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# **SERIE RESEARCH MEMORANDA**

**EMPLOYERS' RECRUITMENT BEHAVIOUR**

**AND**

**RE-EMPLOYMENT PROBABILITIES OF UNEMPLOYED**

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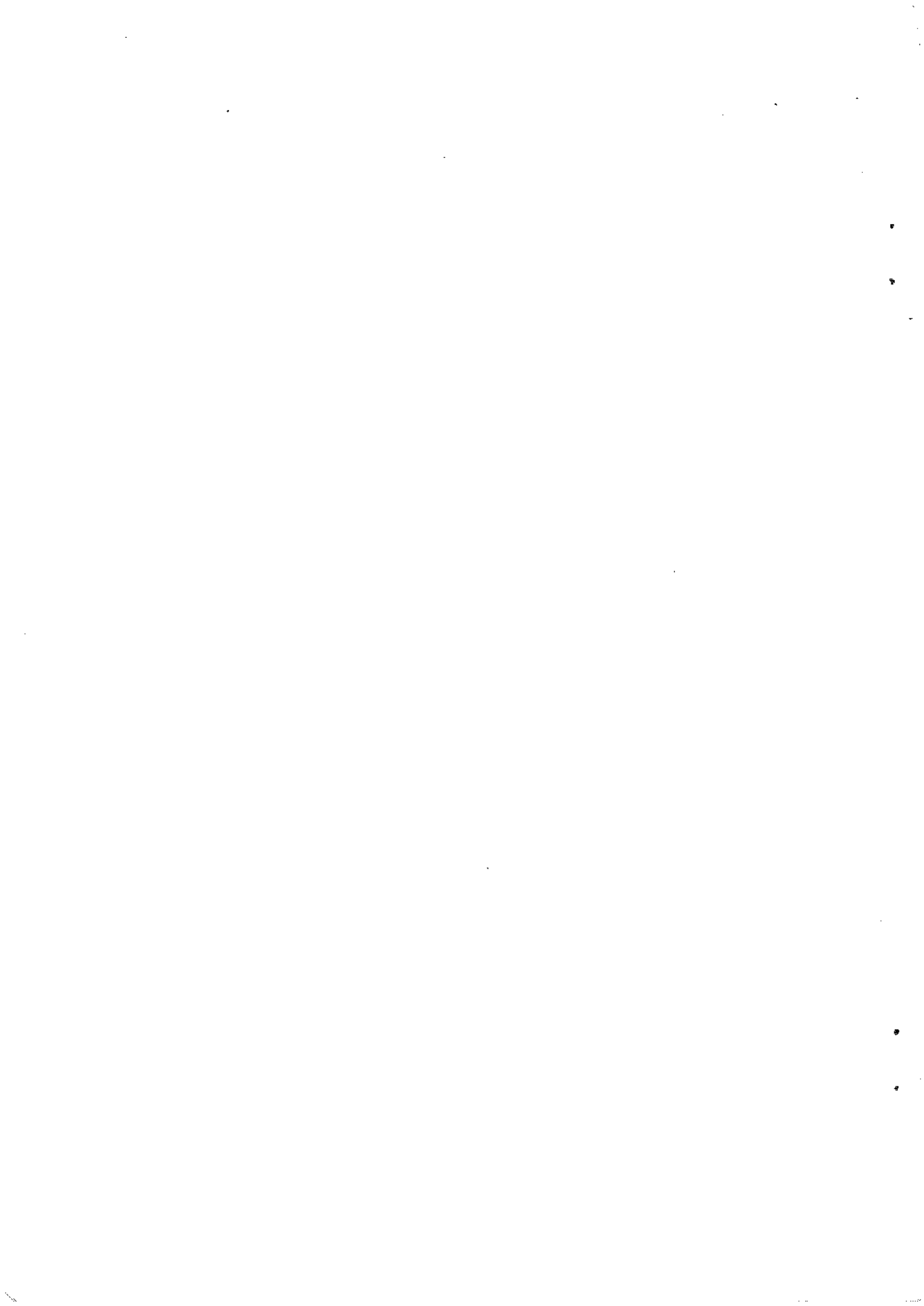


ABSTRACT.

This paper is focused on the allocation of vacant jobs to job seekers from a demand side perspective by studying the recruitment behaviour of employers. A model is developed to analyze the role of search and selection methods of employers as determinants of the re-employment probabilities of the unemployed.

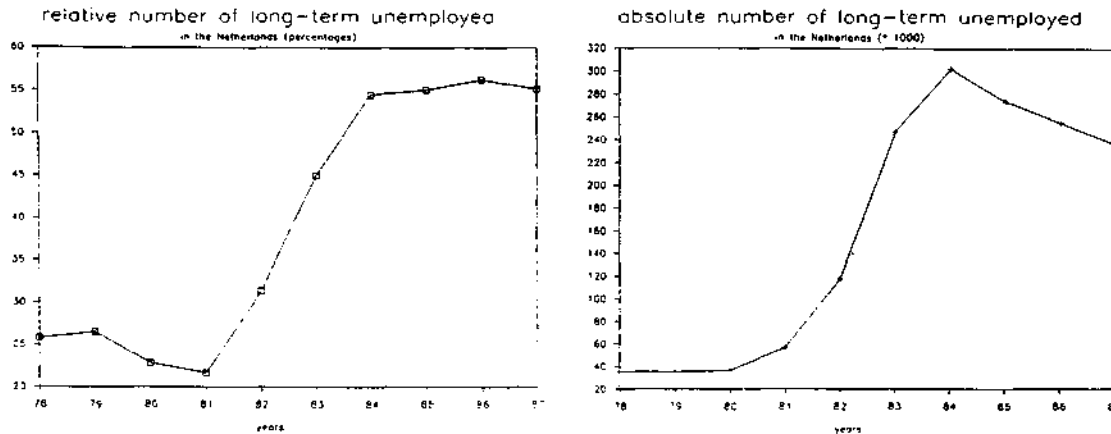
In an empirical application for the Dutch labour market, we have examined the effect of the recruitment behaviour of employers on the chances for unemployed individuals to get a job. This is carried out by testing whether the probability of acquiring a vacant job by an unemployed individual is influenced by the use of different recruitment channels by the employer and the requirements for the applicants imposed by the employer.

We find that job requirements for the applicants are the most important determinant of the re-employment probability of the unemployed. In addition, the use of search methods by the employer does also have a significant effect.



## 1. A BIRD'S EYE OVERVIEW

In the last decade numerous studies on unemployment have been carried out as a consequence of structural mismatches on labour markets in most western countries. Recent research is in particular concentrating on the issue of long-term unemployment. The almost universal rise in the relative share of long-term unemployment has stimulated a large number of studies into the nature of long-term unemployment. In fig 1.1 the trend of long-term unemployment is shown for the Netherlands.



**Figure 1.1** Long-Term Unemployment for Males in the Netherlands (long-term refers to those unemployed for more than 12 months)<sup>1</sup>.

Many theories have been developed in order to explain the observed high level of unemployment in industrialized countries (see for example Malinvaud, 1977, Solow, 1980 and Mortensen, 1986). The consequences of structural economic change and the effects of the social security system are often used as explanatory elements in these theories. More recently, the theory of hysteresis has become popular among economists. Hysteresis of unemployment is defined as the dependence of the "natural rate" of unemployment on past unemployment realizations and has been examined at the macro level in several empirical studies (see for an overview, Johnson and Layard, 1987). For example, Blanchard and Summers (1986) have hypothesized that sticky wages due to insider-outsider bargaining cause the hysteresis of unemployment.

At the micro level hysteresis of unemployment implies the presence of duration dependence of unemployment, i.e. a positive effect of the current spell of unemployment on future unemployment. There is still a (mainly empirical) debate going on about the magnitude and causes of the duration dependence effect (see among others, Heckman and Borjas, 1980, Lynch 1984, Narendranathan and Nickell, 1985)<sup>2</sup>. Duration dependence may occur because employers believe - justified or not - that the unemployed lose their ability to work during their unemployed period, because skills of the unemployed are gradually declining (the "deskilling" effect). In that case, the employers will not hire the long-term unemployed anymore. When this view is based on

<sup>1</sup> Source: Central Bureau of Statistics.

<sup>2</sup> See for an overview of the empirical findings of duration dependence in the Netherlands, Gorter et al (1989).

prior ideas about unemployed people and not based on their actual skills, duration dependence is not caused by a lack of ability as such of the unemployed, but by (unjustified) stigmatization by the employer (the "stigma" effect, see also Budd et al., 1987 and Ebmer, 1989).

The fundamental question to be raised at the micro level is why unemployed people remain unemployed so long or - to put it differently - why unemployed people do not easily get a job. Labour market research on the re-employment probabilities of the unemployed has mainly concentrated on supply-side factors (which might be due to data limitations at the demand side) in order to explain differences in unemployment duration of individuals.

A widely used method of analysis for studying the duration of unemployment is the hazard-rate approach in which the differences in the leaving (hazard) rate of the unemployed are assessed and explained (see for example, Lancaster, 1979, Nickell, 1979, Van Opstal and Theeuwes, 1985, Ter Huurne, 1988, Gorter et al., 1989). The relevant labour market characteristics in the hazard-rate approach are usually:

- educational level
- occupational group
- gender
- age
- region
- labour market history
- search behaviour (duration, methods and intensity)

Within the field of duration models, one can distinguish between a structural and a "reduced form" approach. In the structural hazard rate approach of job search, the (optimal) search behaviour of the unemployed is explicitly included in the model in contrast to the "reduced form" model where the observed differences in leaving rates are related to differences in personal labour market characteristics and general labour market conditions (such as the vacancy rate) in a non-behavioural context.

In the structural hazard-rate approach of job search, the emphasis is placed on the labour market characteristics and the search behaviour of the (unemployed) individual (see for a survey, Lippman and McCall, 1976). In this approach, one assumes that an unemployed job seeker selects from a pool of job offers. By setting a reservation wage (dependent on personal circumstances and non-working income), the unemployed individual specifies his minimum demands with respect to the wage level. The optimal search strategy is then to wait for a wage offer higher than the reservation wage. A crucial assumption is that when a job offer is made to an individual, acceptance by the job-seeker leads to a match of the job and the seeker. Labour market conditions are here summarized in just one variable, namely the job-offer arrival rate. This implies that the way vacant jobs are allocated to searchers is taken as an exogenous variable in this analysis.

In reality however, the matching process of labour demand (vacant job) and labour supply (job-seeker) is influenced by both the behaviour of the job seeker and of the employee-searcher, and is thus much more complex.

Vacant jobs are not offered unconditionally to any person. Employers with a vacant job usually start a recruitment procedure in which suitable applicants are selected and finally they offer the job to the optimal (or at least acceptable) candidate. In Goodwin and Carlson (1981) the actual recruitment process of a new employee is subdivided into three stages:

- 1) search process for candidates by the employer
- 2) selection process in which the optimal candidate is chosen by the

employer

3) the decision of accepting the job offer by the employee

Job search theory is normally only concerned with the last step (by means of the structural model of the hazard-rate approach), whilst the impact of employer search is manifest in the first two steps. In other words, in the structural hazard-rate approach of the re-employment probabilities the starting point is the unemployed individual searching and selecting a job, whereas in a demand-side approach the starting point is the vacant job with the employer searching and selecting the optimal candidate. The latter approach has not received much attention in the scientific literature until now. Only a limited number of empirical demand-side oriented studies have been carried out (see for example, Beaumont, 1978, Roper, 1988, Van Ours, 1989, and Renes, 1989).

In figure 1.2, both approaches are shown in one framework.

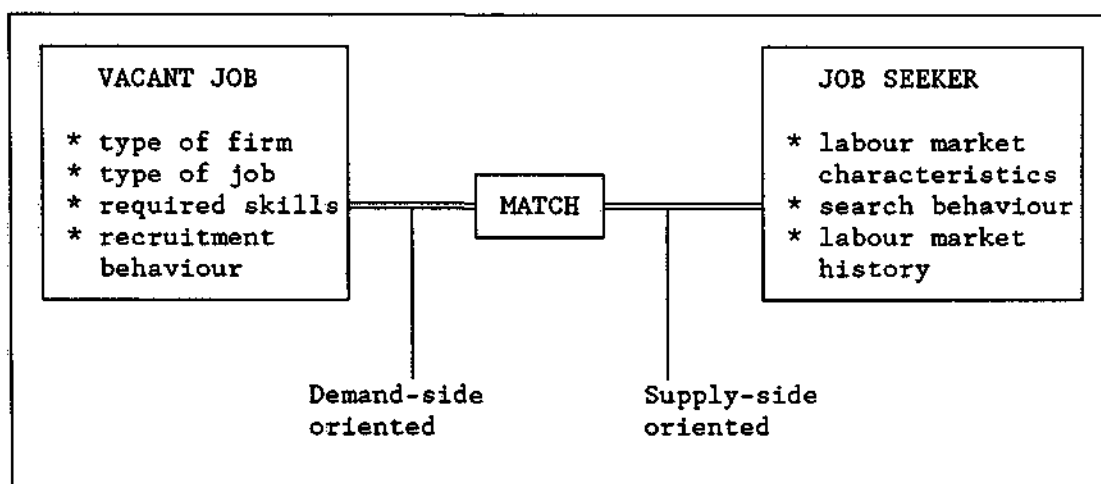


Figure 1.2 Matching of Supply and Demand.

The matching of vacant jobs and job seekers is a simultaneous process of job searchers trying to find a job and employers trying to fulfil their vacancies. So preferably, the analysis of unemployment histories should use both sides of the market, i.e. an integration of the hazard-rate (job search) approach with the demand-side oriented (employer search) approach. In Osberg et al. (1986) an attempt is made to incorporate demand side variables (though not reflecting the behaviour of the employers) in the analysis of re-employment probabilities of unemployed using a "reduced form" model. The conclusion was that estimates of individual unemployment incidence and duration which omit consideration of the firms to lay off and hire particular workers will suffer from omitted variables bias.

In structural job search studies demand side influences are only very restrictedly included (such as the job-offer arrival rate) which is, as said before, probably due to lack of data.

Job search studies on the effect of labour market characteristics and the search effect of the unemployed on the re-employment probability are informative about the relative chances of getting and accepting a job, but do not offer much insight into the allocation mechanisms of vacant jobs, which is mainly controlled by the employers' search and selection behaviour. In this view, job

availability rather than wages act as an adjustment mechanism in equating labour supply and demand. It is not the high reservation wage of the job searcher, but rather the level of job availability which determines the chances of getting a job.

In order to fill this gap, the present study concentrates on the effect of recruitment behaviour of the employers on the allocation of vacant jobs. In other words, the focus is on the causal relationship between the search and selection behaviour of the employer (given the type of job) and the chances for unemployed individuals of getting a job.

The importance of the analysis of the recruitment behaviour of the employer in this analysis lies in the fact that

- a) employers requirements for the applicants may be impossible to fulfil by unemployed individuals (for example, if work experience is required)<sup>3</sup>.
- b) the use of search channels by the employer which may not (or to a lower extent) reach the unemployed ( for example, if internal recruitment is used).

Clearly, this demand-side oriented approach differs strongly from the job search approach in which labour market characteristics and the search behaviour of the unemployed individual are the explanatory variables.

In this paper, we will use a demand side approach by means of a discrete regression model in which the dependent variable is the outcome of the allocation process of the vacant job with respect to the previous labour market position of the accepted applicant. In the analytical framework of this allocation process it will then be possible to test the following hypotheses:

- I) the probability of fulfilment of a vacant job by an unemployed individual is influenced by the recruitment channels used by the employer in the search for applicants.
- II) the probability of fulfilment of a vacant job by an unemployed individual is influenced by the required characteristics of the applicant imposed by the employer.

For testing these hypotheses, we have to examine the significance of the effect of using different recruitment channels and of specifying different required characteristics on the outcome of the allocation process with respect to the previous labour market position of the accepted applicant, while controlling for other relevant variables such as the characteristics of the job and the type of firm.

## 2. A DISCRETE REGRESSION MODEL

In this section, we will present the derivation of our allocation model. The allocation of vacant jobs starts with the employer who is searching for applicants by means of certain recruitment channels. If it is assumed that employers are rational decision makers in choosing a candidate when they have a vacancy, then they will compare the applicants on the basis of a set of relevant individual qualifications or characteristics. Next, the employer will select the most suitable applicant for the vacant job.

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<sup>3</sup> If unemployed people have the required skills, it is still uncertain whether they will get the job or not, because this is dependent on the preferences of the employer.



In this case, the following expression of the probability for an individual to get a job can be formulated:

Pr (individual  $i$  will get job type  $j$  | recruitment channel  $k$ ) =

$$\frac{q_{ij} * p_{ijk} * F(X_i, Z_j)}{\sum_i q_{ij} * p_{ijk} * F(X_i, Z_j)} \quad (1)$$

with  $q_{ij}$  = probability that individual  $i$  is willing to fulfil job  $j$ <sup>4</sup>

$p_{ijk}$  = probability that individual  $i$  becomes part of the actual choice set for vacancy  $j$  if recruitment channel  $k$  is used

$X_i$  = the qualifications of individual  $i$

$Z_j$  = the characteristics of the vacant job  $j$

$F(X_i, Z_j)$  = the suitability of individual  $i$  for vacancy  $j$

Ideally, we would estimate relationship (1) on the basis of data on the characteristics of the vacancy and the qualifications of the applicants. However, this kind of data is usually not available. A notable exception is the study of Mattson and Weibull (1981) in which a multinomial logit model of allotment of job openings among applicants is estimated. In this study, the emphasis lies on the impact of characteristics of the applicant, but there is also limited information about vacancy characteristics (viz. the occupational group).

The data on vacancies available to us offers much information on vacancy characteristics, but almost nothing is known on the labour market characteristics of the applicants. We have only knowledge of the previous labour market position and the educational level of the accepted applicant (see Appendix A for further details of the data); nothing is known about applicants who were not accepted. Consequently, we have to adjust relationship (1) by formulating a set of assumptions in order to allow an empirical estimation of the model.

In our approach we will distinguish three types of applicants on the basis of their labour market position, viz. the employed (E), the unemployed (U) and the persons leaving school (S).

The following sets are defined:

$T_w$  = set of all potential applicants of type  $W$  ( $W = E, U$  or  $S$ )

$S_{wjk}$  = set of all actual applicants of type  $W$ , given job  $j$  with recruitment channel  $k$

The number of elements of  $T_w$  and  $S_{wjk}$  are  $M_w$  and  $N_{wjk}$  respectively. Then we have

$$E(N_{wjk}) = \sum_i q_{ij} * p_{ijk}, \quad i \in T_w \quad (2)$$

and we assume that the set of  $T_w$  is so large that the difference between the actual  $N_{wjk}$  and its expected value is negligible.

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<sup>4</sup> It is implicitly assumed that people who are willing to work will accept a job offer with probability 1.

Unfortunately, our data set does not inform us about the size of the  $N_{wjk}$ 's. In order to arrive at a meaningful relationship to be estimated the following assumptions are made. First, it is assumed that two kinds of applicants can be distinguished: those who are willing to work ( $q_{ij} = 1$ ) and those who are not willing ( $q_{ij} = 0$ ). Further, we assume that  $p_{ijk}$  is equal for all willing individuals in a certain group W:

Thus one arrives at:

$$\begin{aligned} q_{ij} * p_{ijk} &= P_{wjk} \quad \text{for all "willing" persons } i \in T_w \\ q_{ij} * p_{ijk} &= 0 \quad \text{for all "non-willing" persons } i \in T_w \end{aligned} \quad (3)$$

Let  $\alpha_{wj}$  denote the fraction of applicants of type W who are willing to fulfil job j. Further, let  $f_{wj}$  denote the average suitability for this job of an applicant of type W (willing to fulfil job j):

$$f_{wj} = \frac{1}{\alpha_{wj} M_w} * \sum_i F(X_i, Z_j) \quad (4)$$

where summation takes place over all "willing" persons  $i \in T_w$ .

Then it follows from (1) to (4) that

$$\begin{aligned} \text{Pr (individual of type W will get job type j | channel k) =} \\ \frac{P_{wjk} * \alpha_{wj} * M_w * f_{wj}}{\sum_w P_{wjk} * \alpha_{wj} * M_w * f_{wj}} \end{aligned} \quad (5)$$

Now, it is assumed that the probability that an individual of type W (willing to fulfil job j) will become part of the actual choice set for vacancy j depends on the search methods of the employer for job vacancy j in the following way:

$$P_{wjk} = g_{wk}(Z_j) \quad (6)$$

Further, we suppose that

$$f_{wj} = f_w(Z_j) \quad (7)$$

and that

$$\alpha_{wj} * M_w = a_w(Z_j) * M_w \quad (8)$$

The latter assumption means that the number of individuals of type W, who are willing to fulfil job j, will depend on the type of job and the absolute number of individuals of type W.

Then (5) can be written as

$$\begin{aligned} \text{Pr (individual of type W will get job type j | channel k) =} \\ \frac{g_{wk}(Z_j) * a_w(Z_j) * M_w * f_w(Z_j)}{\sum_w g_{wk}(Z_j) * a_w(Z_j) * M_w * f_w(Z_j)} \end{aligned} \quad (9)$$

Although the probability of interest (5) is now written in terms of the known variables  $Z_j$  and  $M_w$ , it is still impossible to identify the separate effects of the access to information of job vacancy  $j$  ( $g_{wk}$ ), the competition between applicants ( $a_w$ ) and the suitability of the applicants ( $f_w$ ) on the probability that an individual of type  $W$  will get a vacant job  $j$ .

Therefore the numerator of (9) is simplified as follows:

$$g_{wk}(Z_j) * a_w(Z_j) * M_w * f_w(Z_j) = M_w * h(\beta_w * Z_j, \mu_w * d_k) \quad (10)$$

where  $\beta_w, \mu_w$  are the parameters to be estimated and  $d_k$  is a dummy variable representing the use of different search channels by the employer.

If we specify

$$M_w * h(\beta_w * Z_j, \mu_w * d_k) = \exp(\beta_w * Z_j + \mu_w * d_k + \ln(M_w)) \quad (11)$$

then we arrive at a multinomial logit model (see Maddala, 1983), which can be estimated by means of standard procedures<sup>5</sup>.

Thus, in this model specification the outcome of the recruitment (search and selection) behaviour of the employer with respect to the type of worker is related to the characteristics of the job vacancy, the choice of the recruitment channels and the number of potential applicants. In other words, the result of the allocation process can be associated with the type of vacancy and the search methods of the employer. This will make it possible to see which type of jobs are allocated to employed people, unemployed people or people leaving school respectively and how the use of different search channels influences this allocation.

It is noteworthy here that essentially we do not have a structural model in which the effects of competition between applicants and search and selection behaviour of the employer can be identified (for each type of job vacancy) as well as the willingness of applicants to accept a job, but in fact a "reduced form" model in which we will investigate the distribution of vacant jobs over the different types of workers<sup>6</sup>.

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<sup>5</sup> It can be shown that the coefficients  $\beta_w$  and  $\mu_w$  are not uniquely determined, so that a reference group  $r$  has to be chosen with an arbitrary constant (for example  $\beta_r = \mu_r = 0$ ) in order to identify the parameters of the model. Furthermore, we note that the term  $\ln(M_w)$  will be absorbed in the parameter of the constant term  $\beta_{w0}$ , which is equal to  $\beta_{w0} + \ln(M_w)$ .

<sup>6</sup> One may also formulate other sets of assumptions which lead to specification (11).

### 3. THE EXPLANATORY VARIABLES.

In this paper we will apply the discrete regression model specified in section 2 to data on job vacancies in the Netherlands<sup>7</sup>.

This data set consists of a sample of 763 vacancies. On the basis of this representative sample, it is possible to get a reasonable idea of the total number of vacancies in the Netherlands. It appears that on a yearly basis - about 540,000 vacancies are fulfilled of which about 32% are related to new jobs. In this paper, we address the question whether (and to which extent) the unemployed get an opportunity to fulfill these vacancies or whether these jobs will mainly become occupied by other groups at the labour market.

In the sample, employers were asked about the characteristics of the firm and the vacant job, their recruitment methods and some characteristics of the accepted applicant. The latter category gives information about the previous labour market position of the accepted applicant (employed, unemployed or leaving school) until the moment of acceptance, which will be the dependent variable of our model (from now on, we will refer to this dependent variable in abbreviated form as PLMP). The outcome of the allocation process with respect to this variable can be related to a number of explanatory variables (see also (11) in section 2). These variables will be discussed in this section.

It should be recalled that the aim of this study is to test the two hypotheses formulated in section 1. First, we want to examine whether the way information is spread by the employer does influence the outcome of the allocation process on the labour market. The concept of information as a strategic variable in matching processes on the labour market was for instance discussed in Clark (1987). Secondly, the impact of required characteristics imposed by the employers on the outcome of the allocation process will be analyzed in greater detail.

First, the variables directly corresponding to the above mentioned hypotheses will be discussed. Next, we will pay attention to the remaining variables included in the model.

#### 1. The recruitment channels.

It is plausible that the choice of the recruitment channels by the employer has decisive consequences for the allocation of jobs to the unemployed individuals (the importance of accessibility to such channels is - among others - stressed by Saunders and Flowerdew, 1987 and Fischer and Nijkamp, 1989). In the most obvious case, the job is directly allocated to a candidate from inside the firm and as a result unemployed individuals (and other people outside the firm) stay aside. This channel will be referred to as the internal recruitment channel<sup>8</sup>.

Employers recruitment through informal contacts is often popular

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<sup>7</sup> The data source is described in full detail in Appendix A.

<sup>8</sup> Due to the selection mechanism in the sampling of the data, there are no vacancies for which the employer searches exclusively by means of internal recruitment channels. Therefore, the use of internal channels is underrepresented in our model. It is known from the entire survey that in about 8% of the vacancies the search process was exclusively undertaken by means of internal recruitment channels.

due to the reduction in cost and the provision of reliable information about job applicants. In addition, applicants recruited through informal contacts do usually live in the neighbourhood of the firm and hence there is probably no need for a move for the applicant, which makes the probability of acceptance of the job offer by the chosen applicant higher. Besides the internal recruitment channel the employer may use his network of relations to hire people in an informal, direct way. This channel is called the external relations channel. The chances for unemployed people are relatively low if the employer decides to recruit via such external contacts. Only when the unemployed individuals have a social network (a sufficient number of working people), then their chances may be higher.

The use of informal information channels is often not sufficient to fulfil the vacancies of the employers. In that case, the employer does (also) use formal recruitment methods. In general there are three formal ways of seeking contact with job applicants, namely the use of advertisements, the use of the labour exchange office and the use of a private employment office. Advertising probably leads to the largest flow of applicants, maximizing the selection possibilities for the employers. So, although it is easy for unemployed individuals to have knowledge about the existence of the vacant job, competition will be often severe.

Chances for the unemployed to get a job may be higher if employers register their vacancy at the labour exchange office, because the exchange office tries to match the job with the registered searchers, who are mainly unemployed people. The outcome is of course uncertain because the decision to accept the unemployed job searcher is still taken by the employer.

Finally, the employer may search with the help of a private employment office. These offices may propose employees on a flexible basis which is attractive for the firm if temporary workers on an irregular basis are needed. For the unemployed, this channel might be successful, because temporary, irregular jobs are not always attractive to full time employed workers. On the other hand, however, there may also be a strong competition of first-time entrants on the labour market who are also looking for temporary jobs. In our analysis this channel will also include all other channels which are sometimes used by the employer (such as direct mailing of people leaving school) and will be referred to as other channels.

## 2. Required characteristics

The second class of variables, corresponding to the second hypothesis, consists of three classes of indicators:

- i) age
- ii) education
  - minimal required level
  - specific educational qualification
- iii) work experience

The outcome of the allocation process (i.e. the choice of the employer) concerning the PLMP is expected to be influenced by the kind of requirements to be fulfilled by the job applicant. Clearly, work experience requirements can often hardly be fulfilled by unemployed people and hence this variable is expected to have a negative effect on the choice of an unemployed person for the vacant job (instead of an employed person). The same may

be true for the variable reflecting educational requirements, because on average unemployed people have a lower educational level relative to the employed people. Finally, it depends on the age structure of the unemployed whether the age requirements can be met. If the employers do not want to hire older people, a large part of the unemployed do not have high chances to get a job anymore.

Secondly, the remaining variables in the analysis of the choice of the PLMP by the employers will be discussed<sup>9</sup>. The reason for including control variables is that the recruitment behaviour (and the outcome of the allocation process choice) will differ among jobs and firms and hence excluding would lead to omitted variable bias.

Job characteristics can be classified into two groups, viz. the kind of occupational group the job belongs to and the kind of contract offered to the applicant (permanent versus temporary and full-time versus part-time). Firm characteristics are summarized in terms of firm size, location of the firm and sectoral characteristics of the firm.

The use of the latter variable, together with the occupational group variable, however does create a problem. Regarding the cross-classification of occupational group and sector of the firm we may often find a high degree of correspondence between the two variables. In order to prevent multicollinearity in our model a choice between the both classifications has to be made. We have dealt with this choice problem here by performing the analysis on both classifications successively. A specification test will then show which classification gives the best fit of the data, whilst it will also provide a check on the robustness of the parameters of the other variables.

In the variant at the sectoral level (variant A), we distinguish four types of sectors:

- \* construction sector
- \* industrial sector
- \* services sector
- \* quaternary sector

whilst in the variant at the occupational level (variant B), the following six occupational classes are distinguished:

- \* administrative functions
- \* technical functions
- \* sales functions
- \* medical/educational/social functions
- \* functions in production
- \* other functions (including domestic/management functions)

The other firm characteristics to be incorporated in the model are the size and the location of the firm. For the definition of the latter variable, the Netherlands is subdivided into urban and rural areas (see map 3.1)<sup>10</sup>.

In summary, variables reflecting job and firm characteristics are included in the analysis of the choice of the job applicant made by the employer, because the outcome of the PLMP may be different among jobs and firms. These differences may occur as a result of differences in<sup>11</sup>:

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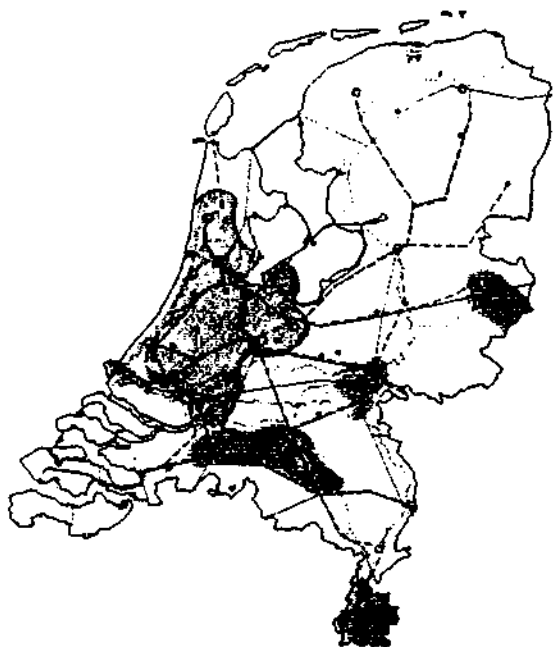
<sup>9</sup> We will refer to these variables as control variables because they are not directly related to the hypotheses of section 1.

<sup>10</sup> Source: "Fourth Memorandum of Physical Planning", Ministry of Housing and Planning, (1988).

<sup>11</sup> See also section 2.

- i) the degree of competition among applicants. Both the absolute number of applicants and the relative number of each category (employed, unemployed or leaving school) are important here (see for a discussion of the effect of competition among applicants for job openings also Rogerson, 1987).
- ii) the average suitability of the different categories to fulfil a particular job in a certain firm.
- iii) the willingness to work of the different categories.
- iv) discriminatory selection behaviour of the employer.
- v) unobserved characteristics of the vacant job (such as, for example, the working conditions).

Unfortunately, it is - as mentioned before - impossible with our data set to measure the effects of competition, suitability, willingness to work and discrimination on the PLMP separately, because we do not have information on these items. Therefore variables related to the type of job or firm will only represent the aggregate of those effects for a certain job or firm, respectively.



Legend:

■ = urban areas

□ = rural areas

Map 3.1 Urban and Rural Areas of the Netherlands

Some summary indicators of the available data are given in Appendix A.

In the next section, the estimation results of the logit analysis will be presented for model variant A (sectoral classification) and model variant B (occupational classification). The postulated hypotheses will then be tested and the relative order of magnitude of

the impact of each variable on the probability that an unemployed individual is chosen (in stead of an employed individual or a person leaving school) to fulfil a vacant job will be estimated.

#### 4. RESULTS OF THE LOGIT MODEL.

##### 4.1 Introduction.

In this section, we will first provide the estimation results of the logit model specified in (11) and next evaluate the importance of the various explanatory variables.

The aim of this analysis is to estimate the discrete regression model which is able to explain the outcome of the allocation process with respect to the previous labour market position of the accepted applicant (PLMP) as a result of the choice made by the employer who has a vacant job to fulfil. This is done by estimating a "reduced form" model (see (11)) in which the outcome of the PLMP is dependent on required characteristics (for the applicant) imposed by the employer and the recruitment behaviour of the employer, while controlling for differences in job type and characteristics of the employers' firm. Thus, the probability that an individual with a certain labour market position will get the job is specified and estimated by means of the logit model.

The dependent variable is basically split into two categories, namely the employed and the unemployed individuals. The data used in the analysis offers the possibility to distinguish a third category: people entering the labour force by getting a job. This category consists of people who just have left school or the military service. We then arrive at the following trichotomic classification of the dependent variable PLMP:

- state 1: the vacant job is fulfilled by an employed person
- state 2: the vacant job is fulfilled by an unemployed person
- state 3: the vacant job is fulfilled by a person leaving school

With this choice of the dependent variable, it is possible to compare (pair-wise) the probabilities of getting a job between

- (i) unemployed and employed people:
- (ii) unemployed and people leaving school
- (iii) employed people and people leaving school.

For the aim of testing hypotheses I and II (formulated in section 1) it is sufficient to look at (i) and (ii).

The estimates of the logit model enable us to analyze the different effects of the explanatory variables on the outcome of the PLMP. Next, we will present the separate effects of each explanatory variable on the probability of appointing a certain type of candidate<sup>12</sup>.

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<sup>12</sup> The separate effects of the explanatory variables on the probability of a certain outcome of the PAC are much easier to interpret than the logit estimates themselves due to the discrete nature of the dependent variable.



#### 4.2. The logit estimates

The direct estimates and the transformed separate effects on the probability of a certain outcome of the PLMP in the triple state logit model are presented in Table 4.2.1 and Table 4.2.2 respectively. We will interpret the results here in the context of the hypotheses stated in section 1.

The results of the logit estimates for the unemployed relative to the employed people (see part (i) of Table 4.2.1) are in line with our prior expectations. The largest negative effects on choosing an unemployed in stead of an employed individual to fulfil a vacancy stem from the requirements of work experience and a higher educational level. These highly significant effects imply that hypothesis I cannot be rejected. Interestingly, the requirement of a certain age does not have a significant effect on the probability of the unemployed to get a job. Apparently, unemployed people do not have more difficulties to meet the age requirements than employed people<sup>13</sup>.

The differences in search behaviour of the employer through the use of different information channels does have an effect on the (re)-employment probability of the unemployed, but the size of the coefficients is substantially lower (about two to three times) than the effects of the required skills. Nevertheless, the use of external relations has the expected (significant) negative effect, while inversely, the use of the channel including the help of private employment offices (search channel others) has a positive effect of the same size. The use of the labour exchange office does hardly increase the chances for the unemployed of getting a job. This is a rather disappointing result for the regional labour exchange offices. On the basis of this research one may question the effectiveness of regional labour exchange offices as an intermediary on the labour market. In conclusion, the choice of the search channel does influence the (re)-employment probability of the unemployed and hence - although less firmly than hypothesis I - hypothesis II is not rejected either.

Other remarkable results of the logit estimates of part (i) appear at the control variables, especially in the "type of job" indicators. The probability of appointing an unemployed individual is clearly lower in case of a full-time permanent job. This might be caused by the relative large group of (male) employed workers who are expected to apply for full-time permanent jobs and hence reduce the chances for the unemployed.

It also becomes clear that the vacant jobs in the urban areas (large cities) are relatively more fulfilled by employed than by unemployed people. This might be the result of differences in the size and composition of the stock of unemployed people in urban and rural areas (see Kruyt, 1987). In particular, it is possible that in the large cities with their high levels of (long-term) unemployment, the probability of the unemployed to get a job is lower because of inter alia differences in the degree of competition, social environment and work attitude. Furthermore, one may conjecture that the mobility of employed people is higher in the urban areas, leading to a higher probability that an employed person will be offered the vacant job.

Finally, the differences among sectors/occupational groups are not negligible either. To start with the former, we observe a

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<sup>13</sup> It is noteworthy that this result does not mean that age is not a relevant explanatory variable for the difference in the length of unemployment duration (cf. Gorter et al., 1989).

significant negative effect of the quaternary sector on allocating an unemployed individual, which is probably due to a lack of job opportunities for unemployed people in this sector. Unemployed people have the highest probability to get a job in the construction sector (the reference group) inter alia due to the existence of re-hiring of previous employed people who are laid off temporarily and the presence of more vacancies with unpleasant working conditions for which employed people do usually not want to apply.

Compared with the reference occupational group of "production" the probability of the unemployed to get a job is much smaller in all other occupational groups. This may be caused by the relatively low qualifications of unemployed which makes that many non-production jobs are not accessible to them.

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(i) parameters: unemployed relative to the employed

variable	variant A		variant B	
	coeff.	t-value	coeff.	t-value
Constant	3.69	7.11*	3.42	6.77*
Search channels				
* advertisement	-0.12	-0.53	-0.18	-0.84
* external relations	-0.57	-2.19*	-0.51	-1.98*
* labour exchange	0.14	0.59	0.23	0.98
* internal	-0.25	-1.07	-0.24	-1.02
* others	0.50	2.20*	0.47	2.16*
Age requirements	-0.03	-0.14	-0.05	-0.29
Min. required educ.				
* lower vocational	-0.14	-0.46	-0.15	-0.47
* secondary general	-0.62	-1.82	-0.33	-0.84
* medium vocational	-1.00	-2.57*	-0.83	-2.01*
* high general	-1.12	-2.60*	-1.07	-2.37*
Spec. educ. required	0.07	0.30	0.05	0.23
Experience required				
* specific	-1.34	-6.35*	-1.30	-6.19*
* non-specific	-1.30	-4.50*	-1.29	-4.44*
Sector				
* industrial	-0.41	-1.53	-	-
* services	-0.40	-1.54	-	-
* quaternary	-0.98	-3.19*	-	-
Occupation				
* administrative	-	-	-0.92	-2.65*
* sales	-	-	-0.56	-1.50
* technical	-	-	-0.47	-1.69
* medical/educ/soc	-	-	-0.79	-1.74
* others	-	-	-0.52	-1.65
Size of the firm				
* medium	-0.14	-0.64	-0.14	-0.65
* large	-0.39	-1.61	-0.41	-1.70
Location of the firm				
* urban	-0.52	-2.83*	-0.41	-2.23*
Full time job	-1.07	-3.86*	-0.88	-3.31*
Permanent job	-0.99	-4.13*	-0.99	-4.13*

(ii) parameters: unemployed relative to the people leaving school.

variable	variant A		variant B	
	coeff.	t-value	coeff.	t-value
Constant	3.20	2.98*	3.18	3.24*
Search channels				
* advertisement	-0.04	-0.11	-0.06	-0.16
* external relations	-0.48	-1.06	-0.47	-1.04
* labour exchange	1.06	2.33*	1.13	2.46*
* internal	-0.43	-1.06	-0.39	-0.97
* others	-0.57	-1.47	-0.67	-1.70
Age requirements	-0.60	-1.68	-0.66	-1.81
Min. required educ.				
* lower vocational	-0.94	-1.16	-0.99	-1.20
* secondary general	-0.86	-1.03	-0.62	-0.70
* medium vocational	-1.37	-1.52	-1.29	-1.37
* high general	-1.74	-1.86	-1.69	-1.73
Spec. educ. required	-0.94	-2.10*	-0.95	-2.12*
Experience required				
* specific	1.19	3.15*	1.18	3.12*
* non-specific	0.64	1.07	0.63	1.07
Sector				
* industrial	-0.53	-0.96	-	-
* services	-0.45	-0.84	-	-
* quarternary	-0.01	-0.01	-	-
Occupation				
* administrative	-	-	-0.52	-0.84
* sales	-	-	-0.55	-0.84
* technical	-	-	0.08	0.13
* medical/educ/soc	-	-	0.29	0.36
* others	-	-	-0.31	-0.53
Size of the firm				
* medium	-0.01	-0.02	-0.02	-0.04
* large	-0.54	-1.27	-0.57	-1.31
Location of the firm				
* urban	0.17	0.52	0.22	0.66
Full time job	0.95	2.18*	0.80	2.04*
Permanent job	-0.48	-1.15	-0.44	-1.03

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loglikelihood of the logit model.

Baseline model	-664.17	-664.17
Estimated model	-541.19	-543.24
min 2*6 Loglikelihood	245.96	241.84
Chi-squared	67.5 (42 df)	67.5 (42 df)

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Table 4.2.1 Logit estimates of the allocation model with the previous labour market position of the accepted applicant until the moment of acceptance as the dependent variable.

\*) : coefficient significant at a 5% level.

Legend:

Reference groups of the independent variables are given between brackets: size of the firm (small), location of the firm (rural), minimum required education (primary), required experience (no experience), sector of the firm (construction) and occupational group of the job (production).

\*\*\*\*\*

As pointed out above, due to the lack of specific information, it is difficult to prove whether the effects of the control variables occur because of differences in competition (e.g. tightness of the labour market segment), differences in suitability or willingness to work of the type of applicant or differences in employers' preferences (discrimination)<sup>14</sup>.

Next, we will discuss the estimation results for the unemployed relative to the people leaving school, as presented in part (ii) of Table 4.2.1. Favourable significant effects for the unemployed to get a job can be found for the variables of required specific experience, full time jobs and the use of the labour exchange office. On the other hand, we observe unfavourable effects on the acceptance of an unemployed individual in case of a higher educational level or when a specific kind of education is required by the employer. In addition, age restrictions do also have a negative effect on the acceptance of an unemployed individual. The directions of the effects are in some cases opposite to the ones found in the comparison of unemployed with employed people. This is not surprising because the competition between unemployed and employed people is different from the competition between unemployed people and people leaving school. The best example is found in the effect of the required specific work experience: compared to employed people the unemployed people are - on average - in a worse position, whereas they are - on average - in a better competitive position relative to people leaving school.

An important explanatory search variable is the use of the labour exchange office, which has a significant favourable effect on the chances for the unemployed. The use of the other search channels does not have a major impact on the choice between unemployed people or people leaving school.

It can be seen that the unemployed have a higher probability to get a full-time job than people leaving school. This might be due to differences in the willingness to work in part-time (in stead of full-time) jobs between unemployed people and (young) people leaving school.

In conclusion, required skills regarding specific experience and education play an important role in the allocation process (however, with opposite signs), giving additional support to hypothesis I. The choice of the way information is spread is - with the exception of the use of the labour exchange office - much less important and this provides only a weak support to hypothesis II.

The separate effects of the explanatory variables on the estimated probability of getting a job for each category of the PLMP will be presented in Table 4.2.2. The effect of each dummy variable on the probability of choosing a certain type of worker (E,U or S) is calculated as follows. The relevant dummy variable is set equal to 1 (or 0 in case of the reference group), whilst for the other variables their sample mean is taken. Next, we evaluate the probability of choosing each kind of category for these values on the basis of the logit estimates of the allocation model (see Table 4.2.2).

The outcomes are much easier to interpret than the direct estimates of the logit model, because they demonstrate the differences in the probability of getting a job by each kind of category due to the effects of the relevant dummy variables *ceteris paribus*.

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<sup>14</sup> There might also be an effect of unobserved characteristics of the vacant job, such as for example the working conditions of the job.

\*\*\*\*\*

probability of

	E	U	S
calculated in the <u>sample mean</u> of the regressors <sup>13</sup>	62%	34%	4%
effect of:			
<u>search channel</u>			
advertisement	64%	32%	4%
external relations	73%	23%	4%
labour exchange	60%	39%	1%
internal	66%	29%	5%
others	47%	44%	9%
<u>age requirements</u>			
yes	62%	33%	5%
no	62%	35%	3%
<u>minimum required education</u>			
primary	49%	49%	2%
low vocational	53%	44%	3%
secondary general	63%	34%	3%
secondary vocational	70%	26%	4%
university	72%	23%	5%
<u>specific education required</u>			
yes	60%	33%	7%
no	64%	34%	2%
<u>work experience required</u>			
specific	72%	26%	2%
general	69%	27%	4%
no	36%	51%	13%
<u>sector of the firm</u>			
construction	51%	45%	4%
industrial	60%	35%	5%
service	60%	35%	5%
quaternary	74%	44%	2%
<u>size of the firm</u>			
small	58%	38%	4%
medium	61%	35%	4%
large	66%	29%	5%
<u>location of the firm</u>			
rural	54%	41%	5%
urban	67%	30%	3%
<u>type of job</u>			
full-time	66%	31%	3%
part-time	37%	50%	13%
permanent	65%	31%	4%
temporary	43%	53%	4%

**Table 4.2.2** The effects of the explanatory variables on the probability of getting a job for each category.

Legend:

E = employed individual

U = unemployed individual

S = individual leaving school

\*\*\*\*\*

<sup>13</sup> These frequencies are not exactly equal to the sample frequencies of the different categories because of the non-linearity of the logit model.

In this way, we can observe that the requirement of work experience (in stead of imposing no work experience) reduces the probability of getting a job by an unemployed person by 25% (from 51% to 26%) and increases the probability for the employed people with 36% (from 36% to 72%)! Again, it becomes clear that imposing work experience has a dramatic impact on the outcome of the PLMP.

The second most striking change in probability does occur as a result of the requirement of the highest educational level in stead of the primary level (minus 26% for the unemployed and plus 23% and 3% for the employed people and people leaving school, respectively).

Although it is from our data set not entirely clear what the reasons are behind the effects of the "job- and firm" characteristics, the outcomes are remarkably large. The probability that an employed person will get the job is 29% higher for full-time jobs (compared with part-time jobs), 23% higher for permanent jobs (compared with temporary jobs) and 23% higher for jobs in the quaternary sector (compared with the construction sector).

Finally, we will look at the performance of the model with respect to the overall explanatory power of the model, the predictive power of the model, the outliers of the model and the robustness of the parameters of the model.

The Likelihood Ratio (LR) specification test indicates that the estimated models (variant A and B) are both a significant improvement of the model without explanatory variables (base-line model).

It is possible to consider the predictive power of the model by comparing the observed choices with the predictive choices of the estimated model. This is done for variant A in table 4.2.3.

\*\*\*\*\*

<u>predicted</u>	<u>observed</u>			
	employed	unemployed	school	total
employed	365	136	24	525
unemployed	72	123	22	217
school	7	4	9	20
total	444	263	55	762

Table 4.2.3 Predicted versus observed choices of the PLMP on the basis of the logit estimates of variant A.

\*\*\*\*\*

It becomes clear that in 64% of all cases a correct prediction is given by the model. With the logit estimates, we are able to predict the outcome of the allocation of an employed person fairly well (82% of the cases is correct), but the model does perform badly with respect to the choice of people leaving school (only 16% correctly predicted). This is probably caused by the relatively low number of observations in this category (about 7% of the sample).

The bad performance of the model with respect to the prediction of the choice of people leaving school is also confirmed by the finding of 10 outliers (i.e. observations with a probability of the observed choice of less than 0.05), all of them corresponding to the choice of

an individual leaving school.

Using the sectoral (variant A) or the occupational (variant B) classification does not make much difference for the overall fit of the model, so that both variants may be used to interpret the results. Most of the estimated coefficients of the variables (other than the sector/occupational group) are robust against the choice of the sectoral or occupational level. However, the estimates of the coefficients for the minimum required education are slightly different.

##### 5. Concluding remarks.

The aim of this article was to study the re-employment probabilities of the unemployed from a different perspective than the usual one in which a job-seeking individual has to decide on accepting a job offer or not. In this usual approach, the emphasis is placed on the search behaviour and the labour market characteristics of the job-seeking individual. In general, the conclusion from studies for the Netherlands in the 80's is that unemployed people with a low educational level and without labour market experience have very small chances to obtain a job.

In this article, we have tried to examine whether this conclusion is confirmed by a demand side oriented approach, based on the recruitment behaviour of the employer. In particular, we have postulated two hypotheses about the effect of the recruitment behaviour of the employer on the probability of the unemployed to get a job. The first hypothesis complies with the finding of the supply-side oriented studies:

- (I) The unemployed do not easily get jobs because they cannot meet the requirements (education, experience, etc) of the vacant job.
- The second hypothesis, however, contains a rather new element in the study of the re-employment probabilities of the unemployed, viz.
- (II) The unemployed do not get easily get jobs because they do not have access to (information on) vacant jobs due to the use of specific recruitment channels by the employer.

In order to test the hypotheses, we have derived a model in which the outcome of the allocation process is related to characteristics of the vacant job and the search behaviour of the employer.

We conclude from the estimation results that

- (a) job requirements for the applicants are the most important determinant of the outcome of the previous labour market position of the accepted applicant (PLMP).
- (b) the effect of the use of search channels by the employer is less significant than the job requirements, but does play a role.
- (c) the "type of job- and firm" characteristics are also of significant importance, representing the (unidentified) effects of
  - \* the degree of competition
  - \* the average suitability of the type of applicant
  - \* the possible discriminatory behaviour of the employer

Summing up, the empirical results derived from a demand side oriented approach support the findings of the supply side studies, but also show that the use of search and selection methods by the employer is a critical determinant of the re-employment probabilities of the unemployed.

Data limitations strongly influenced the statistical approach used

in this paper. With more complete data (e.g. on all applicants actually considered for a vacancy; not only the selected applicant) one may arrive at more refined results.

An interesting topic of future research would be the study of vacancy chains. If a vacancy is not fulfilled by an unemployed person, but by a person already having a job, unemployed people may still benefit from it because the fulfilment of one vacancy may imply the creation of another vacancy. This would lead to approaches similar to those on vacant dwellings in housing markets (cf. Rouwendal and Rietveld, 1988). A possible implication of a vacancy chain is that- if chains are long enough - one may help unemployed persons in getting a job by creating new jobs for which they themselves would not be qualified. Much would depend of course on the length of the chain and the existence of barriers impeding mobility on the labour market.



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## APPENDIX A.

In this appendix, the data source and an overview of the explanatory variables are presented.

### a) The data source

The data used in our analysis of employers recruitment behaviour stem from a survey of the ILBO Institute (Instituut voor Longitudinaal Beleidsonderzoek) carried out in request of the Dutch Ministry of Social Affairs and Employment (the survey was labelled "How do firms recruit"). This survey of employers' recruitment behaviour was undertaken for the first time in December 1984 and has been repeated once a year ever since.

In April/May 1986 a sample of 3198 firms was drawn. Non-response and other reasons (such as firm closures) reduced the sample to 2702 firms. The remaining sample was stratified according to (construction, industrial, service and quaternary) sector and size of the firm (small, medium, large).

From the sample in this survey, firms were selected on the basis of two criteria:

- 1 the firms should have had at least one vacancy which has been fulfilled during the past six months
- 2 the employer should have searched for applicants by using external channels only or a combination of both internal and external channels.

In this way a subsample of 763 firms - used in this paper - has been selected.

### b) Summary indicators of the data in the sample

<u>recruitment channels</u> <sup>15</sup>	<u>number of times used</u>
internal recruitment	236
external relations	126
advertising	163
labour exchange office	192
employment office + others	185
	total: 902

#### required characteristics

	<u>yes</u>	<u>no</u>
age requirements	51%	49%
educational requirements		<u>percentage</u>
* primary level		9%
* low vocational level		30%
* secondary level		20%
* extended vocational level		25%
* university/ high vocational level		16%
	<u>yes</u>	<u>no</u>
specific educational requirements	46%	54%

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<sup>15</sup> Note that the employer may use more than one recruitment channel at the time.

work experience requirements	<u>percentage</u>
* special work experience	58%
* work experience	13%
* no work experience	29%

job and firm characteristics

sector (variant A)	<u>percentage</u>
* construction	20%
* industry	23%
* services	30%
* government	27%

occupational group (variant B)	<u>percentage</u>
* administrative	25%
* technical	23%
* sales	11%
* medical/educational/social	8%
* production	19%
* other	14%

size of the firm	<u>percentage</u>
* small	28%
* medium	39%
* large	33%

location of the firm	<u>percentage</u>
* urban	63%
* rural	37%

	<u>Yes</u>	<u>No</u>
permanent job	84%	16%
full-time job	84%	16%