developed during this period, and by their very nature, time is necessary to build sets of panel data. Time alone is a necessary, but not sufficient, condition for building a longitudinal database. Along with the development of econometric methods, the necessary skills had to be developed with respect to administration and handling of data sets that are typically much bigger and more complex than the aggregate time series data used in much empirical work in economics. Finally, many factors, including costs of data collection and the delicate problems related to data confidentiality, have in many cases made it necessary to utilise the data sets researchers have been able to construct – or collect from different sources, instead of the optimal data sets (discussed below). Further details on the various types of labour

market data are provided in Annex 2, which discusses in particular the characteristics of micro and panel data.

Some of the key terms and concepts used in panel data studies are summarised in the Box. Section I provides the survey of empirical results. This survey is organised into several main areas, which are set out at the beginning of the section. Some concluding comments are provided in Section II. The studies surveyed are presented in a more compact way in the Tables A1 and A2 in Annex 1.<sup>1</sup>

## I. SURVEY OF EMPIRICAL RESULTS

The present section does not attempt to give a complete survey of all panel studies in every OECD country completed during the last 10-15 years. Instead we shall try to summarise a number of recent studies with respect to the nature of data used, the motivation of the studies, estimation methods and the main results. The studies have been selected with the purpose of giving a balanced representation among countries, types of data sets, hypotheses examined, and estimation methods. With few exceptions only studies using data covering individual behaviour have been selected.

The studies selected for review cover the United States, the United Kingdom, Australia, Canada, Germany, the Netherlands, Austria, France, Belgium, Sweden, Denmark and Finland, with the majority of the studies using U.S. data. Inter-country comparisons are difficult, however: there are institutional differences between countries – for example in unemployment insurance arrangements; differences in data sets (*e.g.* sample sizes); and, despite the wide use of the hazard function approach, there are differences in specifications of functions and in whether unobserved heterogeneity is accounted for.

The survey of the results from the included studies are organised into some main groups. The first group consists of results concerning the importance of *individual background factors* for the probability of becoming unemployed, of being hit repeatedly by unemployment, and of escaping from unemployment either to a regular job, to a state outside the labour force, or to participation in some labour market programme. The individual background factors can be viewed both as instruments to control for individual heterogeneity and as indicators for targeting of policy instruments.

The second group of results summarises conclusions relative to *individual history dependence*, especially in relation to unemployment. The majority of studies presents results on duration dependence, *i.e.* the impact on the escape rate out of unemployment from the time spent in unemployment. A number of studies present results also on lagged duration dependence and on occurrence dependence, *i.e.* the phenomenon of recurrent unemployment. The question of history dependence is highly relevant from a policy point of view, where it is important to know whether unemployment breeds unemployment or whether individuals or groups with specific characteristics are especially exposed to the risk of unemployment.

The third group of results, also highly relevant from a policy point of view, concerns the impact from *unemployment insurance*, especially relative to the duration of unemployment as determined by the escape rates from the state of unemployment either into

## TERMS AND CONCEPTS

The theoretical relationships which are suited to analysis with panel data are derived mainly from job search theory, contract and bargaining theory, and trade union theory (incorporating insider-outsider theory). Recent descriptions and reviews of these and other labour market theories can be found in Elliott (1990) and Ashenfelter and Layard (1986). Rather than providing a further review here, we will summarise some of the terms and concepts that are drawn from this literature and used extensively in panel data studies.

Much of the emphasis in studies using panel data is on *transitions* between different *labour market states* – particularly employment, unemployment, and “out of the labour force”, or subdivisions of these categories (e.g. temporary and permanent jobs).

The *reservation wage* of job seekers is the notional wage rate at which the expected returns to further search is just equal to the costs of searching one more period. Of central interest is how the reservation wage changes through time, how it responds to the level and availability of unemployment benefits, the rate at which the job seeker receives job offers (the *offer arrival rate*), and the influence of personal characteristics of the job seeker such as age, education, family size, and so on.

The *hazard rate* is defined as the probability of a transition taking place between different labour market states (e.g. from unemployment to employment), conditional on a set of observed background variables (reflected individual circumstances, market conditions, etc.)

The *hazard function* describes how the hazard rate changes over time.

*History dependence* refers to the influence of the labour market history of the individual worker (e.g. past employment and unemployment experiences) on the transition probabilities faced by that worker. This term is often used in studies of the “escape rate” from unemployment to employment, where the issue of whether “unemployment breeds unemployment” is investigated. History dependence can take several more specific forms, including “duration dependence” and “occurrence dependence” as described below.

*Duration dependence* refers to the influence of time spent in a particular labour market state (usually unemployment) on the probability of a transition from that state. Duration dependence may be positive, negative or constant, depending on whether the probability of transition rises, falls, or stays the same the longer the duration of the spell in a particular state.

In this context, the *scar effect* suggests that if a person is unemployed, particularly if unemployed for a long time, this state may in itself convey a negative signal to prospective employers.

The concept of *lagged duration dependence* suggests that the current probability of leaving unemployment may be affected by the duration of a previous spell of unemployment.

*Occurrence dependence* describes the impact on present unemployment of the number of previous spells of unemployment.

*Single risk models* are applied when a transition can take place to only one destination or *exit state* (e.g. the transition from employment to unemployment). In some cases,

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data allow two or more exit states to be identified (e.g. temporary and permanent lay-offs or temporary and permanent jobs). In these cases, competing risk models can be estimated (with two or more hazard functions, one for each state).

State aggregation refers to the case where the various alternative states to the current state (usually unemployment) are combined (i.e. not separately identified).

Differences between individuals in their chances of becoming employed, unemployed, etc. may be due to differences in observed or unobserved characteristics. For example, a person may have persistently more unemployment than others with identical observed background variables, because this person has some unobserved characteristics that make him or her less employable than others.

Unless this unobserved heterogeneity is taken into account, the effects of the unobserved influences may be ascribed to the observed variables, which will therefore be measured with a bias. There may also be a bias in the estimates towards negative duration *dependence*: that is, the long-term unemployed may appear to have faced an escape rate from unemployment that has declined through time whereas, in fact, one or more unobserved characteristics may have caused the escape rate for these individuals to be low throughout their spell of unemployment.

Selectivity bias can arise in studies using individual data if the researcher does not take into account the possibility that a subset of individuals under investigation may not be selected randomly from the broader sample. For example, participation in labour market programmes may not occur randomly in a sample. A straight comparison of the income profiles of participants and non-participants in order to assess the effects of a training scheme would be misleading if this programme has selected the high (or low) achievers.

employment or to a state outside the labour force. The modelling of unemployment insurance is often highly simplified relative to the actual, often very complex, systems.' It consists mainly in the inclusion of a benefit rate, or a replacement rate, i.e. the ratio between benefits and prior or expected wages. A number of North American studies include also the maximum duration of benefits, that is much shorter in the United States and Canada than in the European countries. Very little evidence is available on the change of reservation wages during a spell of unemployment, or of the interaction between reservation wages, the parameters of the insurance system and the duration of unemployment.

Most of the recent contributions to the microeconomic theory of the labour market concentrate on the supply side of the market. Below, we summarise the evidence that relates to the importance of *demand rationing* in models using panel data. Demand factors are usually entered in a rather crude way, represented by local unemployment rates or U/V rates, i.e. the ratio between unemployment and vacancies.

Finally, the last sub-section surveys the evidence on *policy instruments* apart from the insurance system. Panel data are ideally suited to evaluate individual effects of

many specific instruments. When evidence is still scarce in this area, one reason seems to be that very few adequate data sets presently are available. Other reasons are general problems in the field of policy evaluation in relation to the problem of selectivity and the inclusion of control groups.

For easy reference we have collected a survey of the motivations and databases of the different studies in Table A1 in the Annex. Table A2 presents in the same way a rough survey of the methods and the results in some major fields for each of the included studies.

## A. Individual background factors

In this section we try to summarise the effects from age, gender, marital status and children, health, and education. As will be seen below, such a summary is complicated by the variability between data sets and model specifications.

Results concerning age are generally in accordance with prior expectations of a rising age-unemployment profile.<sup>3</sup> The studies surveyed do not point to specific reasons for this relationship, although possible influences include discrepancies between the age-productivity and the age-wage relationship, or employer discrimination. Cross-section studies generally show a positive relationship between age and unemployment over a wide range of the age interval. This is confirmed by the evidence from studies using panel data where comparable estimations of hazard functions out of unemployment nearly all show a negative impact of age on the escape rate.<sup>4</sup> The only exception is Katz & Meyer (1990a) where a significantly positive effect is found within the age group between 17 and 24 years.<sup>5</sup> In the only three-state hazard study surveyed,<sup>6</sup> Theeuwes *et al.* (1990), using Dutch data, find a significant negative impact from age on the transition from employment to unemployment.

The evidence is unclear on the relationship between age and the incidence of recurrent spells of unemployment. Steiner (1989) finds for Germany that the impact from age on the recurrence of unemployment is initially increasing with age, and after a maximum, decreasing. Santamaki-Vuori (1991), with Finnish data, on the other hand finds a negative impact from age up to 24 years and no significant effect above that age. Finally, relative to the job search model, van den Berg (1990) finds a significant negative impact of age on the job offer arrival rate. Wadsworth (1990), in a study of job search effort, finds a corresponding negative impact from age on search intensity.

*Gender, marital status* and *children* are other important demographic variables with an impact on labour market transitions. One generally expects to find a weaker position for women in the labour market, and particularly women with children, as a result of supply side differences in search behaviour, and/or discriminating behaviour by employers. Consistent with this expectation, studies suggest that women have a higher occurrence of unemployment spells, including a higher probability of temporary layoff unemployment (Steiner, 1989, German data; Jensen and Westergård-Nielsen, 1990, Danish data). Women are also found to have a lower probability of moving to a new job, when unemployed (Katz and Meyer, 1990b, U.S. data), and to have a lower escape rate to regular employment in a study of laid off workers (Edin, 1989, Swedish data).

The impact from being married differs between men and women. For men, being married means a shorter duration of unemployment and a higher arrival rate of job offers. For women, the opposite pattern is typically found.

In a number of studies, children in the family, or the number of dependent children, are included among the explanatory variables. The result is a significantly weaker labour market position for mothers. This is especially the case for single parents, in practice nearly always lone mothers: they are found by Theeuwes et al. (1990), with Dutch data, to have a significantly lower probability of moving from unemployment to employment, and a significantly higher probability of moving from employment to unemployment. The number of dependent children is also found to depress search activity significantly (Wadsworth, 1990, U.K. data).

An indicator for health *status*<sup>7</sup> is included in a number of studies. Significant effects are, without exception, found in expected directions – that is, an adverse effect of health on employment prospects and other indicators of labour market performance. Steiner (1989), with German data used in a probit analysis, finds higher occurrence of unemployment spells for women with health problems and a lower probability of employment for both women and men with health problems. Lynch (1989, U.S. data) finds a higher re-employment probability for young unemployed individuals who declare themselves to be healthy, while Edin (1989, Swedish data) finds that health problems result in longer duration before escape to regular employment. Wadsworth (1990, U.K. data) finally finds that health problems reduce search activity among men.

With only one exception, the same clear effects are found when general education is included among the explanatory variables. The expectation is that education will in general provide individuals with a stronger labour market position. The one exception is the U.S. study by Moffitt (1985) who finds a significantly negative effect from schooling in the escape rate from unemployment to employment. This is reported also in Meyer (1990) who uses the Moffitt data. In Katz and Meyer (1990*b*) the same data are used once again, but this time in a competing risk model where re-employment is either recall to the old job or entry in a new job. It is interesting to note that schooling in this case is found to have a significantly positive effect on the probability of moving to a new job but no effect on the recall probability. State aggregation – merging the probabilities of moving to a new job and of recall to the old job – is one possible explanation of the unexpected results concerning schooling in estimates using the Moffitt data. A contributing factor could be the selective nature of the data set, consisting only of unemployment benefit receivers. It is well known that a major fraction of the unemployed in the United States do not receive benefits, cf. Blank and Card (1989). This is due either to non-entitlement or to the fact that a new job is found either before the claim is followed by payment of benefits or before the waiting period has gone. In either case these problems represent an unknown bias in U.S. samples of benefit recipients only, cf. the discussion based on Fallick (1991) and Portugal and Addison (1990) below.

The U.S. results discussed above are as mentioned the only exception to a general consensus about the effects of education. In all other surveyed studies of the transition from unemployment to employment, education is found to have a significantly positive effect. The same is found with unemployment duration as the dependent variable. Education is found also to have a significantly negative effect on recurrence of unemployment and on the experience of temporary layoff unemployment. In the Dutch study by Theeuwes et al. (1990) of transitions between three labour market states a significantly negative relation is found between education and the transition from

employment to unemployment for men. Regarding the transition from unemployment to employment, it is interesting to note that Theeuwes *et al.* (1990) find a significantly positive effect from education for women, but not for men. In probit analyses of respectively the probability of employment (Licht and Steiner, 1992, German data) and unemployment (Santamaki-Vuori, 1991, Finnish data) education is significant with expected signs. Lynch (1989), in her study of youth unemployment, finds a significant positive effect from schooling on the probability of re-employment. Finally, it is interesting to note that education is found to influence the rate of job offer arrivals positively (van den Berg, 1990) and to have a positive impact on the search intensity (Wadsworth, 1990).

From a policy point of view, education is the most interesting among the demographic background variables in panel studies. The panel studies by themselves do not present any interpretation of the generally very positive results relative to education. A conjecture could be that they reflect an imperfect correlation between the distribution of wages and the distribution of individual productivity, measured more or less imperfectly by the level of education. With perfect accordance between the two distributions, no significant results are expected from including the educational variable. If on the other hand the distribution of wages (conceived as wage costs) has a smaller variance than the distribution of individual productivities, one would precisely expect to find a positive impact on labour market transitions from the educational variable.<sup>8</sup>

If this conjecture is correct, it would present an example of how policy conclusions of relevance at the macro level could follow from a survey of micro results. In the case of education, the arguments above would lead to the conclusion that an upgrading of qualifications of a certain size would result in a less than proportional increase in wage costs if the variance of the wage distribution is smaller than the variance in the distribution of qualifications, the extreme situation being the case where wages were unaffected by an upgrading of qualifications. If this interpretation is correct, an educational strategy would lead to an improved market position for firms resulting in higher employment. The problem with this strategy would be weak individual incentives to education if only the wage effect is considered. The incentives would be stronger if the increased employment security enters the decision.

## **B. Training and labour market programmes**

Labour market training courses could increase the exit rate from unemployment by improving the productivity of the unemployed, and possibly allowing them to compete more effectively with employed "insiders". If, as in Sweden, the unemployed receive a job offer from the employment office or must join a training programme after a few weeks of unemployment, this could clearly affect the search effort and the escape rate from unemployment.

A relatively small but increasing number of empirical studies investigates the impact of training on subsequent labour market experiences (*e.g.* regarding wages and unemployment). The evidence so far is not conclusive. In the following we will survey a few of the most recent studies. A survey of earlier studies can be found in Bjorklund,

Haveman, Hollister and Holmlund (1990). We have divided the survey into evaluations of general courses and evaluations of youth programmes.

Among the more specific analyses on the effects of training on the Swedish labour market, the study by Edin (1989) should be mentioned. Edin used data for the period 1969-1980 on workers made redundant due to a closing of a pulp plant in northern Sweden in 1977. He estimated a model for the current wage rate, where he controlled both for the number of preceding spells and the total number of spells in unemployment, training activity, and public relief. With inclusion of only lagged spells of unemployment, training and public relief work, training was found to have a negative influence on wage rates. The return to the most recent training activity was significantly negative and was in absolute terms even larger than the drop in earnings due to open unemployment.

In another study, Björklund (1989) focuses on the effects of labour market training in Sweden during the period 1976-1980. He used a rather small sample that was representative for the whole country. But compared to the study by Edin the data were not quite as well suited for the purpose. This study contains different estimates of the effect of training on the wage rate and on unemployment. Björklund uses four different models: *i*) a state dependent model, where programme participation enters an OLS-regression as an indicator variable; *ii*) a fixed effect model, where the dependent variable is the change in income, or alternatively, the change in the percentage of time spent in employment between 1974 and 1981; *iii*) a lagged dependent variables model; and finally *iv*) a self selection model. He found that the standard errors were very large and that the estimated coefficients were quite sensitive to the choice of model. In general, the effects of training were found to be positive on both earnings and employment.

Jensen *et al.* (1992), find with representative Danish longitudinal data that labour market training courses reduce subsequent unemployment for those who are employed when participating, but increases unemployment in the subsequent year for those who have been so long unemployed that they can participate through one of the programmes for the long time unemployed. The type of training and a possible lack of motivation may be the explanation of this somewhat surprising result. Similarly, a positive wage effect is found for skilled workers who are not unemployed before participation. There is hardly any wage effect for unskilled workers, probably due to a less flexible wage system. The results in this study indicate that it may not be a good idea to send the long-term unemployed to courses created for those who have a firm attachment to an employer.

For Austria, Zweimuller and Winter-Ebmer (1991) find that labour market training does not increase the probability that an unemployed individual gets a job. In another study, Zweimuller and Winter-Ebmer (1992) estimate the enrolment process to courses and recurrent unemployment simultaneously and obtain positive and significant effects on wages and employment from training.

Torp (1992) studies the effect on subsequent employment of Norwegian Labour Market Training Programmes for the unemployed. The courses last from five to a maximum of 40 weeks. It is found that the overall mean employment rate 6 or 12 months later is about 10 per cent higher for participants than for non-participants. This effect may, however, come from individual differences in human capital, etc. The subsequent analysis, that takes account of individual differences, is based on register

data with information on participants and non participants, but data on individual histories before participation are not available. Human capital variables and variables for the types of training courses are included in a Tobit model. Estimations show that the marginal effect of training courses on employment is significantly positive. The effect depends, however, on the duration of training courses. Short to medium-long and long courses have positive effects, while 20-30 weeks courses have no or even negative effects. The initial assumption is that the selection into courses does not reveal the usual element of self selection because participation is rationed. Nevertheless, there is evidence that the hypothesis of no selection bias can be rejected. Including a correction for selection bias reduces the estimated employment effect of training. Now, only short courses are found to have an employment effect. This paper stresses the role of the selection process as well as the quality aspects of the courses.

A number of studies deal with evaluations of programmes for youth. Lynch (1991) uses longitudinal data from the American National Longitudinal Survey Youth cohort (NLSY). The data contains a little more than 3 000 respondents who were 14 to 21 years of age in 1978 and who were non-college graduates and non-military. These are followed from 1983 to 1985. The main interest in this study is to estimate the effects on wages of company training, apprenticeships and training provided outside the firm from business courses. Two approaches are applied: a Heckman two-stage procedure and a fixed effect method. The study shows that all three forms of training are associated with higher wages. The impact of training provided from outside is found to be highest.

Ackum (1991) uses survey data on 830 Stockholm youth (16 to 24 years old) to evaluate the effects of unemployment, public relief jobs and labour market training on subsequent hourly earnings. Earnings functions are estimated using cross section and panel data methods. One year of unemployment is found to imply a reduction of 2 per cent in subsequent earnings while the effects from labour market programmes is found to be negligible. Including a correction for selection bias does not have any impact on the estimations. However, the negative effect from unemployment on wages is eliminated when a fixed effect method that also eliminates the unobserved factors is used.

Main and Shelly (1991) attempt to measure the effects of the British Youth Training Scheme on subsequent employment probabilities and earnings. Survey data on about 1 200 Scottish youth are used. A positive effect of YTS is found on the probability of employment. After allowing for sample-selection bias, no significant wage effect is found.

The few studies surveyed here clearly show that analyses of the impact from labour market programmes do not present an unanimous view on the effects from training schemes. There are a number of likely reasons for this. First, the courses analysed are quite heterogeneous. Some are made only for the unemployed (Edin, Torp) while others are made for both employed and unemployed as the study by Jensen *et al.* But even when it comes to studies on a more homogeneous group as youth, the results still seem to be inconclusive. Second, data are different with respect to the available variables. Third, data usually cover only a few participants who are selected in a non-representative way. This becomes especially critical when it comes to modelling the selection process. Though some studies find that the selection into training schemes does not matter, others show that it may be crucial to take the enrolment rule into account. The reason is that only a few studies are based on panel data that makes it possible to control for the history prior to the participation in courses

(initial conditions) and for unobserved heterogeneity as well. The study by Ackum (1991) shows for example that it is not sufficient to take observed selection bias into account; the unobserved variables play an important role too.

The results from evaluation studies seem to depend critically on the choice of estimation methods. Thus, Barnow (1987) concludes in his review of the CETA-programmes, that “different methods of estimation produce a disturbing discrepancy between the estimates from marginally different methods using almost the same data”. In a later review of the Swedish studies, Bjorklund (1990) reaches almost the same conclusion. Bjorklund concludes that part of the problems with high standard errors on the estimates are related also to problems with data quality and high non-response rates. Summing up on the surveys presented here, the type and quality of available data is important both for the choice of estimation method and for the interpretation and reliability of the subsequent results. Too many evaluations have been based on data surveying a relatively small number of participants with meagre information on participants and non-participants prior to the courses. Without control for the past history, the estimations seem to produce highly uncertain results.

A final serious problem in evaluations of labour market programmes is to control for the possibility that employers substitute programme participants for other employees. In this case, relying only on panel data on individuals could be misleading. Dolton (1993) surveys investigations of the British YTS programme and summarises the findings from a number of British studies concluding that this “displacement effect” could be anywhere between 17 per cent and 62 per cent of all jobs created through the programme.

A similar problem arises if labour market programmes create an upward pressure on the general wage level. This could in turn “crowd out” ordinary jobs. In Sweden, studies using time series data suggest that labour market programmes may actually have that effect (see Calmfors and Forslund, 1990). Edin *et al.* (1993) have presented an analysis using the local variances in wage growth and programme intensity together with panel data on individuals in the Swedish engineering industry for the period 1972-87 to test whether such an effect can be verified with micro data. The effects of labour market programmes is measured as wage responses arising from variations in the intensity level of programme activity in the worker’s regional labour market. The findings using micro data seem to indicate that manpower training programmes may actually reduce wage pressure. One of the reasons seems to be that wage drift becomes lower, probably because participants in labour market programmes are also active job searchers, thus increasing the efficient supply of labour.

### **C. History dependence**

From a policy point of view, it is highly relevant to be able to determine the impact on the escape rate from unemployment of the labour market history of the individual worker. A situation where unemployment breeds unemployment is clearly different from a situation where specific characteristics lead to long or frequent spells of unemployment.

### *i) Duration dependence*

History dependence can as mentioned above occur in different forms. An obvious possibility, found in most descriptive studies of unemployment, is duration dependence in relation to the length of the current spell of unemployment. A common finding in descriptive analyses of individual unemployment spells is negative duration dependence, *i.e.* the escape rate from unemployment is decreasing with the duration of unemployment. The central question in more sophisticated analyses is whether this represents a genuine duration dependence or whether it simply represents heterogeneity or sorting. Pure heterogeneity would be present in a situation where each individual worker has an escape rate from unemployment that is independent of the duration of unemployment. In that case, the remaining stock of unemployed workers will have ever lower escape rates and the conclusion in a purely descriptive analysis would be that escape rates were depressed by duration. This type of unobserved heterogeneity will always bias the estimated duration dependence downwards. It follows that both positive and constant duration dependence at the individual level could turn up as negative duration dependence in estimations without measures to correct for unobserved heterogeneity.

Only empirical analyses using panel data and with measures to correct for unobserved heterogeneity can be used as reliable guides for policy. If, as the one extreme, negative duration dependence is a pervasive phenomenon at the individual level, policy measures should concentrate on interrupting spells at an early stage by some kind of active measure. If, as the other extreme, every variation over time in escape rates is due to heterogeneity, policy measures should concentrate on groups and individuals with low, duration independent, escape rates.

The actual studies surveyed here illustrate the importance of measures relative to unobserved heterogeneity. They illustrate also the importance of so-called state aggregation, *i.e.* the sensitivity of conclusions about duration dependence to the specification of different types of unemployment, defined by the state of destination after the exit from unemployment.<sup>9</sup> Regrettably, they also show that consensus has not yet been reached concerning the correct interpretation of history dependence in labour market transitions.

Panel data studies of duration dependence without explicit measures towards unobserved heterogeneity mainly result in finding of negative duration dependence. This is found *e.g.* by Moffitt (1985) with U.S. data,<sup>10</sup> by Groot (1990) with Dutch data and by Jensen & Westergård-Nielsen (1990) with Danish data. The Danish results illustrate the importance of modelling the existence of different destinations from unemployment, thereby avoiding the problem of state aggregation where different destinations – due to lack of information – are collapsed to one state. Negative duration dependence is found in the overall probability of moving from unemployment in the single risk version of the model. In the competing risk version, on the other hand, it is found that the negative duration dependence is related to an exit from unemployment to the former employer, while duration dependence is insignificant in the transition to a new job. The lack of consensus is illustrated by the finding of positive or insignificant duration dependence in other studies without correction for unobserved heterogeneity. For example, this is the case in the German studies by Hujer & Schneider (1989) – who find insignificant duration dependence – and by Wurzel (1990) who finds positive duration dependence in the initial phase of a spell.<sup>11</sup>

Lack of consensus is also the impression from studies taking account of unobserved heterogeneity with different methods. Hujer & Schneider (1989) find with Ger-

man data the positive duration dependence predicted by the standard job search model. Katz and Meyer (1990b) estimate both a single risk model without distinguishing between different destinations for transitions out of unemployment; and a competing risk model, distinguishing between recall to the former job and entry into a new job. For the single risk model, Katz and Meyer (1990b) get the same result with U.S. data as found by Jensen and Westergård-Nielsen (1990) with Danish data without correction for unobserved heterogeneity. That is, the overall likelihood of leaving unemployment is negatively related to the duration of unemployment. This result masks, however, a significantly negative relationship between unemployment duration and the probability of recall to the former job; and a significantly positive duration dependence in the probability of entry to a new job. The latter finding contrasts with the insignificant relationship found with Danish data. The reason for this second finding is most probably that benefits run out relatively quickly in the U.S. system, while they last more or less indefinitely in the Danish system. Groot (1990) finds with Dutch data that correction for unobserved heterogeneity changes the duration dependence from being significantly negative (cf. above) to being insignificant. Van Ours (1992) confirms the finding of no duration dependence using Dutch time series data, which is the result also in a number of studies using panel data, cf. van Opstal and Theeuwes (1986), Ridder (1987), and Gorter, Nijkamp and Rietveld (1991).

A negative duration dependence is reported in Lynch (1989, U.S. data), but the result may not be generalised as the sample consists only of young people.<sup>12</sup> Ham and Rea (1987) also find a negative duration dependence, but with a much more representative Canadian sample. But as illustrated by the results in Katz and Meyer (1990b, U.S. data), this could be due to aggregation of the various alternative states to unemployment. Finally, it should be mentioned that Portugal and Addison (1990, U.S. data) find both the sign and the profile of duration dependence to rely strongly on the sample specification, the definition of unemployment spells and the specification of the replacement rate.

The main impression is that the question about duration dependence is still undecided, awaiting further research using comparable representative samples from different countries and periods. On balance, the evidence seems tentatively to point to, first, the importance of distinguishing between different types of exits from unemployment, and secondly, to heterogeneity as an important factor in explaining time dependence in the escape rate from unemployment.

## *ii) Other forms of history dependence*

Duration dependence is as mentioned the main form of history dependence tested in empirical studies. A number of analyses also include more elaborate forms of possible history dependence. A number of results are briefly surveyed here. With German data, Steiner (1989, 1990) finds both lagged duration and occurrence of unemployment to have significant effects on current employment. Licht and Steiner, also with German data, find variables representing individual labour market history significant in explaining the current individual employment status. The same significant impact on current unemployment from lagged duration and occurrence of unemployment is reported by Junankar and Wood (1992) with Australian data, by Warren with U.K. data, and by Ham and Rea (1987) and Corak (1992b) with Canadian data. Their results generally confirm the findings from descriptive studies of labour market transition matrices, based on annual labour force surveys, of a very strong history dependence. But, as with duration

dependence, this finding could equally well be due to heterogeneity where some individuals are permanently “sorted out” to carry a heavy burden of unemployment in a sequence of periods while others are permanently in a state of full employment. Only the Canadian study by Ham and Rea reports results from the estimation both without taking specific account for unobserved heterogeneity and when this is done. The results do not differ significantly between these two specifications.

Concerning occurrence dependence, the policy conclusion, on the other hand, could be clearer, and less dependent on whether the explanation is due to genuine occurrence dependence or heterogeneity. The welfare consequences of frequent spells of unemployment are negative, resulting for instance in less investment in human capital through on the job training, and this does not depend on whether the reason is unmeasured individual characteristics or genuine occurrence dependence. Less investment in human capital is a highly probable consequence of unstable jobs with frequent interruptions between spells of employment. Independently of the reasons for occurrence dependence, the arguments for reducing the incidence of frequent spells are reinforced by the finding of negative duration dependence in the case of temporary layoffs, a phenomenon that is often correlated with frequent spells of unemployment.<sup>13</sup>

A Danish study by Bjørn (1992) analyses a special aspect of history dependence, whether initial unemployment at the time of entry into the labour force creates a long-term “scar effect”. Analysing unemployment three years after graduation for different educational groups, it is found that unemployment at the time of graduation has a significant impact indicating the existence of a non-trivial scar effect (cf. also the strong negative duration dependence found by Lynch in the studies of youth unemployment discussed above).

Finally, one study, Wadsworth (1990) with U.K. data, examines the duration dependence in search activity. For men, a negative impact on search intensity is found for duration of search above two years. For women, search intensity increases with duration up to one year of search, but decreases significantly if search has continued for more than two years.

#### **D. Insurance effects**

Since the big increase in unemployment in most OECD countries in the mid-1970s many studies have analysed the impact of the unemployment insurance (UI) system on transitions in the labour market. The main interest has been on the eventual effects on the incidence and duration of unemployment.<sup>14</sup> Surveys of theories and results in this field can be found in Dantziger, Haveman and Plotnick (1981), Hamermesh (1977) and recently in Atkinson and Micklewright (1991). The early surveys include results exclusively from U.S. studies, while Atkinson and Micklewright include a number of studies from outside the United States and the United Kingdom, as one of their main points is the difficulties in transferring results in the field of unemployment insurance from one country to another. The recent book by Devine and Kiefer (1991) contains a very comprehensive survey of empirical results in relation to search models, of which many are relevant in relation to the possible effects from UI.

The foundation of most empirical work in this field is a combination of the standard theory of job search, and a highly simplified version of a UI system. In the simple search model, job offers come to an unemployed worker at a constant rate, and the first offer above the reservation wage is accepted. UI benefits are one of the determinants of the reservation wage, through which they implicitly influence the expected duration of search unemployment. Benefits are assumed to have indefinite duration, there is no monitoring of the system ending the payment of benefits if the worker rejects a suitable job offer and benefits are assumed to be paid from general tax revenue independently of the behaviour of individual workers and firms. These highly unrealistic assumptions are emphasised by Atkinson and Micklewright (1990) as a main point of criticism in relation to many models of UI effects. While the essential function of UI is to provide for job loss, the result in standard search theory is that a job, once accepted, lasts forever. Another critical point is that a significant share of the unemployed do not receive UI benefits, but either receive a means-tested public assistance or no income compensation at all. As a consequence, the behaviour of non-recipients of UI benefits could only be affected by the UI system in an indirect way.<sup>15</sup> A final critical point discussed by Atkinson and Micklewright (1990) is the concentration on the supply side in search theory. Only a few studies are available in the field of equilibrium theories, including both the supply and the demand side. Burdett and Mortensen (1980) and Albrecht and Axell (1984) are among the important theoretical studies of equilibrium search models. Van den Berg (1990), discussed above, Eckstein and Wolpin (1990) and Bonnal and Fougere (1992), are selected for survey among the rather few empirical studies of structural search models and equilibrium models.<sup>16</sup>

Atkinson and Micklewright (1990) summarise some main points of relevance – both in the evaluation of existing studies of UI effects and as interesting guidelines for future work. One main point is the necessity of distinguishing between several labour market states.<sup>17</sup> Other points concern the over-simplification involved in representing a highly complex UI system by a summary replacement rate, the necessity of including instead more realistic institutional assumptions regarding real world UI systems, and as mentioned above the dangers of applying results from one country to other countries. This danger is, of course, partly related to the fact that national differences in insurance systems are not modelled in an adequate manner.

Atkinson and Micklewright (1990) in their survey of empirical results concentrate on transitions to and from unemployment, mainly drawing on studies using microeconomic data. Before presenting results from the specific studies surveyed in the present paper, we refer shortly to some main points in the Atkinson and Micklewright survey. Concerning the outflow from unemployment, 'typical results in U.S. and U.K. studies from the 1970s and the early 1980s were significant, but rather small effects from the replacement rate in the direction predicted by the standard search model.<sup>18</sup> In more recent U.S. and U.K. studies based on panel data, typical results are significant elasticities of unemployment duration with respect to the benefit level in the range 0.3 to 1.0. With respect to other OECD countries, Atkinson and Micklewright (1990) conclude that effects from the benefit level are typically small and measured with low precision. Regarding state aggregation, *i.e.* that outflow from unemployment is to more destinations than regular employment in a new job, the relatively few studies point to significant differences in the impact from UI dependent on the state of destination (cf. the discussion of some specific studies in this field below). Concerning the entry into unemployment, Atkinson and Micklewright (1990) conclude that the impact

found from UI is typically smaller than found for the outflow, but that the evidence is weak. Rather few studies exist including other UI parameters than the level of benefits or the replacement rate, *i.e.* benefit duration, monitoring and administration of UI and effects from the financing of the UI system. Benefit duration is typically found to have significant effects in North America, where effective duration is quite short compared to European UI systems (cf. the discussion below). Administration and monitoring of the insurance system is pointed out by Atkinson and Micklewright (1990) as a promising area for research, but with great difficulties in modelling and identifying effects.

The clearest distinction in the empirical results surveyed in the present paper is between benefit effects in U.S. and European studies. U.S. studies find mostly significant results from UI benefits in the direction predicted by the standard search model (cf. Katz and Meyer, 1990a; Moffitt, 1985; Meyer, 1990 and Fallick, 1991). Lynch (1989) in her study of youth unemployment finds no significant effect from unemployment income, while in Canadian studies Ham and Rea (1987) find benefits insignificant and Corak (1992a) reports the surprising result of a significantly positive impact from benefits for women. The U.S. studies resulting in significantly negative effects from benefits on the probability of escaping from unemployment all use data exclusively consisting of unemployed who receive benefits. As a major share of the U.S. unemployed are not entitled to benefits, the evidence from these studies is hardly conclusive, unless non-recipient unemployed are found to behave significantly differently from those who receive benefits. If the probability of leaving unemployment does not differ significantly between those two groups it becomes difficult to interpret the results concerning the role of benefits in studies using data only for benefit recipients.

Two recent U.S. studies, Fallick (1991), discussed below, and Portugal and Addison (1990) illustrate the potential dangers of including only benefit recipients in the sample used for empirical estimations. Portugal and Addison use a sample from the Displaced Workers Survey attached to the Current Population Survey in 1984 of workers displaced during 1982 and 1983. The sample includes individuals finding a new job without intervening unemployment and individuals who experience a period of unemployment with or without UI benefits. A duration model is estimated, both on the full sample and on a modified sample excluding those without intervening unemployment. The replacement rate is specified in different ways. The first is to assign a "replacement" to non-recipients calculated as the replacement ratio multiplied by the pre-displacement wage.<sup>19</sup> For the full sample with actual replacement for UI recipients and hypothetical replacement for non-recipients, the replacement rate has a significant effect on unemployment duration. But, in separate estimations on recipients and non-recipients, the replacement rate is insignificant for both groups. In the modified sample, estimation is done both with replacement calculated as above for non-recipients, with zero replacement for non-recipients and with a dummy variable for benefit receipt. Replacement is significant in all specifications, but it turns out that assigning zero compensation to non-recipients results in a 50 per cent increase in the strength of the replacement effect compared to the estimation where they are assigned their potential replacement if entitled. The tentative conclusion seems to be that U.S. studies are quite sensitive to the sample selection used and to the specification of replacement during unemployment.

In contrast to the typical U.S. and U.K. results, studies from continental European countries find no or only weak effects of replacement on the escape from unemployment, in models with only one alternative state to unemployment (*i.e.* single risk

models). The majority of continental European studies surveyed, using Dutch and German data, find no significant effects from UI benefits (cf. van den Berg, 1990; Hujer and Schneider, 1989; Groot, 1990; Opstal and Theeuwes, 1986; Groot and ter Huurne, 1988; Vissers and Groot, 1989 and Wurzel, 1990). Two studies, Hujer and Schneider (1989) with German data and Groot (1990) with Dutch data, even find that means tested Unemployment Assistance has a significantly negative effect on the probability of leaving unemployment, while benefits, as mentioned, are found to be insignificant in both studies. Unemployed workers are only entitled to means-tested Unemployment Assistance when spell duration exceeds the maximum duration of UI benefits. The negative effect is hard to reconcile with standard job search models, but may reflect the effects of high composite tax rates creating a poverty trap where exit to a low wage job could result in either very little increase or a decrease in disposable income.

Summing up the evidence from single risk studies surveyed here, the difference between the U.S. and U.K. results on the one hand and the continental European on the other is quite surprising, as continental UI systems are more generous than both the U.S. and the U.K. system. Standard search theory would thus predict even stronger disincentive effect from UI benefits on continental European labour markets. Several factors could contribute in explaining this somewhat paradoxical difference. One factor is other differences in the UI system than those captured simply by including benefits, for instance the difference in maximum duration of benefits. The short duration in the United States compared to longer durations in Europe with eventual transfer to a means-tested programme of unlimited duration, combined with the incentive to re-establish entitlement through a spell of employment, is one potential factor. The persistently higher level of unemployment in Europe is another related factor.<sup>20</sup> Long-term unemployment in particular is higher in Europe than in the United States. As benefit effects are concentrated on short-term unemployed (cf. below), this difference in the average duration of unemployment could be a major factor in explaining the difference between U.S. and (continental) European results. An additional factor could be the greater variance of the U.S. wage distribution, which makes it easier to get a job by reducing one's reservation wage. In many European countries this option is not available for many unskilled unemployed workers due to the relatively high minimum wage, at least in the organised part of the labour market.

The discussion above was concerned with a comparison of results from single risk models. A number of studies analyse the problem of state aggregation by including more exit states from unemployment, mainly entry to a new job or recall to an old job. Other distinctions are found in Narendranatan and Stewart (1990) between full time and part time jobs and in Korpi (1991) between permanent and temporary jobs. It turns out that this disaggregation is equally important for analyses of insurance effects as for the analysis of duration dependence (cf. above). In the U.S. study by Katz and Meyer (1990b) benefits were found to have an insignificant effect on the total probability of leaving unemployment. In the competing risk model estimated on the same data set, benefits have a significantly positive influence on the probability of recall to the former job, while they have a significantly negative effect – the standard result – on the probability of exit to a new job. Fallick (1991) finds the same for the probability of moving to a job in another industry than the one before unemployment. In the Danish study by Jensen and Westergård-Nielsen (1990) estimating probabilities for recall and a new job separately for men and women in four age groups, the influence of benefits, when significant, is found to be negative; the results are particularly strong in the case of the

recall probabilities. Jensen and Westergård-Nielsen report also the results from a logit analysis of the probability of temporary layoff unemployment. The replacement rate has a significantly negative influence: *i.e.* individuals with higher wages have a significantly higher probability of unemployment ending with recall to the old job.<sup>21</sup> Differences in the composition of the stock of unemployed between the United States and Denmark is a possible explanation of the opposite effects from benefits on the recall hazard. Even though there is not consensus about the results, these studies demonstrate the importance of distinguishing between different types of unemployment.

The *maximum duration of benefits* is another important UI parameter. The effects on the escape rate from unemployment are mainly analysed in U.S. studies for the obvious reason that a rather short maximum duration period is found there, in contrast as mentioned to a number of European countries. Empirical hazard functions with U.S. data on UI recipients show very clear spikes (*i.e.* strong increases in the probability of leaving unemployment) at the time of benefit exhaustion (cf. Katz and Meyer, 1990a, 1990b; Moffitt, 1985; Meyer, 1990; Fallick, 1991; and Ham and Rea, 1987 with Canadian data). This is confirmed by estimations of hazard functions in the same studies where a significant impact is found on the probability of leaving unemployment from being close to the time of benefit exhaustion. In most of these studies data do not contain information about the labour market status after the time of benefit exhaustion. Fallick (1991) is an interesting exception. The data used in his study are the same as in the Portugal and Addison (1990) study discussed above, *i.e.* from the Displaced Worker Survey, including both recipients and non-recipients of UI benefits. The empirical hazard functions surprisingly show spikes also for non-recipients and at the same time as for recipients. Other factors than benefit exhaustion may thus be part of the explanation of the spikes found in empirical estimates of the probability of leaving unemployment. One of the German studies, Hujer and Schneider (1989), contains another somewhat peculiar result, where being less than two months from benefit exhaustion is found to have a significantly negative effect on the exit rate from unemployment. In Germany, the end of benefits means that unemployed workers are transferred to the public unemployment assistance programme with means-tested benefits, somewhat lower than UI benefits. The prior expectation would be a weaker effect than in U.S. studies, but not a change in sign, unless the reason is unobserved heterogeneity, or the existence of a poverty trap for this group due to a high composite tax rate.

A few studies take account of the possibility that the impact from benefits on the probability of moving from unemployment to employment might depend on spell duration. Nickell (1979) finds with U.K. data that benefit effects disappear for spell durations above 20 weeks. Fallick (1991) finds the same with U.S. data. Along the same lines Moffitt (1985, U.S. data) finds smaller disincentive effects from benefits when unemployment is at a high level. The tentative conclusion is that disincentive effects from benefits are concentrated among short term unemployed, cf. the discussion above of Atkinson and Micklewright (1990), and of the typical difference between U.S. and continental European results in relation to the effects from benefits. But, the rather few observations at high durations make results in this area tentative.

Finally, it should be mentioned that benefits also may have positive effects on incentives, *i.e.* increase the probability of a good match between firms and workers, and increase search intensity to remain eligible to benefits in future unemployment. Only one of the surveyed papers analyses search activity. Wadsworth (1990) finds with U.K. data that benefit claimants search significantly more than other unemployed.

In conclusion, studies using panel data have not yet resulted in consensus about the impact from UI on labour market transitions. Benefits are generally found to have significant effects in U.S. and U.K. studies, while most continental European studies find insignificant or weak effects. We have pointed to probable explanations of this difference above. The same difference is found in relation to the impact from the maximum duration of benefits. In both areas results seem very sensitive to data and specifications. Finally, a distinction between different exit states from unemployment seem to be a very important area.

## **E. Job offer arrival rates and acceptance probabilities**

In the search model, the process of entry into a new job from unemployment is governed by the job offer arrival rate together with the probability of acceptance of a job offer by the unemployed worker (and acceptance of the applicant by the firm). The job offer arrival rate could either be endogenous, dependent on search intensity, or as in the standard search model be exogenous, determined by demand for labour in the relevant part of the market. Finally, mixed cases could occur where an exogenous base level of the offer arrival rate may be influenced by individual search intensity. Possible effects from UI benefits through the arrival rate will occur if search intensity is sensitive to benefits and if the arrival rate of job offers is sensitive to search intensity. If, on the other hand, the arrival rate is purely exogenous, possible benefit effects must work through an impact on the probability that a job offer is accepted.

The acceptance probability, given a job offer arrives, depends on the wage offer in relation to the reservation wage. A number of empirical studies report estimates of the acceptance probability.<sup>22</sup> Among the studies surveyed here, Warren with U.K. data and van den Berg (1990) with Dutch data conclude that virtually every job offer is accepted by individuals in their samples. Devine and Kiefer (1991, p. 137 ff.) in their summary of results from studies of structural models conclude that unemployed workers almost always accept an offer, once an offer is received. Devine and Kiefer reach the same conclusion in their summary of results from three-state models.<sup>23</sup> They conclude p. 158) that variations in the transition into employment by and large reflect variations in arrival rates, as opposed to systematic variations in the willingness to accept offers.

As a consequence of these findings, longer durations of unemployment for some groups of workers are interpreted as reflecting more infrequent arrival of offers. This will shift the explanation of longer spells of unemployment to the demand side if the arrival of job offers is exogenous as assumed in the standard job search model. If, on the other hand, the arrival rate can be significantly affected by individual search intensity, this will be a channel through which UI benefits can influence unemployment durations.

In their survey of results from studies with direct evidence on search activity, Devine and Kiefer (1991) conclude – tentatively – that there is some evidence that search intensity declines with the duration of an unemployment spell. Wadsworth's (1990) result, referred to above, that benefit claimants search more than non-recipients, goes in the opposite direction. A possible interpretation is that benefits have opposite effects on the level and the duration dependency of search intensity.

Studies estimating the parameters in structural search models are still in an early stage. Available evidence does not support very firm conclusions. On balance, the results concerning the very high acceptance probabilities point to variations in arrival rates as very important, thereby shifting the weight to demand side factors in the explanation of unemployment durations (cf. also the separate sub-section on demand factors below).

## F. Adaptation of reservation wages

The standard job search model predicts that the post-unemployment wage will be lower than the wage prior to unemployment as a consequence of a decreasing reservation wage during a spell of unemployment. Chowdhury and Nickell (1985, U.S. data) find a big initial negative impact from unemployment on the post-unemployment wage, but the effect fades rapidly. Addison and Portugal (1989) use US data from the Displaced Workers Survey from 1984 to analyse the impact from tenure in the pre-displacement job and the duration of unemployment on the wage in the post-displacement job. Their main finding in relation to unemployment is a rather strong impact on the post-displacement wage from the duration of the intervening spell of unemployment. Different specifications are tried, and Addison and Portugal (1989) conclude that a central estimate is a post-unemployment wage elasticity of about 0.1 with respect to the duration of unemployment. They further find that both industry and occupational shifts have very strong effects on the post-displacement wage, resulting in a decrease between 16 and 20 per cent in case of industry shifts and between 5 and 14 per cent in case of an occupational shift. Finally, they find that the wage loss is strongly dependent on education with significantly higher losses for unskilled workers. It is not possible to compare the results in Addison and Portugal (1989) with the results in Chowdhury and Nickell (1985) in relation to the possible regaining of the wage loss in the new job.

Blackaby *et al.* (1991, U.K. data) address the question of the importance, in relation to wages, of long-term unemployment. This has formerly only been studied using conventional time-series data. Blackaby *et al.* (1991) construct a quasi-panel data set with the purpose of analysing this question using individual data on wages, and unemployment represented by a short- and a long-term component. In real wage regressions, short-term unemployment is found to have a significantly negative effect, while long-term unemployment has a significantly positive influence. The result is in accordance with former U.K. results using conventional time-series data, pointing to the increase in long-term unemployment in the 1980s as an important factor in explaining the unexpectedly slow deceleration of inflation.

A number of studies have attempted to address the question of how reservation wages change over the duration of an unemployment spell. There are in principle two ways to obtain estimates of reservation wages. One is to use a direct survey question on the lowest wage that can be accepted. The other way is to estimate the reservation wage from a structural search model. Devine and Kiefer (1991) summarise the results from studies of reservation wages using different approaches. In regression studies, using direct evidence on reservation wages from surveys, no strong results emerge. Estimates of the impact of unemployment duration on reservation wages cover a wide

range, reflecting problems both in the application of survey based data on reservation wages and in the interpretation of the econometric methods used. The tentative conclusion, put forward by Devine and Kiefer (1991), is that results from regression studies provide some evidence of a decline in the reservation wage with duration of unemployment, at least over part of a spell of unemployment. Even more tentatively, this decline seems to take place in the initial phase of a spell for young workers, and in a later phase for older workers. A number of the regression studies surveyed by Devine and Kiefer (1991) use duration as the dependent variable and enter the reservation wage among the explanatory variables. The result, both in U.S. and U.K. studies, is a significantly positive impact on duration from the reservation wage. There is no inconsistency between this result and the possibility of a decreasing reservation wage with the duration of unemployment. Both individuals with short durations and low reservation wages, and individuals with longer durations and higher reservation wages, can have a decreasing reservation wage during a spell of unemployment.

Only a few structural studies are available in this area. Devine and Kiefer (1991) conclude in their survey that there is weak evidence of slowly declining reservation wages with duration, and evidence of rather low elasticities of the reservation wage with respect to UI benefits. Finally, a few structural studies, cf. Devine and Kiefer (1991, Ch. 4), find rather uncertain and low elasticities of unemployment duration with respect to the reservation wage.

Summing up, available evidence points to a declining reservation wage with the duration of unemployment, but results in this area are still rather uncertain. The results in Chowdhury and Nickell (1985) discussed above point to the possibility that such wage decreases that may occur as the consequence of a spell of unemployment may be regained quickly when the unemployed worker enters a new job.

## **G. Temporary layoffs and experience rating**

The United States is the only country that has an experience rating system for the financing of benefits that makes employers contribute to the UI system according to how much unemployment they "create". The fact that the system is different across states gives an opportunity to investigate the impact on unemployment. Hamermesh (1990) has calculated that a typical employer pays 75 per cent of the benefits paid out to his former laid-off workers. The similar figure is in most other countries close to zero.<sup>24</sup> Another limitation is a maximum and a minimum contribution to the system. If the firm has had high unemployment it will pay the maximum contribution irrespective of the present creation of unemployment, resulting in marginal costs of zero.<sup>25</sup>

A few studies on U.S. data that control also for individual characteristics show unanimously that there is a lesser risk of being on temporary layoff in states and industries with a lower UI subsidy (Saffer, 1982; and Topel, 1983, 1984 and 1985). Some of the studies show that there is also a similar but smaller impact on permanent layoffs. A study by Topel (1990) suggests that imposing complete experience rating would reduce unemployment by as much as 20 per cent. This estimate is difficult to apply in relation to the European unemployment problem as a measure of the possible effect from a reform of the financing of UI benefits. Contrary to the United States, most

European countries have worker protection laws that prevents firms from laying off workers temporarily. This, on the other hand, has led to a growth in the supply of temporary jobs. A more important difference, making it difficult to apply U.S. results in this field, is the much greater weight of long-term unemployment in the European countries. Nevertheless, incomplete experience rating with firms paying benefits for a specific number of the first days of each spell of unemployment might, even in a European context, contribute to reductions both in temporary layoffs and in temporary jobs.

## H. Demand factors

Search theory is as mentioned the foundation for much of the empirical estimations of hazard functions. The emphasis has thus been on the supply side of the labour market. Nevertheless, a number of the empirical studies include variables to capture the impact from demand factors on labour market transitions. Eckstein and Wolpin (1990, U.S. data) estimate an equilibrium model but without empirical success. The following short survey summarises the experience from including demand side variables in a more *ad hoc* manner.

For the most part, regional or other local indicators, either unemployment rates or unemployment-vacancies ratios, are used as demand-side indicators. The dominant finding is that these indicators have a significant impact on transitions between different labour market states. The only exceptions among the studies surveyed here are Licht and Steiner (1992) and van den Berg (1990). Licht and Steiner (1992) find no effects from cyclical factors in a probit analysis of the employment status for a sample from the German socio-economic panel. Van den Berg (1990) finds local unemployment rates insignificant in a study of job offer arrival rates with Dutch data. The evidence on this specific point may be weak in van den Berg's analysis: the data set is very small; and the Dutch labour market may be less well suited to capture effects from local unemployment on the job offer arrival rate, as commuting, covering a major part of the Dutch labour market, is possible.

On balance, the conclusion is that demand factors affect transitions. The general result from many European studies, that cyclical variations are transmitted primarily to the duration of unemployment spells and much less to variations in the inflow rate to unemployment, has been somewhat debated in the United States. The result is confirmed by Baker (1992), for the United States, with grouped panel data for the 1980s. Finally, it should be mentioned that Katz and Meyer (1990a) point to the general problem of drawing policy conclusions from microeconomic-based, supply-oriented studies in a situation with rationing from the demand side.

## I. Other factors

A few studies based on panel data attempt to draw some broader conclusions regarding trends in the functioning of the labour market. Junankar and Wood (1992)

find weak evidence of labour market segmentation in their study of Australian panel data. Cahuzac *et al.* (1992) contains a description of the Belgian labour market based on register data covering a major part of wage earners in the private sector. They find clear evidence of “polarisation” in the labour market, *i.e.* individuals with unemployment below a certain level tend towards an improved employment situation over time, whereas the employment situation tends to deteriorate for individuals with unemployment above a certain level. In a descriptive panel study covering the whole Danish population between 25 and 59 years of age from 1981 to 1989, the Danish Social Commission (1992a) finds the same pattern as for Belgium, *i.e.* the number of individuals who provide fully for themselves during the year and those with either UI benefits or other forms of welfare benefits during the whole year both increases, while the intermediate group is reduced in numbers. In another longitudinal study, the Danish Social Commission (1992b), a special form of long-run state dependence is found. For a sample of young people in 1989 there is clear evidence of correlation between their dependence on UI and welfare benefits and the dependence of their parents ten years earlier, indicating the existence of an inter-generational history dependence.

In another study of the broad patterns of labour market development in the 1980s, Bjørn and Pedersen (1992) analyse the probability of becoming an “outsider” in relation to the labour market and the transitions between “outsider” and “insider” positions. A representative Danish longitudinal data base is used, and different criteria are used to make the insider-outsider concept empirically operational. Age, education and gender are found to have significant effects on the probability of being an “outsider”, with significantly higher probabilities for the age groups below 35 years and above 55 years of age. Considering transitions, young women and persons in their late fifties have significantly lower probabilities of moving from an outsider to an insider status. The same groups have a significantly higher probability for moving from an insider to an outsider position.

Panel data are ideally suited to evaluate the impact of individual-oriented instruments in labour market policy. Studies of the effects of training were discussed above. Effects of the creation of new incentives affecting the escape rate from unemployment are analysed by Anderson (1992). Data are from an experiment in New Jersey where newly qualified UI benefit claimants were exposed to job search assistance and/or a re-employment bonus. Both instruments had significant effects on the probability of leaving unemployment, and both had benefits exceeding costs, job search assistance being superior in this respect. It is always difficult to generalise from experiments and the re-employment bonus can create adverse incentives, especially relative to temporary layoffs. With these reservations, innovative incentives to reduce search unemployment seem to be a promising area.

## II. CONCLUDING REMARKS

This paper has surveyed a number of recent studies in which various types of panel data have been used as a basis for investigating individual transitions in the labour market.

The first general problem raised in the survey concerned the comparability between the empirical analyses. The conclusion was that comparability at the present stage is less than perfect due to an unbalanced country coverage among existing empirical studies, and to quite large differences in the data and methods being used.

With these reservations, results from a number of studies were considered. The first set of results concerned the effects from individual background factors in transitions between – and implicitly durations in – different labour market states. Demographic factors result in effects which are in the expected direction based on cross-section studies. Education was generally found to have an important, favourable influence on individual labour market performance. The effects from labour market training are, on the other hand, uncertain based on available panel data studies.

The important question of duration dependence in the transition out of unemployment is still undecided. On balance the evidence seems to point both to the importance of distinguishing between different destination states for those exiting from unemployment, and to heterogeneity as an important factor in explaining the measured time dependence in the escape rate from unemployment.

When the empirical effects of unemployment insurance are assessed, the clearest distinction regarding the level of benefits is between U.S. and European results. The former typically find significant effects from benefits on unemployment duration while in the latter, the effects are generally insignificant, with U.K. studies as the exception. Competing risk studies, where the exit from unemployment can be either recall to the old job or entry into a new job, demonstrate the importance of distinguishing between different destination states. Most U.S. results show that the maximum duration of benefits has a significant effect on the escape rate from unemployment. Comparable results are not found with European data, which probably reflects the much longer benefit duration in Europe. Both U.S. and U.K. studies conclude that benefit effects are strongest during the first part of a spell of unemployment and insignificant in relation to long-term unemployment.

Search activity is found to be influenced positively by receipt of unemployment benefits. Post-unemployment wages are usually found to be lower than the wages prior to unemployment. This reflects the adaptation of reservation wages taking place during a spell of unemployment which has been documented in a number of studies. Finally, the financing of unemployment benefits is included in a number of studies of the U.S. experience rating system. The results point clearly to the importance of this area, both regarding the structure of unemployment – especially relative to the use of temporary layoffs – and the level of unemployment.

Demand factors are included in a number of studies and are generally found to have significant effects on labour market transitions. In the few cases where it has been possible to study the reaction to job offer arrivals, the results are clearly that virtually all offers are accepted. Finally, a number of studies looking at broader labour market trends using very big panel data sets find clear tendencies to polarisation in the distribution of individual unemployment through the 1980s.

## NOTES

1. An additional Annex providing a brief introduction to the econometric methods commonly used in the estimation of panel data models is available from the authors on request.
2. Atkinson and Micklewright (1990) in their recent survey point to a more adequate modelling of the insurance system as a very important field for future research, cf. below.
3. Usually an U-shape is found when also the youngest age groups are included.
4. Warren, Moffitt (1985), Ham and Rea (1987), Hujer and Schneider (1989) and Groot (1990) with English, American, Canadian, German and Dutch data respectively. Edin (1989) finds with Swedish data a corresponding significantly positive impact from age on the duration of unemployment.
5. Katz and Meyer (1990a, 1990b) use the same data set as Moffitt (1985). The different result concerning age must be due to a different model specification and/or estimation method.
6. In a three-state hazard model all flows between employment, unemployment and being outside the labour force are being studied.
7. Either self declared or based on register information on sickness pay during longer spells of sickness.
8. A positive impact is defined here as resulting in a higher hazard from unemployment to employment, a lower hazard from employment to unemployment and a lower hazard to a state outside the labour force.
9. Destination states include a new regular job, a return to the former employer, participation in some sort of labour market programme where participants are not registered as unemployed and temporary or permanent exit from the labour force.
10. Cf. the discussion below of the results Katz and Meyer (1990b) reach using the same data set, but correcting for unobserved heterogeneity and state aggregation.
11. Positive duration dependence is also found by Edin (1989) with Swedish data. This could result though from the special nature of data, *i.e.* redundant workers from a factory closedown in a situation with rather low unemployment in Sweden.
12. In her 1985 study with U.K. data for unemployed youth, Lynch found strong negative duration dependence.
13. Frequent spells could be reduced for instance by changes of the rules for the financing of unemployment insurance, cf. the discussion below of experience rated contributions, or by the timing of active labour market policy, cf. the recommendation by Corak (1992a, Canadian data) of targeting selective policy instruments to individuals beginning a second spell of unemployment.
14. UI rules can also influence transitions to and from being outside the labour force. In the great majority of recent studies surveyed here the topic is the possible impact on the transitions between unemployment and employment.

15. A possibility, pointed out by Mortensen (1977), is that a situation where eligibility is dependent on a preceding period of employment, UI could result in higher search intensity by non-insured unemployed.
16. A comprehensive survey of results from structural search models is available in Devine and Kiefer (1991).
17. This point was illustrated above in the discussion of the importance of state aggregation in some of the empirical works in relation to the question of duration dependence.
18. A number of the U.S. studies are discussed also in the U.S. surveys mentioned above. Two seminal U.K. studies are Lancaster (1979) and Nickell (1979).
19. This hypothetical replacement is bounded to lie between the minimum and maximum actual replacement.
20. This factor is more relevant for explaining the difference between the United States and the continental European countries than between those and the United Kingdom.
21. Without UI benefits, classical wage theory would predict a compensating wage premium for groups with frequent spells of *e.g.* seasonal unemployment. In Denmark, UI benefits are calculated as 90 per cent of the previous wage, but with a rather low maximum benefit amount. As a consequence, the replacement rate is quite low for high wage groups which contributes to explain the result above.
22. Many of these estimates come from structural search models, so that they depend on assumptions concerning the form of the wage offer distribution. Generally, the precise estimates are sensitive to assumptions about the distribution. But the range of the estimates from a given model – for different distributional assumptions – is moderate, cf. Devine and Kiefer (1991).
23. The three states are employment, unemployment and being outside the labour force.
24. From 1989 Danish employers must pay the first day of unemployment. There are some recent indications that this burden is shared with the unemployed as theory would predict. Sweden has also some employers contribution to the UI-system in the case of temporary layoffs, but not based on the unemployment record of individual firms.
25. See Hamermesh (1990) for a closer description of the U.S. experience rating system.

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## ANNEXES



## Annex 1

### Table A1. Subject and data

Study	Subject	Data
Chowdhury and Nickell (1985) United States	Using panel data to study impact on earnings from unionisation, schooling, sickness and unemployment..	Sample of male heads of households from Michigan PSID data.
Moffitt (1985) United States	Study effects of UI benefits, maximum potential duration of benefits and cyclical factors on the distribution of spells.	Sample from Continuous Work and Benefit History (CWBH) data set. Register based, 4 628 UI recipients, 13 states, 1978-83.
Solon (1985) United States	Study of effects on unemployment duration from partial introduction of taxation of benefits in 1979.	Sample from CWBH data set of individuals filing valid UI claims in Georgia in 1978 and 1979.
Lynch (1989) United States	Study of determinants of non-employment spells for young people.	National Longitudinal Survey Youth Cohort. Interview based. Sample of non-employed youth with earlier stable employment, not in school or military, not returning to school.
Eckstein and Wolpin (1990) United States	To demonstrate the feasibility of estimating a Nash labour market equilibrium search model.	Sub-sample from National Longitudinal Survey of Labor Market Experience Youth Cohort, high school graduates, 1979-81.
Katz and Meyer (1990a) United States	Study of effects on unemployment duration from benefit level and Benefit duration.	<ol style="list-style-type: none"> <li>1. Sample of spells for household heads from PSID, recipients and non-recipients.</li> <li>2. Data from CWBH, Moffitt (1985) data. Register based, only benefit recipients. No information on <b>post</b> UI benefit record. Data from 12 states, 1978-83.</li> </ol>
Katz and Meyer (1990b) United States	Study importance of explicitly accounting for temporary layoff unemployment among UI recipients.	Sample of UI recipients from CWBH register, two states, 1979-80, interview one year later.
Meyer (1990) United States	Study effects of level and duration of benefits on spell duration.	Moffitt data from CWBH data set, about 1 200 excluded due to missing observations.
Portugal and Addison (1990) United States	Study analytical consequences of problems in the measurement of unemployment duration and specification of the replacement rate.	Restricted sample from Displaced Worker Survey attached to CPS 1984. Individuals displaced during 1982 and 1983.
Fallick (1991) United States	Study of the effects of making the impact of UI benefits time dependent and of including non-recipients of UI benefits in the sample.	Sample from Displaced Worker Survey, 1984.

Table A1. Subject and data (cont.)

Study	Subject	Data
Anderson (1992) United States	Study impact on unemployment duration from a re-employment bonus and job counselling.	Experiment, mid-1986 to mid-1987, 11 060 newly qualified UI claimants in New Jersey.
Baker (1992) United States	To reconcile contradictory results about the relative cyclical importance of variations in inflow to and duration of unemployment.	CPS, 1979-88, monthly "outgoing rotation group", interrupted duration of spell of unemployment for those unemployed between 16 and 64.
Steiner (1989) W. Germany	Study of unemployment recurrence.	Cohort leaving unemployment in 1983. Labour market status 1986 and history since 1983.
Huger and Schneider (1989) W. Germany	Discussion of panel data, illustrated with results from German study.	Sample from Socio-Economic Panel, 1983-85.
Wurzel (1990) W. Germany	Study of unemployment duration when entry time is known only by interval.	Sample from Socio-Economic Panel, 1984-85
Steiner (no year) W. Germany	Relationship between long-term unemployment and frequency of subsequent spells.	Register data on everybody ending a spell of unemployment in 1983 in Linz and data on unemployment 1984-86.
Licht and Steiner (1992) W. Germany	Study of effects of non-employment spells on future earnings.	Socio-Economic Panel, 6 waves, 1984-89.
Licht and Steiner (no year) W. Germany	Study of individual persistence of unemployment.	First five waves of Socio-Economic Panel.
Bonnal and Fougere (1992) France	Estimation of relationship between search costs and UI benefits.	Sample of unemployed, data on history, number of contacts with employers, reservation wage, past wage and duration of UI entitlement.
Warren (no year) United Kingdom	Explain duration of long-term unemployment.	Sample of survey results for people unemployed for six months. work history three years back.
Blackaby, Blade-Hovel1 and Symons (1991) United Kingdom	Gain further evidence on role of unemployment and its duration in wage determination.	Sample from Family Expenditure Survey, transformed to pseudo-panel data for 1980-86, supplemented with quarterly regional unemployment rates and (unofficial) regional price data.
Wadsworth (1991) United Kingdom	Analysis of effects from UI benefits on search activity.	Sample from 1984 Labour Force Survey, including recipients and non-recipients of benefits.

Table A1. Subject and data (cont.)

Study	Subject	Data
Ham and Rea (1987) Canada	Study impact of unemployment insurance on male unemployment.	Register-based sample from Canadian Employment and Immigration Longitudinal Labour Force File. Weekly observation of labour force status, 1975-80.
Corak (1992a) Canada	Study extent and nature of recurrent spells with UI benefits.	Register based from UI administration, covering 1971-90.
Corak (1992b) Canada	Study duration of spells with payment of UI benefits.	Register based from UI administration, covering 1971-90.
Trivedi and Alexander (1989) Australia	Determinants of re-employment probability for long-term unemployed youth.	Australian National Longitudinal Survey, 1984, combined with one year retrospective survey.
Junankar and Wood (1992) Australia	Study of occurrence dependence and evidence of secondary labour market.	Australian Longitudinal Survey. Males, 16-25 in 1985, followed until 1988.
Fischer and Pichelmann (1991) Austria	Analysis of extent of temporary layoff unemployment in Austria.	Sample of all registered as unemployed in 1985. Labour market histories for 1972-88 constructed from administrative registers.
Winter-Ebmer (1991) Austria	Study of hysteresis in unemployment at micro level.	Representative sample of male native entrants to unemployment register during 1986.
Cahuzac, Mouchart and van der Linden (1992) Belgium	Description of annual transitions between states in the labour market.	Register data from pension scheme covering 75 per cent of the labour force, 1977-85.
Jensen and Westergård-Nielsen (1990) Denmark	Analysis of temporary layoffs in Denmark.	Representative register-based sample of adult Danish population, 1979-84.
Santamaki-Vuori (1991) Finland	Study factors behind recurrence of unemployment.	Sample from Labour Force Surveys, 1978-89. Including interview-based information on labour market history.
van den Berg (1990) Netherlands	Estimation of structural search model.	Small interview-based sample from the Netherlands Socio-Economic Panel, 1983-85.
Theeuwes, Kerkhofs and Lindenboom (1990) Netherlands	Estimation of three-state hazard model.	Interview-based sample (OSA) from 1985 with retrospective construction of labour market history for 1980-85.

Table A1. **Subject and data** (*cont.*)

Study	Subject	Data
Groot (1990) Netherlands	Study unemployment duration, especially duration dependence, heterogeneity and benefits.	Longitudinal Survey, 1985-86. Sample from stock of benefit receiving unemployed workers in the Spring of 1985.
van Ours (1992) Netherlands	Study duration dependence when unobserved heterogeneity is included.	Time series of distribution of interrupted spells of unemployment.
Korpi (1991) Sweden	Investigation of duration dependence in situation with several possible exit routes from unemployment.	Sample of unemployed youth in Stockholm
Edin (1989) Sweden	Study implications of state aggregation in analyses of unemployment duration.	Plant closure data, 1977. Daily observations of redundant workers.

**Table A2. Survey of methods and results**

Study	Method	History dependence	Insurance effects	Policy factors	Other factors
Chowdhury and Nickell (1985) United States	Estimations of Human Capital functions, Hausman-Taylor, fixed effect.	No results.	No results.	No results.	Unemployment, great initial impact, rapidly decaying. Spell of sickness, permanent reduction of earnings. Union factor, 14-24per cent. Schooling, no precise estimates.
Moffitt (1985) United States	Graphic analysis and regressions on Kaplan-Meier estimator. Estimation of parametric and non-parametric hazard.	Kaplan-Meier, mainly negative duration dependence. UH ignored.	Time to exhaustion of benefits and benefit level significant.	Disincentive effects of raising benefits smaller when unemployment is higher.	Education, significantly positive impact on duration.
Solon (1985) United States	Estimation of duration models, Weibull and Generalised Weibull.	Negative duration dependence, no correction for unobserved heterogeneity (UH).	Significant effect from taxation, same as for changes in gross benefits. Significant effect from potential benefit duration.	No results.	Unemployment rate insignificant.
Lynch (1989) United States	Estimation of Weibull and log-logistic hazard.	Negative duration dependence, robust to UH. No lagged duration dependence.	Unemployment income insignificant.	Private sector training significant for women, insignificant for men. Public sector training insignificant.	Schooling significant for women. Local unemployment rate significant.
Eckstein and Wolpin (1990) United States	ML estimation Of equilibrium model and unrestricted model.	No results.	No results.	No results.	One of very few attempts to model and estimate both sides of the market.

**Table A2. Survey of methods and results (cont.)**

Study	Method	History dependence	Insurance effects	Policy factors	Other factors
Katz and Meyer (1990a) United States	Kaplan-Meier empirical hazards. Non-parametric hazard estimation.	No results.	Time to exhaustion significant. Benefit level significant. (Increase in coefficients in experiments with UH.)	Benefit duration much stronger disincentive effects than benefit level for given budget restriction.	Critical towards micro results in situation with job rationing from demand side.
Katz and Meyer (1990b) United States	Graphic hazard. Estimation of non-parametric hazard with competing risk, recall, new job.	Negative duration dependence for total hazard, masking negative for recall and positive for new job hazard. Robust to experiments with gamma-distributed UH.	Exhaustion dummy significant. Benefit level insignificant in total hazard, positive for recall, negative for new job.	Results concerning differential effects of UI important relative to incentives to participation in training programmes and take up of re-employment bonuses.	Education significantly positive for new job hazard.
Meyer (1990) United States	Kaplan-Meier hazard. Estimation of non-parametric hazard. Unobserved heterogeneity included.		Relative large disincentive effects from UI, both exhaustion and benefit level. UH tends to increase coefficients.	No results.	State unemployment rate significant. Negative effect on hazard from years of schooling.
Portugal and Addison (1990) United States	Graphic hazards for recipients and non-recipients. Estimation of duration models with different specifications of sample and replacement rates.	Duration dependence strongly affected by sample and replacement rate specification.	Replacement significant for full sample, insignificant for recipients and non-recipients separately. Risk of upwards bias of replacement effect and reverse causality.	No results,	Local unemployment rate Significant.

Table A2. Survey of methods and results (cont.)

Study	Method	History dependence	Insurance effects	Policy factors	Other factors
Fallick (1991) United States	Empirical hazards for recipients and non-recipients of UI. Estimation of semi-parametric hazard with competing risk, return to old industry or job in other industry.	No results.	Single risk benefits reduce re-employment during initial part of spell. Competing risk: significant reduction of re-employment probability in new industry. 'Exhaustion' spikes for both recipients and non-recipients of UI.	No results.	Impact from benefits on hazard only in first 20 weeks of spell.
Anderson (1992) United States	Estimation of competing risk hazard, new job and recall.	No results.	No results.	Both new job bonus and job counselling cost effective. Both instruments in combination, reduction of duration with one week.	
Baker (1992) United States	OLS and logistic regression on group-specific duration and inflow to unemployment.	No results.	No results.	No results.	Clear dominance of counter-cyclical variation in duration.
Steiner (1989) W. Germany	Probit with correction for selectivity.	Lagged duration and occurrence dependence for men.	Insignificant,	No results.	UN significant for men.
Hujer and Schneider (1989) W. Germany	Estimation of Weibull hazard with and without considering unobserved heterogeneity.	Duration dependence insignificant without UH. Significantly positive when UH is included.	Benefits insignificant. Being close to benefit exhaustion and receiving unemployment assistance has negative effect.	No results.	

Table A2. Survey of methods and results (cont.)

Study	Method	History dependence	Insurance effects	Policy factors	Other factors
Wurzel (1990) W. Germany	Estimation of Weibull and log-logistic hazard.	Initial phase with positive duration dependence.	Benefits insignificant.		Education strongest demographic factor.
Steiner (no year) W. Germany	Ordinal probit. Dependent variable number of spells.	Lagged duration dependence significantly negative for men.	Probable correlation between unemployment and labour market policy for men in 1983.		
Licht and Steiner (1992) W. Germany	Probit, employment status. Estimation of income function.	History variables significant in employment function. Permanent negative effect on income from non-employment spells.	NO results.	No results.	No effects from cyclical factors.
Licht and Steiner (no year) W. Germany	Estimation of hazard function.	Negative duration dependence, number of previous spells positive, accumulated duration of lagged unemployment negative.	Benefits insignificant.	No results.	No vocational training negative.
Bonnal and Fougere (1992) France	Estimation of stationary structural search model.		Elasticities of unemployment duration with respect to UI benefits 0.2 to 0.33. Elasticities of labour force participation maximum 0.15 to 0.25 for unskilled.	No results.	One of few estimations of structural search model.
Warren (no year) United Kingdom	Estimation of hazard.	Strong lagged duration dependence.	No results.	No results.	Regional unemployment highly significant.

Table A2. Survey of methods and results (cont.)

Study	Method	History dependence	Insurance effects	Policy factors	Other factors
Blackaby, Bladen-Hovell and Symons (1991) United Kingdom	Regressions on individual real wages.	U significantly negative and long-term U significantly positive.	No results.	Interpretation: expansionary policy on regional basis.	
Wadsworth (1990) United Kingdom	Estimations of reduced form search effort equations.	Significantly negative impact on search effort from search duration above 24 months. For women significantly positive effect from duration shorter than one year.	Significantly more search effort by benefit claimants.	Benefits increase probability of match.	
17 Ham and Rea (1987) Canada	Estimation of hazard with and without including UH.	Duration and lagged duration significantly negative.	Exhaustion effect. Benefits insignificant.	No results.	Results robust to inclusion of UH.
Corak (1992a) Canada	Significantly positive occurrence dependence.	No results	Motivation for early activation of unemployed.	Only abstract of paper available.	
Corak (1992) Canada	Parametric hazard estimation.	No results,	Benefit significantly positive for women.	No results	Regional unemployment rate significant for men. Only abstract of paper available.
Trivedi and Alexander (1989) Australia	Estimation of extended mixed proportional hazard model distinguishing between first, second and third spell of unemployment.	Negative lagged duration dependence.	No results.	No results.	Indicate serious misspecification if same model is used for single and multiple spell cases.

Table A2. Survey of methods and results (cont.)

Study	Method	History dependence	Insurance effects	Policy factors	Other factors
Junankar and Wood (1992) Australia	Estimation of multinomial logit.	Significant lagged duration and occurrence dependence.	No results.	No results.	Weak evidence of labour market segmentation.
Fischer and Pichelmann (1991) Austria	Description of temporary and permanent layoffs by industry, etc.	No results.	No results.	No results.	About one-third of all spells temporary layoffs.
Winter-Ebmer (1991) Austria	Estimation of individual referral rates from employment office and of joint determination by employer and worker of acceptance.	Previous unemployment significantly positive impact on referral rates. Relative unemployment negative impact on employer acceptance, unemployment duration positive impact on worker acceptance.	No results.	No results.	On the job search positive impact on employer acceptance. Further referrals negative impact on worker acceptance.
Cahuzac, Mouchart and van der Linden (1992) Belgium	Calculation of transition matrices.	Division in four main groups: two polar groups with high, respectively very low employment and strong history dependence and two intermediate groups attracted to each of the polar groups.	No results.	No results.	No results.

Table A2. Survey of methods and results (cont.)

Study	Method	History dependence	Insurance effects	Policy factors	Other factors
Jensen and Westergård-Nielsen (1990) Denmark	<ol style="list-style-type: none"> <li>1. Estimation of single risk hazard and</li> <li>2. of competing risk hazard model for exits to former and new employer.</li> </ol>	<ol style="list-style-type: none"> <li>1. Significantly negative duration dependence.</li> <li>2. Significantly negative duration dependence for recalls, non-significant duration dependence for permanent layoffs.</li> </ol>	<ol style="list-style-type: none"> <li>1. Significantly negative for the youngest and oldest age groups.</li> <li>2. Predominantly negative for recalls and for permanent layoffs.</li> </ol>	No results.	40 per cent of spells are temporary. labour market experience increases hazard. Small children increases hazard for men but decreases for women. Education does not have a significant impact.
Santamaki-Vuori (1991) Finland	Estimation of probability of unemployment and of conditional probability of multiple spells.	No results.	"Perverse" effects from regional employment programmes. Reverse causality?	No substantial difference between single and multiple spell persons.	
van den Berg (1990) Netherlands	Estimation of structural search model.	No results.	No significant effect from benefits. Virtually every offer accepted.	No results.	Education important to job offer arrival rate.
Theeuwes, Kerkhofs and Lindenboom (1990) Netherlands	Estimation of three-state hazard model.	Men: significantly negative duration dependence for E to U. Women: significantly positive duration dependence for E to N.	No results.	No results.	Education important, especially for women.
Groot (1990) Netherlands	Weibull hazard with and without including UH.	Duration dependence significantly negative without UH, insignificant with UH.	Unemployment benefits insignificant. Means-tested social benefits negative.	No results.	Education significantly positive.
van Ours (1992) Netherlands	Analysis of escape rates from different duration classes.	No duration dependence.	No results.	No results.	No results. Not individual data.

Table A2. Survey of methods and results (cont.)

Study	Method	History dependence	Insurance effects	Policy factors	Other factors
Korpi (1991) Sweden	Estimation of logit model and Weibull hazard for leaving unemployment	Negative duration dependence for transition to permanent job.	Benefit exhaustion effect on hazard. No effects from unemployment assistance (KAS).	Recommends combination between labour market programmes and limitation of benefit duration.	Vacancies significant.
Edin (1992) Sweden	Competing risk duration model. Exits to regular employment, labour market programmes or non-employment.	Overall hazard positive duration dependence.	No results.	Exit to programmes decrease with age and schooling.	

## **Annex 2**

### **INDIVIDUAL LABOUR MARKET DATA**

The existence and availability of data sets often determine the choice of economic model for investigating labour market processes. Since data are not identical across countries, international comparisons are difficult. In order to get a common ground for the comparisons, we will use some space discussing the different types of available data sets.

#### **A. Aggregate data compared to micro data**

The most basic macro statistics for unemployment consist of a raw unemployment percentage that measures the fraction of the labour force that is unemployed at a given point of time. This measure neglects completely the dynamic structure of unemployment. Most often unemployment consists of people who have been unemployed only small fractions of a year along with people who have had very long spells of unemployment.<sup>7</sup> The policy measures against long-term unemployment differ from measures targeting short spells of unemployment. Information on inflow to and outflow from unemployment improves the quality of the data in this respect. But aggregate data can never reveal the pattern of recurrent unemployment and the background of people who become unemployed, *i.e.* their individual training, past labour market experience, the effect of the individual replacement ratio or wage rate, etc.

Aggregate data are most suitable as a foundation for macro economic policy but are less useful in relation to more specific labour market policies aimed at structural problems. Here, data on individual labour market histories are necessary.

#### **B. Ideal micro data**

Before we go into details on which types of data are usually available, we will describe what could be considered an ideal data set for microeconomic analyses of the dynamics of unemployment. According to the conventional microeconomic view, the labour market is characterised by movements between jobs, between employment and unemployment, and between out of the labour force and employment or vice versa. Different economic models are applied to explain these transitions. A transition in itself is characterised as a probability or a transition rate out of the current state depending on the general state of the labour market, on the time the person has spent in the current state, different characteristics of the current state and personal characteristics together with characteristics of the state of destination. The current and future state could be described by type, wage rate, type of job, job satisfaction, and job perspectives.

The ideal data set contains information on persons at each transition point, *i.e.* at each point of time where there is a change in individual labour market status. Data should also contain information on those who are not mobile in order to have a control group. It is also important for assessing the longer run effects that people can be followed for as long a period as possible before and after a transition has taken place. A sufficiently long observation period is necessary also to assess the impact from participation in specific labour market programmes. Information on individual characteristics should be supplemented with data for the demand side both for the local and the national labour market.

### C. Available micro data sets

In most cases we have to use data that are less than ideal in several aspects. First, observations may only take place at certain fixed intervals, say once a year. Second, data may only cover specific individuals once or a few times. Third, the quality of data and the observed variables may not be ideal. There can be measurement errors as one problem, and as another, data could have been collected for administrative purposes and therefore be less suitable for economic analysis. These aspects will be examined in the following.

Some data sets contain only observations at regular intervals, for example once every year. Using such a data set presents a special problem to the researcher because information is not available about events taking place between observation points. The researcher can not observe what happens to the ongoing spells of unemployment or employment, neither can he see what the person did before the observation point. Similarly, it is not possible to observe whether the person is usually unemployed at this time of the year, for instance, because of an implicit agreement with the employer (as suggested by some contract and bargaining theories).

Another censoring problem occurs using annual data. The use of annual data means that all spells beginning in one year and ending in the next will be counted as one spell in each year. This increases the number of spells and decreases the duration of unemployment, but results in a spurious history dependence. Thus, a simple regression analysis will show dependence between unemployment in two subsequent periods, though the true relation is that the registration procedure has split a number of on-going spells in two.

In some, but rare, cases, administrative registers make it possible to follow the activities of the person continuously.\* There is growing evidence that continuous observations are very important when describing the transitions in the labour market as a foundation for relevant labour market policies.

If the individuals are observed over a longer period, data form a panel, contrary to a situation with cross-section data where the respondents are only observed once. Some data sets are of an intermediate type – following respondents for a couple of data collection rounds, as in the Eurostat Labour Force Surveys. Panel data have a number of advantages over data based on single point observations. One important advantage is that panel data facilitate dealing with the problem of unobserved heterogeneity. Another advantage is that censoring problems diminish because it is possible to look at a number of spells over a longer period.

Panel data can be based on either surveys or registers. Survey data can most easily be exemplified by the Eurostat Labour Force Survey, that covers a representative sample and where information is collected by interviews or postal questionnaires once a year. This usually provides information on the labour market status in the month before the survey. Sometimes survey data contains elaborate questions on the past history. However, there is now evidence that retrospective data are exposed to errors, because respondents either forget or beautify their past. By comparing individual responses with company records on the same persons, Bound *et al.* (1990) find that people tend to forget short spells of unemployment, or to under-report the

duration of actual spells. They also find that people are not able to remember their exact wage rate correctly. The worst problem with survey data, however, seems to be the attrition problem that (with a few exceptions) results in a decreasing rate of response in repeat surveys using the same sample of individuals.

Register based data may in principle have the same structure and contain the same information as survey data. The main difference is that register data are more reliable when it comes to figures on wage income, unemployment benefits, unemployment experience, transfer income and the like. But they have the disadvantage that information is strictly limited to what is available in administrative records. The lack of qualitative response variables means that it is usually not possible for instance to characterise the job and the job environment. Another aspect is that register data most often come from administrative registers that have been collected for strictly administrative purposes. Often, these data have to be transformed in order to be used for analytical purposes.<sup>3</sup>

#### **D. Panel data on the demand side**

Today, available panel data cover in almost all known cases only the supply side of the labour market. Hamermesh (1990) mentions only three panel data sets covering the demand side. In principle there is no problem in collecting panel data for employers as well. Ideal data should be able to link information on individuals with information on the employing firms, and should furthermore contain information on the economic performance of the firm. This would make it possible to estimate demand functions and to analyse wage and skill profiles in a more comprehensive way. At the present state, the lack of systematic information on the demand side leaves most empirical models fairly underdeveloped in this respect. Often macro statistics on unemployment or job vacancy rates are used, but this is still in lieu of better data.

## NOTES

1. In Denmark, 700 000 individuals, who have had at least one spell of unemployment, have about 1.3 million spells in total which results in an annual unemployment corresponding to 300 000 persons on average. Of these about 100 000 have been unemployed for more than a year.
2. But even in this case there remains a right hand censoring problem at the end of the observation period.
3. One example is Danish register data on degrees of unemployment defined as the number of hours in unemployment compared to the normal working year. This statistics has a clear administrative purpose because it is strictly related to the payment of benefits. For analytical purposes, these degrees must, however, be transformed into spells of unemployment, which experience shows is not a trivial procedure.