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Russo, G.; Gorter, C.; Schettkat, R.

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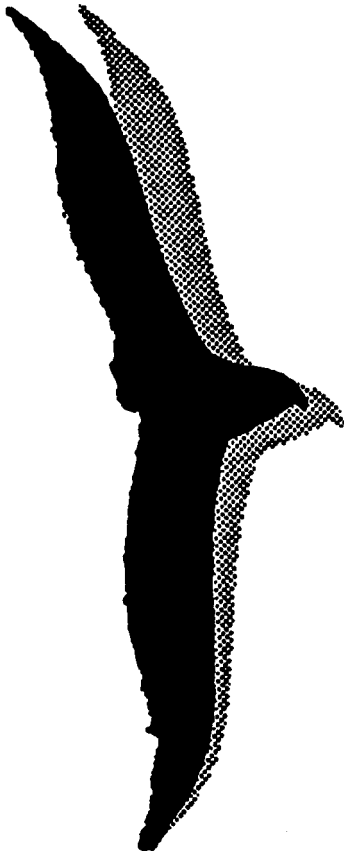
Serie research memoranda

Searching, Ranking and Hiring

Giovanni Russo
Cees Corter
Ronald Schettkat

Research Memorandum 1997-17

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Searching, Ranking and Hiring

Giovanni Russo*/ Cees Gorter*/ Ronald Schettkat**

* Free University of Amsterdam and Tinbergen Institute
Department of Regional Economics
De Boelelaan 1105
1081 HV Amsterdam
Tel + 3 1-20-4446093
Fax + 3 1-20-4446004

** University of Utrecht
Department of Socio and Institutional Economics
Heidelberglaan 1
Postbus 80140
3508 TC Utrecht
The Netherlands
Tel +31-30-2531959
Fax +31-30-2531619
Email R.Schettkat@fsw.ruu.nl

Abstract

This paper analyses employers' recruitment strategies (in terms of search channel used, and applicants' characteristics) in response to different conditions on the relevant regional labour market. In particular we were able to formulate two hypotheses on the nature of the adjustments:

- (1) The use of the labour exchange office and the hiring of unemployed candidates are events more likely to happen in a slack regional labour market. The use of advertisement and the hiring of already employed job seekers are more likely to occur in presence of excess demand on the relevant regional labour market;
- (2) The process leading to the choice of the recruitment channel and the outcome of the recruitment process in terms of the characteristics of the hired applicants are correlated.

The recruitment behaviour we find in our data is consistent with a theoretical ranking model (Blanchard and Diamond 1994) but it is less likely to be induced by endogenous creation of good jobs during periods of excess demand as modelled in Pissarides (1994). In fact the composition of the educational requirements among the vacant jobs appears to be rather constant. This supports the view that shifts in recruitment strategies are driven by changes in expected recruitment costs and variations (both in size and composition) of the pool of available applicants.

1. Introduction

A common result of studies on gross job creation and destruction (Leonard 1987, Davis and Haltiwanger 1992, Cramer and Koller 1988) is that both take place simultaneously at any time of the business cycle, i.e., in shrinking as well as in expanding industries. Job search and hiring are therefore continuous activities in dynamic economies (Holt and David 1966). However, search and hiring intensity vary over the business cycle and furthermore, activities on the one side of the market have external effects on the costs of the other market side (thin and thick markets effects, Diamond 1982). Along this line Christopher Pissarides (1994) has published a model with on-the-job search and two categories of jobs, good and bad, in a recent issue of *The Review of Economic Studies*. In his model on-the-job search reduces employers' search and hiring costs for good jobs and this makes more good jobs profitable if more employed workers search (thick market). This model is consistent with observed procyclical on-the-job search and quits and it predicts a higher share of already employed workers being hired during booms when a high proportion of good jobs is being created. In a recession, on the other hand, hiring from unemployment would be more important because of a higher proportion of bad jobs being created. Thus in the Pissarides framework hiring from different pools is driven by the creation of different types of jobs, good and bad.

In the same issue of *The Review of Economic Studies* Olivier Blanchard and Peter Diamond (1994) developed a model of employers' hiring decisions depending on the duration of unemployment in case of multiple applications. In their model the short-term unemployed are preferred over the long-term unemployed (ranking) and in slack labour markets the chance of getting a job declines rapidly with unemployment duration. Extending the Blanchard and Diamond model to hiring from the ranks of the employed one expects the employed to be ranked over the short-term unemployed in "normal" times when becoming unemployed is more likely to be caused by personal characteristics, that is by a negative selection of former employers. If the economy moves into a recession general economic conditions may be more important than personal characteristics in determining who is becoming unemployed. In this case the newly unemployed may be ranked equally to the employed. Furthermore, if ranking by unemployment duration is taking place the newly unemployed have a strong incentive to search intensively in order to avoid long-term unemployment and a depreciation in their future wages (Schettkat 1995).

In case of ranking we expect hiring to shift from unemployment to employment if the economy moves out of a recession even if the quality of vacant jobs does not change over the business cycle. Both the Pissarides model as well as the extended ranking model of Blanchard and Diamond are consistent with observed gross worker flows in the Dutch labour market as illustrated in Figure 1. The outflow from unemployment becomes more important during the recession in the eighties, but it becomes much less important during the recovery at the end of the eighties / beginning of the nineties. On the other hand, the importance of job-to-job transitions is less evident during the recession in the eighties, but they become much more important during the economic expansion at the beginning of the nineties.

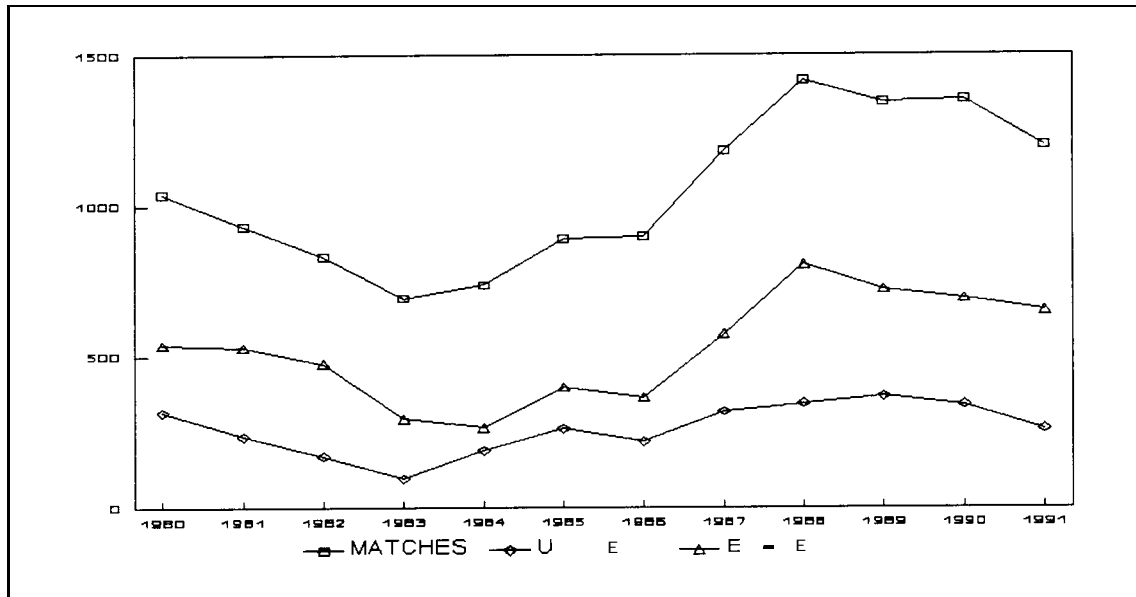


Figure 1: Total engagements (matches), outflow from unemployment to employment ($U-E$), and job-to-job transitions ($E-E$).

In general employers can activate different search channels to reach certain groups of job seekers. Labour exchange offices, for example, best reach unemployed workers, whereas advertisements appears to best reach employed workers. In this paper we aim to illuminate the firms' recruitment strategy given a varying search intensity and a different composition of job seekers over the business cycle. We first develop a simple economic model of employers recruitment behaviour. We then make use of a unique data set on filled vacancies to investigate the relationship empirically. In particular we control for skill requirements of vacancies when analyzing the firms' choice of the recruitment channel. We are able to distinguish between the relative importance of a higher proportion of good jobs being created in tight labour markets a shift of the recruitment channel and corresponding hiring pool, respectively. We investigate whether employers vary their hiring strategy in response to changes in the macro economic conditions. Even if the Pissarides argument is correct that in booms more good jobs are created, we can still study whether for a given skill level of vacancies employers respond to changing labor market conditions and varying hiring costs.

The structure of the paper is the following: section 2 contains the economic search model, while Section 3 presents the functioning of the model. Section 4 contains the description of the data set, and Section 5 introduces the statistical model. Section 6 presents the results of the empirical estimation while Section 7 finally concludes.

2. An Economic Model of Recruitment

The recruitment process is framed in terms of a search model in which the firm decides on the reservation level of productivity and on the recruitment channels to activate taking into account the behaviour of its counterpart and the conditions on the labour market. The benefits employers derive from a match, denoted by π , is defined as the net productivity attached to the vacant position that is the discounted expected productivity minus the wage and hiring costs. Searchers are assumed to maximize the

sum of current and expected future utility when faced with uncertain market conditions. The expected future benefits is a weighted average of the utility derived from continuing search and of the utility derived from hiring an applicant. The weights are the occurrence probabilities of each of these two events. On having a vacant positions employers enter the labour market seeking for suitable applicants. Applications to form an employment relationship arrive at the rate δ_m ($d \delta_m/ds > 0$; $d^2 \delta_m/ds^2 < 0$) depending on the search strategy (m) adopted. The firm chooses the optimal recruitment strategy (subscript g) from the set of all possible search strategies (M). The search strategy consists of the choice of the number (and composition) of search channels to be activated, while it is assumed that every firm has at its disposal the same number of search channels. In this case, M - the set of all possible search strategies - is a finite set composed of the combination of the number of recruitment channels. So, for the optimal strategy (g) we have:

$$U_g = \max_{m \in M} U_m \quad (1)$$

where U_m is the expected net benefit from the adoption of strategy m. Let $V_m(\pi)$ denote the expected discounted lifetime benefit flow in an employment relationship characterized by net productivity flow π ($V_m = \pi/r$) and discount rate r. The net benefit of strategy m, satisfies the following equation:

$$rU_m = -\sum_{j \in m} c_j s_j + \delta_m(s_1 \dots s_j) \int_{-\infty}^{+\infty} \max[V_m(\pi) - U_m, 0] dF_m(\pi) \quad (2)$$

where c represents the channel-specific variable costs, s_j represents the search intensity via the search channel j ($j \in m$, with non-negative values) and F_m is the productivity distribution in the population reached by the search strategy m. The firm can compute the utility derived from each of the search strategies and will adopt the strategy that yields the highest returns (g). If we assume a stationary environment, the following first-order conditions determine the value of the reservation productivity (η_m) and the search channels' use:

$$V_g(\eta) = U_g = \frac{\eta_g}{r} \quad (3)$$

$$c_j = \frac{\partial \delta_g}{\partial s_j} \int_{\eta_g}^{\infty} [V_g(\pi) - V_g(\eta_g)] dF_g(\pi) \quad \forall j \in g$$

Hence, each search channel is utilized up to the level where the expected marginal costs equal the expected marginal benefits.^{1 2}

¹ In the present paper we mainly focus on the choice of the search strategy. Notice that in case two search channels are activated, it can very well be the case that one of the search methods is operative while the second one is kept latent for a certain period; thereafter both search channels are operative. For further research on the timing in the openings of search channels we refer to Gorter and Van Ommereen (1994), where the process has been investigated by means of multivariate duration analysis.

Different search strategies reach different segments of the working population and consequently different shares of job seekers. Let us denote by γ_g the share of all potential job seekers reached by search strategy g . Not every contact will result in a reaction (or application), it depends on the job seekers' reservation wage (wage offer distribution). So the applicants arrival rate for the firm reads as follows:

$$\delta_g = \gamma_g [1 - F_{js}^h(\xi)] \quad (4)$$

where g is the optimal search strategy for employers and h is the optimal search strategy for job seekers (subscript js) and ξ is the reservation wage. Inserting equation (4) in equation (2) and by using the first order conditions we obtain

$$\eta_g + k_g = \gamma_g [1 - F_h(\xi_h)] \int_{\eta_g} [\pi - \eta_g] dF_g(\pi) \quad \text{where } k_g = \sum_{j \in g} c_j s_j \quad (5)$$

Equation (5) describes the employers reaction function. Employers when choosing their search strategy take into account the behaviour of job seekers³. In particular, the choice of the number of search channels and of the reservation productivity determines the probability that an applicant is hired for the position concerned (the hazard rate) as follows: $\theta_g = \delta_g [1 - F_g(\eta_g)]$. In other words, the search method affects the offer intensity, while the reservation productivity determines the probability of the applicant being acceptable. Clearly, both the rate of arrival of applicants and the acceptance probability depend on the recruitment channel/s chosen (see Russo et al. 1995a) and also on the conditions of the labour market.

Certain search channels reach specific candidates better than others, in particular, unemployed job seekers are more likely to be found via the labour exchange office (leo), while already employed job seekers are basically to be reached by placing advertisements (adv) (see e.g., Gorter et al. 1993, Van Ours 1994, Lindeboom et al. 1994). There is a trade-off intrinsic in the choice between these two search channels, the leo is less expensive ($c_{leo} < c_{adv}$), while adv generally guarantees a higher contact rate ($\gamma_{adv} > \gamma_{leo}$). Firms appear to use basically only one search channel (84% of the employers in our sample on job vacancies used only 1 search channel). Therefore, we will concentrate on the relationship between the choice of the recruitment channel (adv vs. leo) and the choice in terms of applicants' characteristics (unemployed vs. employed).

² Let us define d_j a dummy variable signalling whether a given recruitment channel has been included in the optimal strategy g as follows:

$$d_j = \begin{cases} 0 & \text{if } j \notin g \\ 1 & \text{if } j \in g \end{cases}$$

in other words, employers choose the number and composition of the search channels activated (i.e., the optimal recruitment strategy).

³ This model is rather simple and is not meant as a complete explanation of the behaviour of seekers in the labour market. This model can be extended to incorporate endogenous quit into unemployment and non stationarity (Burdett and Wright 1994); in order to incorporate job to job transitions one should include on the job search and moving costs, while to incorporate transition in and out the labour force non wage utility offers should be added.

To summarize, if different conditions on the labour market affect agents perception of expected costs and benefits associated with the recruitment activity, then it may be expected that also the choice of the recruitment strategy (composition of the set of dummies d) will vary with the economic conditions on the relevant labour market, thus reflecting the change in importance of certain key aspects of recruitment.

3. Labour Market Conditions and Firms' Recruitment Strategies

In this section we discuss the impact of different labour market conditions on the recruitment strategy and on the hiring decision. We can identify three critical factors when comparing a period of economic recession with a period of economic expansion (for the same type of vacancy):

1) Demand side effect (quality effect).

Unemployed job seekers have (when controlled for skills) a lower reservation wage than already employed job seekers. The **only** reason why employers are hesitant to hire unemployed workers is that they expect their productivity to be lower than the productivity of employed workers⁴. That is, in terms of our model, the expected productivity distribution of an unemployed worker is located to the left of the productivity distribution of an employed workers ($E_F^u(\pi) < E_F^e(\pi)$) and the differential in expected productivity is greater than the wage differential. This is sometimes labelled as signalling (Spence 1973) or as the stigma effect of unemployment.

The stigma effect gets stronger with the duration of unemployment (due to ranking, see Blanchard and Diamond 1994). The expected productivity differential between unemployed and employed applicants tends to decline when the economy moves into a recession because newly unemployed workers are regarded to be hit by general economic conditions rather than by negative selection of their former employer. If we couple the presence of the stigma effect with the difference in wages, it is more attractive for employers to recruit from among the unemployed in recessions. We therefore expect to observe an increase in the use of the search channel that is best suited to reach the unemployed during recessions.

2) Supply Side Effect (quality/composition effect).

On-the-job search is driven by two factors (Schettkat 1995): (i) an increase in the utility of search for employed workers (better wages or better working conditions), (ii) an increase in the security of their job. During recessions jobs that offer higher wages are hard to find, not least because the unemployed (see 1) are competing with employed job seekers.

In addition, if changing the job turns out to be a mistake there are less opportunities to adjust, that is, to change job one more time. Consequently, during recessions, the pool of job seekers tend to be composed mainly by unemployed workers. On the contrary, during expansions the pool of job seekers would tend to include relatively more employed workers.

⁴ Note that it is sufficient that employers expect these two groups to have different productivity.

3) Supply Side (quantity effect).

During a recession unemployed agents tend to increase their search effort to escape unemployment as soon as possible to prevent the stigma effect related to long-term unemployment. At the same time, the pool of unemployed job seekers tends to be larger. Moreover, alternatives available to job seekers are scarcer and this will lower their reservation level of utility. On the whole, this will lead to a higher number of reactions (via all recruitment channels) during times of a recession.

These three effects together with search channel specific characteristics (costs, contact rate, and target groups) will determine the choice of the optimal search strategy of employers. That is we expect firms to face asymmetries in hiring costs over the business cycle (see also Schettkat 1995). In particular, during recessions we might observe the following: (i) cheaper recruitment strategies; (ii) less search effort of firms; (iii) higher search effort of (unemployed) workers, (iv) lower reservation wages and wage offers (“cheaper” candidates). In contrast, during economic expansions, the hiring costs structure might be characterized by the following: (i) more expensive recruitment strategies; (ii) more search effort of firms (competition for applicants); (iii) less search effort of workers, (iv) higher reservation wages and wage offers (“expensive” candidates).

In terms of the structural parameters of the search model the effects mentioned can be summarized as shown in Table 1. In this framework both the expected costs and the expected benefits from the search activity vary with the condition of the **labour** market. Expected costs vary in relation to the level of effort put into the search activity, and the expected benefits vary with the productivity distribution among the population. In other words, the main reasons why employers would use different channels with different conditions of the **labour** market are threefold: (i) when the expected productivity gap between unemployed job seekers and already employed job seekers narrows while unemployed job seekers tend to have a lower reservation wage, it is worth to hire from unemployment (i.e., the expected net benefit shifts in favour of the unemployed); (ii) the composition of the pool of potential applicants changes, during recessions it consists mainly of unemployed workers because employed workers do not search (quits are procyclical), while during expansions it is more diversified thus, in the latter case, it may be worth to adopt a search channel with a larger spectrum; (iii) the number of vacancies increases and employers usually compete for scarce applicants. On the other hand, during a recession the number of reactions per vacancy increases because job seekers tend to search harder to escape from unemployment, and employers may devote less effort to the search activity.

Table 1: The impact of different labour market conditions on the parameters of the search model (for the same type of vacancy) when comparing adv and leo.

	Slack Labour Market (Low wage offers)	Tight Labour Market (high wage offers)
general differences (#3: quantity effect)		
perceived wage offer distribution (reservation wage ξ)	shifts to the left	shifts to the right +
rate of arrival δ	+	
search channel-specific differences		
Productivity distribution F in the pool of applicants (#1: quality effect)	$F^{leo} = F^{adv}$ $E(\pi^{leo}) = E(\pi^{adv})$	F^{leo} shifts to the left $F^{leo} < F^{adv}$ $E(\pi^{leo}) < E(\pi^{adv})$
composition of the pool of candidates (#2: composition effect)	unemployed	employed
overall expected results		
reservation productivity η	leo + ; adv -	Leo - ; adv +
expected previous labour market position of the hired candidate	unemployed	employed

The implications listed above lead to the following two hypotheses:

- (1) During recessions employers recruitment activities shift to the use of leo because the unemployed are considered to be more attractive (relative to employed workers; the extended Blanchard and Diamond model) and the size of the pool of applicants increases. During expansions, on the other hand, employers shift to any of the remaining search channels (and in particular adv) together with the hiring of an already employed candidate. These shifts appear even if the quality of jobs (vacancies) is controlled for (i.e., the Pissarides effect of better jobs during expansions).
- (2) The choice of the search channel and the expected outcome of the recruitment process in terms of the characteristics of the hired applicants are correlated.

4. Data and Method

The data set used for the empirical application, is derived from a survey on the recruitment behaviour of Dutch firms “How do firms recruit?”. The questionnaire for this survey is sent to a random sample of Dutch firms every second months of the year, that is each year contains 6 waves. We will use data for the years ranging from 1991 to 1994, a period which represents two years of tight labour market (1991 and 1992) and two years of slack labour market (1993 and 1994).

At the aggregate level, we clearly observe the different labour market conditions in these four years (see Figure 2 and Figure 3). From these overall pictures, it also emerges that the share of vacancies filled at the labour exchange office in general, and the share of vacancies filled by non-employed job seekers in particular, is

remarkably larger in 1993 and 1994 than in 1991 and 1992.

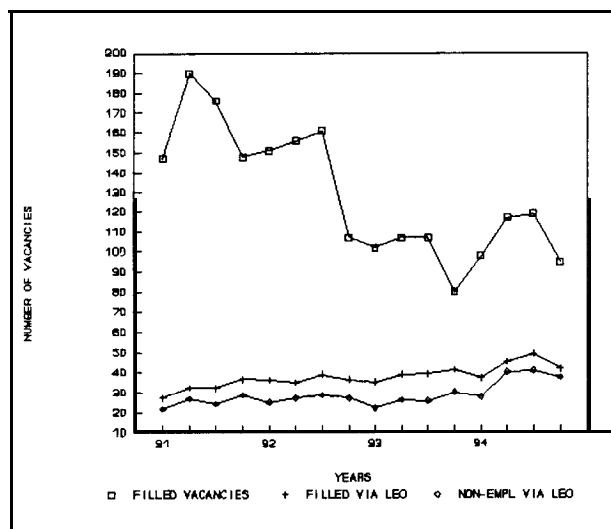


Figure 2: The relationship between the total number of matches, the role of the leo and the share of vacancies won by non-employed job seekers (Source: CBS, and Central Employment Agency).

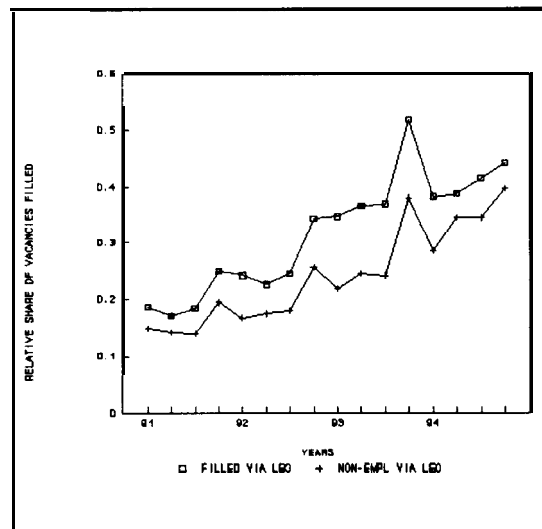


Figure 3: The share of vacancies filled at the leo and the relative share won by non-employed job seekers (Source: Central Employment Agency).

In the survey firms are asked inter alia whether they filled any vacancy in the past two months. For each observation in the data set, we have background information on both firm and vacancy characteristics, and the region where the firm is located. Besides, the survey provides information on elements of the recruitment process such as the duration of the recruitment process, the number of (identical) vacancies posted, the number of applications received, and the number of search channels used. Moreover, the survey records the recruitment channels used and the first recruitment channel activated. We classified the recruitment channels into five categories: **Informal** that includes employee referrals, friends and relatives, self-initiated applications; **Advertisements** (or adv) in newspapers; **Temporary Placement Offices** (or tpo); **Labour Exchange Offices** (or leo); and the residual category **Others** that includes, among others, the use of school recruitment and private employment agencies (head hunters).

The previous labour market position of hired applicants (denoted as plmp) is classified into three groups of job seekers: **Unemployed** (u), **Already Employed** (e), and **School Leavers** (sl). So far for the characteristics at the micro (firm) level.

Next, we need to capture the impact of the general conditions on the labour market over time. To this end we use two aggregate economic indicators (one for the demand side, and one for the supply side) at the meso level⁵. We opted for two indicators instead of the usual U/V ratio, because recently Gorter and Van Ours (1996) found that the demand side tends to be the driving force in the labour market⁶.

⁵ The twelve administrative provinces in the Netherlands. Including the regional variation is also essential because of the time span covered by the data is limited (only 4 years).

⁶ A complete analysis of the efficiency of Dutch regional labour markets at an aggregate level can be found in Gorter (1991), Goner and Van Ours (1994), and Gorter et al. (1995).

Consequently, in order to disentangle the effects due to labour demand from those due to labour supply we considered the two sides of the labour market separately. The condition of the labour demand is captured by the yearly stock of vacancies in the province divided by the total employment in the province; this variable should provide a rough measure of the degree of competition for applicants among employers with vacancies. As far as the supply side is concerned, a natural measure of the availability of job seekers is given by the percentage of registered unemployed at the provincial level. This variable should be able to roughly gauge the degree of competition for vacancies among job seekers.

The data set is treated as a pool of cross-sections, and to account for that, we introduced both yearly and seasonal dummies. If the survey refers to the period January-February the first seasonal dummy takes on the value 1 ($w_1 = 1$); and zero otherwise. The remaining waves are: March-April ($w_2 = 1$), May-June ($w_3 = 1$), July-August ($w_4 = 1$), September-October ($w_5 = 1$), November-December ($w_6 = 1$).

To control for a possible stock composition effect (that is, good jobs are created during expansions while bad jobs are created during recessions; as in Pissarides 1994), we controlled the distribution of educational requirements in our sample (educational requirements are used as proxy for the quality of the job).⁷ Surprisingly, the distribution of the educational requirements over the observed time period is rather stable; with 23% of the vacancies requiring high (university and higher vocational) education, 7 % requiring secondary (general) education, 31% requiring secondary (vocational) education, 30% requiring primary (vocational) education and finally 9% requiring primary (general) education.

The aim is to investigate the relationship between the choice of the recruitment strategy and the employers' options in term of applicants' characteristics, therefore we considered firms having only one vacancy and using only one recruitment channel. After deleting missing cases, 9900 complete observations were kept. Descriptive statistics for some of the key variables are given in Table 2. On the aggregate, both the average number of reactions and the average number of unemployed job seekers appear to increase as the general economic conditions worsen (the average number of employed job seekers hired decrease). This can be seen as an early support for our conjecture. More information on the data is given in Appendix 1.

In the next Section the econometric models used in the empirical analysis of the data set described so far will be introduced.

5. The Econometric Model and Preliminary Analysis

In this section we will model the relationship between the choice of the recruitment channel and the expected outcome of the recruitment process. If we assume perfect foresight on the part of employers the expected outcome of the recruitment process can be approximated by the actual hiring decision (motives can be also discovered from actual behaviour, Beweley 1995). Consistently with the model presented in

⁷ It may be, however, that educational requirements for a specific job vary with different conditions on the local labour market.

Section 2, employers choose the optimal search strategy ⁸ anticipating the behaviour of job seekers.

Table 2: Descriptive statistics, the data set refers to those firms with one vacancy that used one recruitment channel only.

Recruitment Channel	frequency	%	average duration (in day-s)	average # applicants	employed	hired applicant unemployed	school leaver
Informal	3713	37.5	29.54	3.53	0.61	0.23	0.16
Advertisement	2953	29.8	43.76	28.79	0.70	0.17	0.12
TPO	896	9.0	26.20	4.43	0.60	0.28	0.11
LEO	1144	11.6	30.20	6.32	0.30	0.49	0.21
Others	1194	12.1	43.84	6.61	0.47	0.20	0.32
Total	9900	100.0					
			individual	years			
		1991	1992	1993	1994		
average vacancy duration (days)	38.87		36.45	33.67	32.65		
average (%) unemployment	5.33		5.34	6.70	7.72		
average rate vacancy/employment	0.15		0.09	0.05	0.06		
average # applicants	8.85		11.09	13.21	13.52		
hired applicant							
employed	0.66		0.63	0.55	0.51		
unemployed	0.18		0.21	0.28	0.30		
school leavers	0.16		0.16	0.17	0.19		
educational requirements							
university	0.20		0.21	0.24	0.27		
secondary	0.07		0.07	0.07	0.05		
secondary vocational	0.31		0.31	0.31	0.29		
primary vocational	0.34		0.33	0.28	0.30		
primary	0.08		0.08	0.10	0.09		
number of observations	2156		2651	2486	2607		

The recruitment channel choice and the outcome of the recruitment process are thus interrelated and consequently, they have to be modelled simultaneously. Profit

⁸ In the present analysis we will restrict ourselves to recruitment strategies with only 1 search channel.

maximizing firms will choose the pair (search channel, preferred applicant) yielding the maximum utility (U) among all possible pairs (search channel, preferred applicant). Let us denote the pair yielding the maximum utility with A; with T we denote the set of all possible pairs (search channel-preferred applicant), and its generic element is denoted by a. U can be thought of as the result of a comparison between expected costs and expected benefits (via F_m the productivity distribution) of using a certain recruitment strategy for a candidate with certain characteristics. That is, the firm will choose the pair A if the condition $U_A = \text{Max}_a U_a$ holds. Next, we will assume that this utility U can be factorized into a deterministic component and a stochastic component as follows: $U_A = W_A + \varepsilon_A$. The deterministic component is assumed to be a function of a vector of vacancy characteristics, firm characteristics, and labour market conditions, $W_A = W_A(x)$. With random utility U and a feasible choice set T, and the disturbances ε_A are independently identically distributed according to a Weibull (type II) distribution we obtain a multinomial logit model (see Cramer 1991). This implies that P_A - the probability that the pair A is chosen - reads as follows:

$$P_A = \frac{\exp(W_A)}{\sum_{a \in T} \exp(W_a)} \quad (6)$$

To obtain a first impression of the importance of the relationship between the choice of the recruitment strategy and the characteristics of the hired applicant we present the contingency table for the sample at disposal in Table 3. The Pearson statistic⁹ immediately signals the presence of a relationship between the two classifications. In particular, we are interested in the relationship between the choice of adv or leo on the one hand and the choice of an unemployed or already employed person on the other hand (see Section 2). This interdependency appears to be (in line with our prior expectations) significant for the four pairs of interest: advertisement-employed, advertisement-unemployed, leo-employed, leo-unemployed.

Let us denote by d (as in Section 2) the indicator for the choice of the search channel and with plmp the indicator for the expected characteristics of the hired applicants. Thus $d = 1$ if the indicated search channel is chosen and $\text{plmp} = 1$ if the hired applicants shows the characteristic considered.

The joint logit probability for each of the selected pairs reads as follows:

⁹ The Pearson statistic P is computed in the following way:

$$P = \sum_{c,b} [N_{cb} - N(N_{c./N})(N_{.b}/N)]^2 / N(N_{c./N})(N_{.b}/N)$$

where c is the number of recruitment channels (5) and b is the number of the states (PLMP, 3), N is the number of observation in the sample (9900) and $N_{c.}$ and $N_{.b}$ are the marginal distributions.

$$\begin{aligned}
P(d=1, PLMP=1) &= \frac{e^{\beta_1 x}}{1 + \sum_{i=1}^3 e^{\beta_i x}} ; P(d=1, PLMP=0) = \frac{e^{\beta_2 x}}{1 + \sum_{i=1}^3 e^{\beta_i x}} \\
P(d=0, PLMP=1) &= \frac{e^{\beta_3 x}}{1 + \sum_{i=1}^3 e^{\beta_i x}} ; P(d=0, PLMP=0) = \frac{1}{1 + \sum_{i=1}^3 e^{\beta_i x}}
\end{aligned} \tag{7}$$

In other words, we considered four models, one for each of the above mentioned pairs¹⁰. From equation (7) one can derive the following conditional probabilities:

$$P(d=1|PLMP) = \frac{e^{\beta_1 x + \alpha PLMP}}{1 + e^{\beta_2 x + \alpha PLMP}} ; P(PLMP=1|d) = \frac{e^{\beta_3 x + \alpha d}}{1 + e^{\beta_3 x + \alpha d}} \tag{8}$$

where β_i are vectors of parameters to be estimated, and $\alpha = (\beta_1 - \beta_2 - \beta_3)x$ can be interpreted as a measure of association (correlation) between the two processes (Boehm 1980, Maddala 1985). The strength of this model is that from the coefficients estimated from the multinomial logit model specified in equation (7) one can directly make inference on the effect of the independent variables on the conditional probabilities (see also Boehm 1980).

Table 3: Contingency table for the recruitment channel used and the outcome of the recruitment process.

Recruitment Channel (c)	Previous Labour Market Position of the Hired Applicant (b)				
	Employed	Unemployed	School Leavers	Nc.	
Informal	2260 (3.56)	848 (3.71)	605 (1.42)	3713 0.375	
Advertisement	2081 (73)	515 (58.37)	357 (42.88)	2953 0.298	
Tpo	541 (0.37)	255 (5.571)	100 (18.94)	896 0.091	
Leo	342 (162.05)	557 (274.03)	245 (12.25)	1144 0.116	
Others	567 (25.61)	239 (9.62)	388 (163.36)	1194 0.121	
N.b	5791 0.585	2414 0.244	1695 0.171	N= 9900 1	

The contributions to the Pearson statistic of the cells are given in parenthesis.
Pearson statistic = 856.76 significant at 5% ($\chi^2(8)=22$ at 5%)

6. Estimation Results

In this section we discuss the results of the multinomial logit model as specified in equation (7). From these estimates it is possible to gauge the effect of regional labour market conditions on the choice of the recruitment channel (adv vs. leo) and on the

¹⁰ Let us consider, for example, the couple advertisement-employed the pair $d=1$ and $plmp=1$ indicates the use of advertisement and the choice for an employed job seeker; the pair $d=0$ and $plmp=0$ indicates the non use of advertisement and the hiring of a non employed applicant; the pair $d=1$ and $plmp=0$ indicates the use of advertisement and the hiring of a non employed applicant; and finally the pair $d=0$ and $plmp=1$ indicates the non use of advertisement and the hiring of an employed candidate.

outcome of the recruitment process (employed vs. unemployed); consequently, we are able to test the implications of the first hypothesis stated in Section 2.

To test the second hypothesis (that is in slack labour market hiring shifts to the pool of unemployed job seekers) we use the conditional probabilities (based on the multinomial logit model) as specified in equation (8), and in particular the coefficient α that represents the degree of association between the two processes: the choice of the search channel and the outcome of the recruitment process in terms of the previous labour market position of the hired applicant).

We begin our analysis by considering the choice of the search channel and the outcome of the recruitment process as two **independent** processes (that is, we impose $\alpha=0$). In this setting the impact of the conditions on the labour market on the two processes can be investigated by means of independent multinomial logit models. The estimates of the impact of the regional labour market conditions on the choice of the recruitment channel are presented in Table 4. Consistent with the analysis in Section 2, it appears that in a slack labour market the informal channel is (significantly) preferred over advertisement and this relation holds for an excess supply of labour (high unemployment rate, first column in Table 4) and for low unsatisfied demand (low vacancy rate, second column in Table 4). The informal search channel is significantly preferred over the leo when the vacancy rate is high but the shift to the leo in slack labour market is insignificant. This result can be interpreted as support for the finding in Gorter and Van Ours (1996) that the demand side of the labour market dominates the search process. The results are very clear for the choice between adv and leo and tpo and leo. High unemployment shifts the odds significantly in favour for leo and high vacancy rate shifts the odds away from leo. We now consider the effect of the regional labour market conditions on employers' choice in terms of applicants characteristics. The results are put together in Table 5.

Table 4: Logit coefficients for the effect of the conditions on the labour market on the choice of the search channel (standard errors in parenthesis; *: significant at 5%).

choice of the recruitment channel	unemployment rate	10*vacancies/employment
informal/advertisement	0.70 (0.25)*	-3.08 (1.20)*
informal/tpo	0.51 (0.36)	-0.61 (1.83)
informal/Leo	-0.46 (0.29)	3.53 (1.73)*
informal/others	0.09 (0.30)	0.49 (1.65)
advertisement/tpo	-0.18 (0.38)	2.47 (1.85)
advertisement/leo	-1.15 (0.32)*	6.61 (1.78)*
advertisement/others	-0.60 (0.33)	3.57 (1.67)*
tpo/leo	-0.97 (0.41)*	4.41 (2.24)*
tpo/others	-0.42 (0.43)	1.10 (2.18)
Leo/others	0.55 (0.36)	-3.04 (2.09)

The remaining control variables are those used in the full model presented in Table 6.

Again the results seem to be consistent with our analysis in Section 2: in labour markets with excess of demand (high vacancy rate) employed applicants tend to be

hired (second column in Table 5),¹¹ whereas excess of supply of labour (first column in Table 5) leads to a significant shift to hiring from among the unemployed job seekers. Thus, if we treat the choice of the recruitment channel and hiring from the pools of the unemployed or unemployed as independent the estimation results confirm our theoretical considerations. This is already interesting per se, but more insight into the recruitment process can be obtained by investigating the mutual relationship between the recruitment channel choice and the selected applicant's characteristic as presented in equation (8).¹²

Table 5: Logit coefficients for the effect of the conditions on the labour market on the outcome of the recruitment process (standard errors in parenthesis; *: significant at 5%).

outcome of recruitment	unemployment rate	10*vacancies/employment
school leavers/employed	0.61 (0.25)*	-6.28 (1.35)*
school Leavers/unemployed	0.16 (0.28)	-2.76 (1.58)
employed/unemployed	-0.45 (0.22)*	3.52 (1.25)*

The remaining control variables are those used in the full model presented in Table 6.

The result of the estimates for the pairs **advertisement-employed and advertisement-unemployed** are given in Table 6. The coefficients β_2 refer to the probability of activation of a certain search channel conditional on the characteristic of the desired applicant. The coefficients β_3 refer to the probability of hiring a candidate with certain characteristics conditional on the choice of the search channel. We concentrate mainly on these two parameters (β_2 and β_3). Conditional on employers' choices of candidates, advertisements appear to be chosen when the vacancy rate is high (see rows under "labour market conditions"). Conditional on the choice of the search channel, the likelihood of hiring an already employed applicant is higher in times of high labour demand ($\beta_3 P(\text{plmp } d)$). In presence of high unemployment the chances of hiring such an applicant are somewhat lowered (the coefficient is significant at 10%); this may be induced by the absence of the stigma effect (that renders unemployed job seekers more competitive) and by the relatively low number

¹¹ Already employed applicants may find in their actual job a term of comparison, and this provide them with a better understanding of which problems may arise in the new employment. On the ground of experience employed job seekers can better judge their suitability for the prospect employment. Moreover, their decision is not driven by the pressure of external factors as may be the case for unemployed job seekers who may try to leave unemployment before their status become a negative signal for employers.

¹² Where $\alpha = (\beta_1 - \beta_2 - \beta_3)X$ is evaluated at the sample average. The relative standard error has been computed in the following way:

$$SE_{\alpha} = \left\{ \sum_{i=1}^N \frac{(\gamma - \bar{\gamma})_i^2}{N} \right\}^{1/2} \quad \bar{\gamma} = \sum_{j=1}^K (\beta_1 - \beta_2 - \beta_3) X_j$$

where N is the number of observations in the sample and K is the number of regressors (constant included) used in the models.

Table 6: Multinomial logit estimates. Reference groups: non employed applicants + non advertisement, and non unemployed applicants + non advertisement (standard errors in parenthesis; *: significant at 5%).

	Advertisement - Employed			Advertisement - Unemployed		
	β_1	β_2 P(d=1 plmp)	β_3 P(plmp=1 d)	β_1	β_2 P(d=1 plmp)	β_3 P(plmp=1 d)
constant	-1.02 (0.35)*	-1.11 (0.44)*	-0.43 (0.29)	-1.88 (0.54)*	-0.62 (0.30)*	-0.32 (0.32)
educational requirements						
university	1.78 (0.13)*	0.29 (0.15)*	0.88 (0.10)*	-1.10 (0.18)*	0.88 (0.11)*	-1.14 (0.11)*
secondary	1.13 (0.17)*	0.43 (0.18)*	0.67 (0.13)*	-0.63 (0.23)*	0.55 (0.14)*	-0.77 (0.14)*
secondary vocational	1.35 (0.12)*	0.19 (0.13)	0.59 (0.09)*	-0.52 (0.15)*	0.69 (0.11)*	-0.75 (0.09)*
primary vocational	0.32 (0.12)*	-0.09 (0.13)	0.05 (0.08)	-0.27 (0.15)	0.17 (0.11)	-0.25 (0.09)*
size/100	0.10 (0.02)*	-0.00 (0.03)	0.08 (0.02)*	-0.07 (0.03)*	0.02 (0.02)	-0.04 (0.02)*
economic sector						
industry	-0.05 (0.09)	-0.56 (0.13)*	-0.05 (0.07)	-0.60 (0.15)*	-0.12 (0.08)	-0.12 (0.08)
quaternary	-0.02 (0.08)	-0.07 (0.10)	-0.08 (0.06)	0.09 (0.12)	-0.08 (0.06)	0.16 (0.07)*
construction	-0.36 (0.13)*	-0.73 (0.16)*	-0.35 (0.10)*	-0.36 (0.19)	-0.15 (0.11)	0.42 (0.10)*
transportation	0.09 (0.14)	-0.33 (0.18)	0.21 (0.10)*	-0.29 (0.21)	-0.06 (0.12)	0.20 (0.11)
labour market conditions						
unemployment rate	-1.15 (0.29)*	-0.48 (0.36)	-0.38 (0.22)	-0.30 (0.45)	-0.79 (0.25)*	0.10 (0.24)
vacancies/employment	0.74 (0.14)*	0.46 (0.18)*	0.51 (0.12)*	0.46 (0.23)*	0.26 (0.12)*	-0.31 (0.14)*
wave and year						
w2 March-April	0.03 (0.10)	0.26 (0.13)*	0.08 (0.09)	0.07 (0.15)	-0.01 (0.09)	-0.16 (0.09)
w3 May-June	-0.36 (0.11)*	-0.08 (0.14)	-0.27 (0.09)*	-0.29 (0.17)	-0.17 (0.09)	-0.25 (0.09)*
w4 July-August	-0.39 (0.10)*	-0.06 (0.14)	-0.22 (0.09)*	-0.19 (0.16)	-0.27 (0.09)*	-0.37 (0.10)*
w5 September-October	-0.38 (0.10)*	-0.17 (0.13)	-0.15 (0.08)	-0.29 (0.16)	-0.30 (0.08)*	-0.24 (0.09)*
w6 November-December	-0.19 (0.11)	-0.05 (0.14)	0.04 (0.09)	-0.15 (0.16)	-0.21 (0.09)*	-0.09 (0.09)
1992	0.03 (0.12)	-0.04 (0.15)	0.10 (0.10)	0.12 (0.19)	-0.04 (0.09)	0.13 (0.11)
1993	-0.29 (0.15)	-0.21 (0.20)	0.05 (0.13)	0.36 (0.25)	-0.37 (0.13)*	0.25 (0.15)
1994	-0.65 (0.14)*	-0.44 (0.18)*	-0.11 (0.11)	0.18 (0.23)	-0.56 (0.12)*	0.39 (0.13)*
Q		0.55 (0.33)			-0.41 (0.36)	
-2 Log likelihood for full model		24,049.593			21,857.956	
-2 log likelihood for restricted model		25,248.420			22,949.194	
number of observations		9,900			9,900	
Reference groups of the exogenous variables are given in brackets: required education (primary), economic sector (services), wave (first wave, January-						

of employed job seekers.

As far as the pair advertisement-unemployed is concerned, we find that conditional on employers' preferences about applicants (β_2), advertisement appears to be activated when the conditions on the labour demand are relatively good, while the contrary holds in periods of high unemployment. Conversely, conditional on the choice of the recruitment strategy (β_3), the hiring chances for unemployed candidates are reduced in periods of excess labour demand. While, the coefficient for the supply side is positive but not significant, thus suggesting that unemployed applicants tend to compete with already employed job seekers on equal footing.

To summarize the results so far, it appears that conditional on the employers' choice of the search channel, the chance of hiring an employed applicant is high when there is excess demand and it is low (although to a less extent) when there is excess supply. On the contrary, the chance of hiring unemployed applicants is low when there is excess demand, but it is not increased when there is excess supply. Furthermore, conditional on the employers' choice of applicants' characteristics, advertisement seems to be used during periods when the vacancy rate is high. The contrary holds when the unemployment rate is high.

For vacancies requiring high educational standards employers tend to rely on advertisements and they seem to prefer already employed candidates. At the same time, the chance for unemployed persons is significantly reduced. A positive effect for the use of advertisement (when recruiting for positions requiring experience) on the probability of hiring already employed applicants was found in Gorter et al. (1993).

The estimates referring the labour exchange office (leo) are presented in Table 7. We will begin with the pair **leo-unemployed**. As it may have been expected, conditional on employers' choice about job seekers, the labour exchange office tends to be activated when unemployment is high (β_2), whereas it tends to be significantly less used when there is excess demand (that is, even if an unemployed worker is preferred, firms use other recruitment channels when regional labour demand is high). Conditional on the employers' choice for the recruitment method (β_3), the probability of hiring unemployed applicants is not affected by the condition on the regional labour market (that is unemployed job seekers are not preferred in presence of excess of supply, but they are not impaired either). In this case, different labour market conditions affect solely the choice of the search channel. The impact of regional labour market conditions is more articulate for the pair **leo-employed**. Given the employers' choice of the plmp of applicants (β_2), employers usually activate the leo when the unemployment rate is high. On the other hand, given the employers' choice of the recruitment strategy (β_3), the likelihood of hiring an already employed job seekers is lower when the unemployment rate is high, while it is higher when the local demand for labour is high. This result seems to be consistent with a stronger presence of the stigma effect in a regional labour market characterized by excess of demand, compared to a regional labour market characterized by high unemployment (excess of supply).

To summarize the results for the "leo pairs" we may say the following: conditional on the employers' choice in terms of applicants' characteristics, the labour exchange office is more likely to be used in periods of high unemployment (for both employed and unemployed job seekers). Conversely, when the vacancy rate is high the use of the labour exchange office turns out to be less likely. Conditional on the employers' choice of the recruitment strategy, already employed job seekers seem to be selected

Table 7: Multinomial logit estimates. Reference groups: non unemployed applicants + non leo, and non employed applicants + non leo (standard errors in parenthesis; *: significant at 5%).

	Labour Exchange Office - Unemployed			Labour Exchange Office - Employed		
	β_1	β_2 P(d=1 plmp)	β_3 P(plmp=1 d)	β_1	β_2 P(d=1 plmp)	β_3 P(plmp=1 d)
constant	-2.50 (0.52)*	-2.41 (0.50)*	-0.64 (0.31)*	-2.58 (0.65)*	-2.13 (0.46)*	-0.26 (0.26)
educational requirements						
university	-1.02 (0.18)*	-0.66 (0.18)*	-1.56 (0.10)*	0.32 (0.23)	0.17 (0.16)	1.17 (0.09)*
secondary	-0.75 (0.25)*	-0.21 (0.23)	-0.94 (0.13)*	0.31 (0.30)	0.16 (0.21)	0.74 (0.11)*
secondary vocational	-0.83 (0.16)*	-0.43 (0.17)*	-0.95 (0.09)*	0.20 (0.21)	0.04 (0.14)	0.83 (0.08)*
primary vocational	0.16 (0.15)	0.26 (0.16)	-0.36 (0.08)*	0.34 (0.20)	0.47 (0.13)*	0.21 (0.08)*
size/100	-0.12 (0.04)*	-0.22 (0.05)*	-0.06 (0.02)*	-0.13 (0.06)*	-0.09 (0.04)*	0.08 (0.02)*
economic sector						
industry	-0.14 (0.14)	0.06 (0.12)	-0.19 (0.08)*	0.37 (0.16)*	-0.14 (0.12)	0.01 (0.07)
quaternary	0.45 (0.12)*	0.07 (0.11)	0.10 (0.07)	0.43 (0.15)*	0.21 (0.10)*	0.08 (0.06)
construction	0.59 (0.15)*	-0.49 (0.19)*	0.16 (0.10)	-0.61 (0.27)*	0.18 (0.13)	-0.14 (0.09)
transportation	0.23 (0.18)	-0.30 (0.21)	0.05 (0.11)	0.19 (0.25)	0.07 (0.17)	0.27 (0.10)*
labour market conditions						
unemployment rate	0.57 (0.38)	0.93 (0.36)*	0.27 (0.24)	0.10 (0.49)	0.63 (0.32)*	-0.43 (0.21)*
vacancies/employment	-0.50 (0.23)*	-0.48 (0.22)*	-0.17 (0.13)	-0.16 (0.28)	-0.17 (0.20)	0.49 (0.11)*
wave and year						
w2 March-April	0.19 (0.15)	0.03 (0.16)	-0.19 (0.09)*	0.16 (0.20)	0.18 (0.14)	0.02 (0.08)
w3 May-June	0.02 (0.16)	0.02 (0.16)	-0.27 (0.09)*	-0.24 (0.22)	0.01 (0.14)	-0.28 (0.08)*
w4 July-August	-0.03 (0.16)	0.26 (0.16)	-0.28 (0.09)*	0.18 (0.20)	-0.05 (0.14)	-0.31 (0.08)*
w5 September-October	0.10 (0.15)	0.18 (0.15)	-0.21 (0.09)*	0.06 (0.20)	0.11 (0.14)	-0.18 (0.07)*
w6 November-December	0.11 (0.16)	0.14 (0.16)	-0.07 (0.09)	0.22 (0.20)	0.10 (0.14)	-0.02 (0.08)
1992	0.12 (0.20)	-0.09 (0.18)	0.13 (0.11)	-0.05 (0.24)	0.09 (0.17)	0.11 (0.09)
1993	0.33 (0.24)	-0.05 (0.23)	0.39 (0.14)*	-0.12 (0.30)	0.12 (0.21)	0.01 (0.12)
1994	0.60 (0.22)*	0.25 (0.20)	0.49 (0.13)*	0.10 (0.26)	0.26 (0.19)	-0.16 (0.10)
a		1.29 (0.64)*			-1.33 (0.56)*	
-2 log likelihood for full model		16,861.154			19,118.098	
-2 log likelihood for restricted model		17,721.557			20,092.562	
number of observations		9,900			9,900	
Reference groups of the exogenous variables are given in brackets: required education (primary), economic sector (services), wave (first wave, January-						

when the vacancy rate is high. In contrast, when the unemployment rate is high, already employed job seekers are less likely to be hired. So far the results are consistent with what could be expected from our theoretical model (see also Table 1). Educational requirements again play an important role; their impact appears to be strong on the outcome of the recruitment process. The conditional probability of hiring an unemployed candidate is considerably reduced if educational requirements are high. On the contrary, the conditional probability of hiring an already employed job seekers is high if the educational requirements are high. On the other hand, the conditional probability of choosing the labour exchange office seems to be somewhat lower when high educational standards are required (as found in Russo et al. 1995b). Our second main issue concerns the correlation between the choice of the search channel and the employers' choice for applicants' characteristics (α). In concordance with our prior expectations, we find a significantly positive relationship between the choice of the labour exchange office and the option for unemployed applicants, and a significantly negative relationship between the choice of the labour exchange office and the option for already employed applicants. The relationship between advertisement and the choice for already employed job seekers is also been found but it is somewhat weaker (α is significant at 10%). A plausible reason for the weakness of the relationship is that in some cases the use of advertisement can be compulsory for equity reasons, in these situations unemployed persons (especially long-term ones) receive a special treatment.

7. Conclusions

The aim of the present paper was to empirically analyze the way employers adjust their recruitment strategies (in terms of search channel use, and applicants' characteristics) in response to changes in the overall economic conditions. In particular we were able to formulate two hypotheses on the nature of the adjustments:

- (1) The use of the labour exchange office and the hiring of unemployed candidates are more likely to happen when there is an excess of supply on the labour market. The use of advertisements and the hiring of already employed job seekers are more likely to occur in presence of excess demand.
- (2) The process leading to the choice of the recruitment channel and the one leading to the hiring of an applicant with certain characteristics are correlated.

To test these hypotheses we developed a model in which the impact of the overall economic conditions and the strength of the relationship between the choice of the recruitment channel and the employers' options in term of applicants' characteristics can be measured.

The empirical results, based upon a sample of filled vacancies in twelve regions and over four years, do not reject our hypotheses. We found a significantly positive relationship between the use of the labour exchange office and the hiring of unemployed applicants (leo). Moreover, the choice of the leo appears to be more likely in presence of excess supply. The consequence at the macro level of such a behaviour is that in presence of high unemployment the flow into employment mainly

generates from unemployment (as observed in Schettkat 1995 and Burda and Wyplosz 1994). We also found a positive (although weaker) relationship between the use of advertisement and the hiring of already employed job seekers. In addition, the use of advertisement seems to be more likely in presence of excess demand.

Our results are consistent with an extended theoretical ranking model (Blanchard and Diamond 1994), that predicts changes in the hiring pools. An alternative explanation of the shift in hiring pools (from the pool of unemployed job seekers to the pool of employed ones) in situations with excess demand is the one modelled in Pissarides (1994). In this model the above mentioned shift is driven by an endogenous creation of good jobs when the economic conditions are favourable. This explanation seems insupportable in our case. In fact, the rather constant composition of the educational requirements of the vacancies supports the “ranking” argument.

Finally, our analysis shows the importance of an integrated Macro-Micro approach to the labour market.

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Appendix

Table 8: Additional descriptive statistics disaggregated by year and search channel.

1591: 2156 observations							
Recruitment Channel	frequency	%	average duration (in days)	average # applicants	employed	hired applicant unemployed	school leaver
Informal	695	32.2	35.64	3.09	0.66	0.16	0.18
Advertisement	850	39.4	41.36	16.15	0.74	0.11	0.14
Tpo	207	9.6	26.05	4.04	0.66	0.25	0.10
Leo	169	7.8	45.46	4.80	0.34	0.43	0.22
Others	235	10.9	45.95	6.63	0.59	0.11	0.30
1992: 2651 observations							
Recruitment Channel	frequency	%	average duration (in days)	average # applicants	employed	hired applicant unemployed	school leaver
Informal	922	34.8	31.78	4.60	0.67	0.19	0.13
Advertisement	928	35.0	42.47	24.30	0.73	0.15	0.12
Tpo	247	9.3	22.90	3.65	0.60	0.30	0.10
Leo	246	9.3	30.43	6.15	0.32	0.48	0.20
Others	308	11.6	47.93	5.60	0.48	0.20	0.32
1993: 2486 observations							
Recruitment Channel	frequency	%	average duration (in days)	average # applicants	employed	hired applicant unemployed	school leaver
Informal	989	39.8	26.80	3.82	0.58	0.25	0.17
Advertisement	632	25.4	45.65	37.59	0.67	0.22	0.12
Tpo	236	9.5	27.08	4.60	0.59	0.30	0.11
Leo	310	12.5	27.30	5.78	0.28	0.51	0.21
Others	319	12.8	42.26	7.58	0.47	0.23	0.30
1994: 2607 observations							
Recruitment Channel	frequency	%	average duration (in days)	average # applicants	employed	hired applicant unemployed	school leaver
Informal	1107	42.5	26.28	3.43	0.55	0.28	0.17
Advertisement	543	20.8	47.51	46.00	0.64	0.22	0.14
Tpo	206	7.9	29.28	5.58	0.58	0.28	0.14
Leo	419	16.1	26.04	7.44	0.28	0.50	0.22
Others	332	12.7	40.05	6.61	0.39	0.23	0.37