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ORIGINAL ARTICLE

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# How do the unemployed search for a job? – Evidence from the EU Labour Force Survey

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## Abstract

Using harmonised micro data, this paper investigates the job search behaviour of the unemployed in Europe. The analysis focuses on the importance of individual and household characteristics in this context, as well as on cross-country differences in Europe. Our findings suggest that both individual and household characteristics play an important role, with the latter being more decisive for women. However, even when controlling for these factors, remarkable differences remain between countries, which are associated with institutional characteristics at the country level.

**JEL codes:** J20; J64; C38

**Keywords:** Job search; Search channels

## 1. Introduction

In September 2013, about five years after the start of the global economic and financial crisis, about eleven per cent of the labour force in the European Union were unemployed (Eurostat 2013). Compared to March 2008, this was an increase of more than 4 percentage points. While economic recovery will certainly lead to a reduction in the cyclical component of unemployment, high rates of structural unemployment remain a problem in many European countries, which may also slow down the beneficial labour market effects of the recovery.

In equilibrium, unemployment rates crucially depend on the efficiency of the process of how unemployed, job-seeking individuals are matched with open vacancies (e.g. Pissarides 2000; Petrongolo and Pissarides 2001). Usually, this matching process is treated as a black box. However, individuals can influence the efficiency of the process by deciding on how much effort to devote to job search and on which search methods to employ, taking into account associated costs and expected benefits (e.g. Holzer 1988; Blau and Robins 1990). Benefits accrue in the form of job offers, which may vary in their quantity and quality, and thus determine the probability of being employed and the income earned in the next period. Costs may be of pecuniary nature or relate to time and effort aspects.

In this paper, we shed some light on the job search process in Europe. In particular, we aim to answer the following four questions. First, what are the determinants of an individual's overall job search intensity? Second, how are different search methods related to each other, can we detect certain search patterns? Third, what are the determinants of using specific search methods? Fourth, how are the labour market institutions in the EU Member States associated with job search? Regarding the use of specific

search methods, we pay particular attention to the use of the public employment services and to job search via personal networks. On the one hand, these two methods can be considered to be polar examples of a very formal and a very informal search channel. On the other hand, the “Employment Guidelines” agreed on by the EU Member States foresee a key role to be played by the national public employment services in implementing the European employment strategy, which envisages, among others, an employment rate of 75 per cent for women and men aged 20 to 64 by 2020 (Council of the European Union 2010). It is therefore of high interest to know to which extent the public employment services actually do play a role in the matching process. In order to answer these questions, we use the European Union Labour Force Survey (EU-LFS), a representative and internationally comparable survey of individual workers in Europe.

Our investigation relates to several other studies on the search behaviour of the unemployed (e.g. Barron and Mellow 1979; Holzer 1988; Osberg 1993; Clark 2001; Addison and Portugal 2002; Weber and Mahringer 2008; Riddell and Song 2011) and contributes to this literature in the following respects. First, we provide detailed cross-country evidence for the European Union, based on a harmonised survey. This can be seen as an update to Clark (2001) who partly used the same data set but focused on the years prior to 1999 when – due to data limitations – comparability of the data across time and countries was more difficult and the EU consisted of 15 countries only. Second, we put special emphasis on the role of household characteristics in determining search behaviour. Detailed household information is rarely available in comparable data sets but should be of major importance assuming that labour supply is, in general, a household decision. From a policy perspective, this appears particularly relevant as it might help identify specific groups of the population who may be in special need of targeted support by the state. Third, we explore whether country differences in job search behaviour can be linked to (institutional) characteristics of the labour market.

Our analysis is inherently descriptive in nature and exclusively focuses on the determinants of job search behaviour, that is, the ‘inputs’ to the job search process. Since the EU-LFS data consist of yearly cross-sections, we are not able to follow individuals over time. Hence, we are unable to relate search behaviour to subsequent outcomes and cannot draw any conclusions about the effectiveness of different search strategies. However, assuming that individuals base their search choices on a cost-benefit rationale, we are still able to infer factors determining the relative costs and benefits of search strategies as perceived by job-seeking individuals. A detailed understanding of these factors can help policy makers in designing more targeted policies to increase the efficiency of the matching process.

The paper is structured as follows. The next section describes the data used for the analysis. Section 3 outlines the empirical methodology. Results are presented in Section 4, and Section 5 concludes.

## **2. The EU-LFS data set**

The analyses in this paper are based on the European Union Labour Force Survey (EU-LFS), a harmonised cross-country survey (Eurostat 2008a, 2008b). The Labour Force Surveys at the national level are conducted by the national statistical agencies and processed by Eurostat to ensure comparability across countries. The sample size is

about 1.5 million people per quarter, with the sampling rates in each country varying between 0.2 per cent and 3.3 per cent.

The EU-LFS data set is a representative sample survey among private households which provides both annual and quarterly information on the individual members of the households covered who are older than 15. The annual data set, which is used in the analysis of this paper, consists of yearly cross-sections. This means that it is not possible to follow individuals over time. The data set contains various characteristics of the persons covered, including age, sex, educational attainment, labour market status, unemployment duration, and the search methods of the unemployed used during the four weeks preceding the interview. Furthermore, the EU-LFS contains household information, such as household size and the employment status of the spouse. However, household information is not available for the Nordic countries in the time period analysed. For the analyses conducted in this paper, we restrict attention to unemployed individuals, employing the ILO definition of unemployment.

As far as our main variables of interest are concerned, the EU-LFS data set contains information on thirteen search methods, including active search methods relating to both dependent-status employment and self-employment (e.g. “looked for permits, licences, financial resources”) as well as passive search methods (e.g. “waiting for a call from a public employment office”) and the residual category “Other search methods”. As our analysis focuses on search efforts that are supposed to lead to dependent-status employment, we consider neither passive search methods – active search is a prerequisite for being classified as unemployed according to the ILO definition – nor methods relating to self-employment. We exclude the latter because only about two per cent of the unemployed look for a job in self-employment. Furthermore, for reasons of data quality and comparability, we have to restrict our analysis of search behaviour to the years 2006 to 2008 and we also discard the residual category, which strongly fluctuates over time and countries.<sup>1</sup>

Having imposed these restrictions, we are left with seven active and comparable search methods used by individuals seeking a job in dependent employment. These are “Contacting the public employment office to find work”, “Contacting a private employment agency to find work”, “Direct applications to employers”, “Asking friends, relatives, and trade unions, etc.”, “Answering or inserting advertisements”, “Studying advertisements”, and “Taking a test, interview, or examination”.<sup>2</sup>

In the empirical analysis, we consider both the use of specific search methods and overall search intensity. Following Holzer (1988) as well as Weber and Mahringer (2008), we measure the latter by the number of different search methods used. Other authors have proposed to use the time spent for job search to proxy for search effort (e.g. Barron and Mellow 1979), but this information is not available in the EU-LFS data set.

### **3. Empirical methodology**

The empirical analysis starts by presenting descriptive evidence on the search intensity of the unemployed. To gain further insight, we follow Weber and Mahringer (2008) in estimating ordered logit models using different sets of explanatory variables.<sup>3</sup> The first set of factors includes socio-demographic characteristics of the individual, such as age, gender, and education. The second set of explanatory variables describes the (recent) labour market history of the individual, such as the elapsed unemployment duration,

the occupation (at the ISCO 1-digit level) and the broad economic sector of the last job, a dummy variable that indicates whether the individual has not been employed at all in the preceding eight years, and a set of dummy variables describing the situation immediately before the person started to seek employment. Thirdly, we control for the regional environment of the individual by including information on the degree of urbanization and a maximum set of region dummies at the NUTS 1 level.<sup>4</sup> In addition, we always include country fixed effects for the country of residence to control for country-specific effects which are constant over time, as well as dummy variables for each survey year in order to capture time-varying effects such as the business cycle. Furthermore, to account for a potential serial correlation in the error term within countries, we cluster standard errors at the country level. Note that this yields more conservative standard errors than the ones obtained if we cluster at the household level instead.

In an extended specification, we use the information at the household level contained in the EU-LFS data to construct additional control variables which provide some insight into the correlations between household-specific variation and the outcome variables of interest. This set of controls comprises information on the number of small children (0–4 years), number of older children (5–14 years), and the number of elderly persons (65 and above) living in the household. Furthermore, we control for the size of the household by adding the number of persons aged between 15 and 64 living in the household to our set of control variables. Finally, we also add information on the labour market status of the spouse – if present in the household. The information derived from these extended models might have highly-relevant policy implications, as they may point to flaws and shortcomings in existing institutions which hamper job search or the use of specific search methods.

These models are estimated jointly and separated by gender, as it may well be the case that different forces are at work in determining job search. Especially with regard to the number of children and elderly living in the household, we expect – as traditional role models would suggest – that their influence varies by gender. Unfortunately, no household information is available for Denmark, Finland, and Sweden so that we have to exclude these countries from this part of the analysis.

In the second step of the analysis, we examine whether certain search methods are usually used together, thus forming “bundles” of search methods. For this purpose, one possibility would be to analyse all the bundles actually used by the unemployed individuals, but with seven different methods the number of bundles would be far too large. Therefore, we instead explore in more detail the correlation matrix of the search methods and conduct a factor analysis (cf. e.g. Gorsuch 1983; Johnson and Wichern 2008).

Generally speaking, for the  $p$  observed variables (search methods)  $X_1, \dots, X_p$ , we aim to find  $q$  common factors  $F_1, \dots, F_q$  (with  $q < p$ ) that linearly reconstruct the  $p$  original variables:

$$X_j = F_1\alpha_{1j} + F_2\alpha_{2j} + \dots + F_q\alpha_{qj} + e_j$$

where  $X_j$  denotes the  $j$ -th variable,  $F_k$  the  $k$ -th common factor, and  $\alpha_{kj}$  the set of linear coefficients called factor loadings. Finally,  $e_j$  is the error term, also known as unique or specific factor. Accordingly, the term uniqueness refers to that part of the variance of the original variable that is not accounted for by the common factors. Common and specific factors are assumed to be uncorrelated and – as in most applications – the

common factors are also assumed to be uncorrelated with each other. Note that a normalization of this kind is necessary to make the model identifiable since in contrast to a regression model, the  $F_k$  are unobserved and need to be estimated alongside the factor loadings. Even after this normalization, factors and factor loadings are only identified up to an orthogonal rotation (see below). At the end of the procedure, the predicted correlation matrix – where each variable is described only in terms of the common factors – should be reasonably close to the original correlation matrix.

In order to conduct the factor analysis, we proceed as follows. First, we base the analysis on the matrix of tetrachoric correlations, following the recommendation of Knol and Berger (1991). This is because we have a series of binary yes-no variables for the different search methods, making the standard product-moment correlation matrix, which requires interval-scaled variables, inappropriate. Second, in order to extract the common factors, we choose the principal-component factor method, which minimises the variance accounted for by the specific factors summed across all variables. In this case, the resulting factor-loadings matrix is made up of the scaled eigenvectors corresponding to the  $q$  largest eigenvalues of the sample correlation matrix. Third, to enhance the interpretation, we use the Varimax rotation for factor rotation, which tends to produce the simplest (that is, easiest-to-interpret) structure of the factor-loadings matrix.

The third step of the analysis consists in a detailed analysis of the use of specific search methods. In order to do so, we first provide descriptive evidence on the frequency of use of different search methods across EU Member States. We then investigate the determinants of the use of these search methods running separate probit regressions. As for the control variables, we apply the same methodology as for the analysis of search intensity described above, focussing on the role of individual, regional, and household characteristics in the job search context.

In the final step of the analysis, we examine whether the intensity of the job search of the unemployed as well as the use of specific search methods is related to the labour-market framework of the EU countries under investigation. In order to investigate the link between job search and institutions, we take the fixed effects from the regressions on job search intensity (step 1 of the analysis) and on the use of specific search methods (step 3) as a starting point. These fixed effects provide a measure of the level differences between countries which are purged of the composition effects which may result from differing characteristics of the pools of the unemployed in the EU Member States. We correlate these fixed effects with indicators for the institutional set-up, which are provided at the country level by Eurostat and the OECD.

We thus obtain an overall impression of which labour market features may explain country differences in job search behaviour. Clearly, this step of the analysis does not provide any proof of causality. Nevertheless, we think that the results may give an indication of where cross-country institutional differences are likely to have an impact on job search behaviour and where therefore further investigations may be worthwhile.

## **4. Empirical analysis**

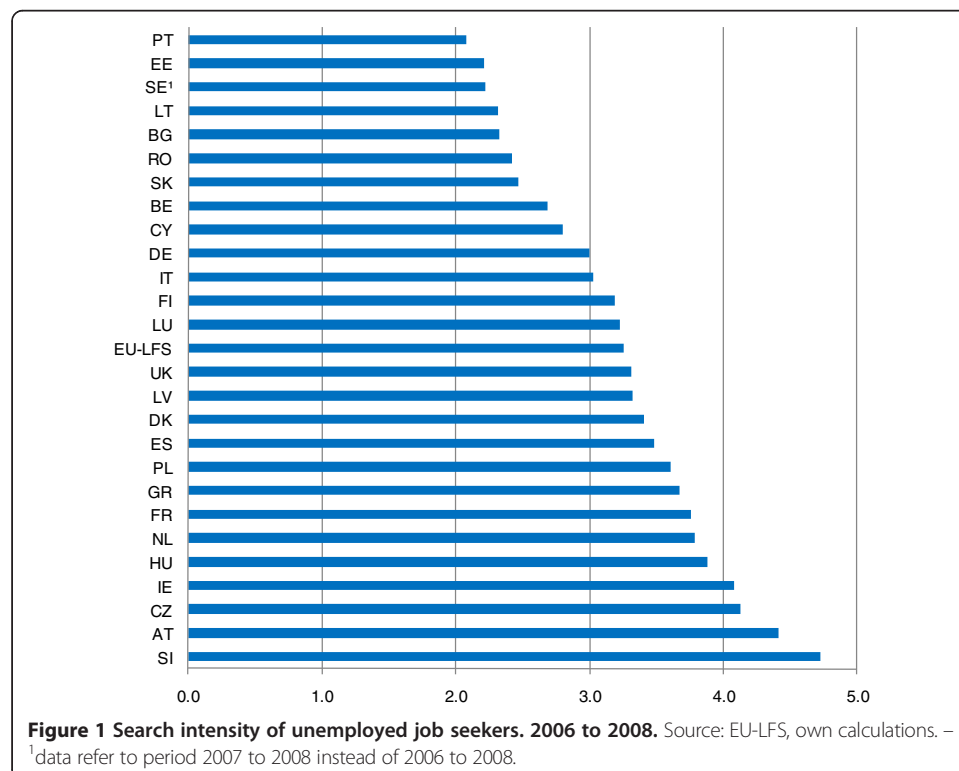
### **4.1. Search intensity**

Most unemployed individuals state that they have used several different search methods during the previous four weeks in order to find work (Figure 1). The average number of methods used – among the seven we selected for our analysis – is 3.3, with search

intensity being highest in Slovenia and Austria (4.7 and 4.4 methods, respectively) and lowest in Portugal, Sweden and Estonia (2.1 the former, 2.2 the latter two).

In order to examine which factors determine the overall job search intensity of the unemployed, we run a series of ordered logit regressions. In doing so, we start with our baseline specification, which mainly includes individual characteristics. We then add variables on household characteristics to obtain an extended specification. Note that in the latter case, we lose all the observations of Denmark, Finland, and Sweden because there is, at least for our period of analysis, no household information available for these countries. Table 1 displays the marginal effects of the explanatory variables on the odds ratio and the associated z-values. This effect is expressed as a multiple of the baseline odds ratio so that values greater than one denote a positive and values smaller than one a negative correlation with the outcome.

The regression results are given in Table 1 (middle column: baseline specification; right column: extended specification) and can be summarised as follows. First, we find clear correlations between search intensity and individual characteristics. To start with, men search more intensively than women, holding all other characteristics constant. The number of search methods used also differs by age groups, which is in line with the existing literature (e.g. Weber and Mahringer 2008). Search intensity is significantly lower for the highest age group. The (exponentiated) coefficient of 0.49 of the latter variable tells us that the odds of observing a search intensity greater than  $m$  versus less than or equal to  $m$  –  $m$  could be any number of search methods – is 51 per cent lower for the age group 55 to 64 years than for the reference category, that is, unemployed job seekers aged 15 to 24. This can reflect the former's higher costs in accessing non-standard search channels, which would be a cause for worry. On the other hand,





individuals of different age groups may have different perceptions regarding the expected benefits of job search activities, and older individuals, being more experienced, may simply have better knowledge of the effectiveness of different search methods.<sup>5</sup>

Moreover, consistent with Riddell and Song (2011) and Weber and Mahringer (2008), search intensity increases with the skill level of unemployed job seekers, which is in line with theoretical predictions. On the one hand, search is likely to be less costly for high-skilled individuals who may be more aware of the different search channels and in a better position to use them. On the other hand, the expected benefits are higher for the high-skilled than for the low-skilled since the former have a higher probability of receiving a job offer and, in general, face a larger wedge between potential wage income and unemployment benefits.

The two dummy variables capturing the elapsed unemployment duration are individually insignificant but jointly significant. The respective Wald test statistic has a value of 9.78, which corresponds to a p-value of 0.0075. Moreover, individuals having been in unemployment for more than eleven months search significantly less than individuals that have been in unemployment between six and eleven months, i.e. the relationship between search intensity and unemployment duration is hump-shaped. Several explanations for this pattern may be at work. First, long-term unemployed individuals may become discouraged and therefore search less intensively. Second, other observable or unobservable characteristics that drive both, the speed of leaving unemployment as well as search intensity – such as a strong intrinsic work motivation – may be responsible for this correlation. Third, there may be reverse causality if those unemployed individuals that search more intensively are also more likely to leave unemployment quickly, which may be an optimal search strategy in a stock-flow search framework (Petrongolo and Pissarides 2001). In the latter two scenarios, differences between duration classes emerge even without any change in individual behaviour. In fact, all three mechanisms may well be at work, but we are unable to discriminate between them since the data do not allow us to follow individuals over time. Note that the same mechanisms are likely to explain the strongly negative correlation between job search intensity and the indicator variable that equals one if individuals had no employment in the preceding eight years.

In light of the previous discussion, we would expect to see a difference in search intensity between the short-term (<6 months) and the medium-term (6 to 11 months) unemployed, too. It is possible that the mentioned factors contributing to a negative correlation between unemployment duration and search intensity are counteracted by an incentive effect, which goes in the opposite direction. In general, unemployment benefits are only paid for a limited period of time so that the pressure to find a new job increases the closer the date of benefit exhaustion comes. In fact, this end-of-benefits spike is found in many empirical studies on unemployment duration (e.g. Meyer 1990). Given these opposing forces, it is not surprising that existing empirical results on the correlation between unemployment duration and search intensity are ambiguous. Holzer (1988) finds a positive relationship between the two variables whereas Barron and Mellow (1979) find a negative one.

As far as other characteristics of the recent labour market history of the individual are concerned, both the occupation and the broad economic sector of the last job and the situation immediately before the individual started to seek employment matter for job



**Table 1 Ordered logit estimation of search intensity**

|   | Without household variables |         | With household variables  |         |
|---|-----------------------------|---------|---------------------------|---------|
|   | Odds ratio                  | z-value | Odds ratio                | z-value |
| Male  | 1.1289                      | 6.85    | 1.1242                    | 6.48    |
| Age 15-24   | <i>Reference category</i>   |         | <i>Reference category</i> |         |
| Age 25-54   | 0.9056                      | -3.65   | 0.9410                    | -1.76   |
| Age 55-64   | 0.4933                      | -5.32   | 0.5127                    | -5.28   |
| ISCED 0-2   | <i>Reference category</i>   |         | <i>Reference category</i> |         |
| ISCED 3-4   | 1.5002                      | 16.90   | 1.4781                    | 16.20   |
| ISCED 5-6   | 1.9320                      | 9.73    | 1.9085                    | 9.39    |
| <i>Unemployment duration &lt; 6 months</i>  | <i>Reference category</i>   |         | <i>Reference category</i> |         |
| Unemployment duration 6-11 months   | 1.1000                      | 1.78    | 1.0979                    | 1.67    |
| Unemployment duration > 11 months   | 0.9943                      | -0.09   | 0.9935                    | -0.10   |
| No employment in preceding 8 years  | 0.6229                      | -7.78   | 0.6239                    | -7.38   |
| <i>Occupation of last job: Clerk</i>  | <i>Reference category</i>   |         | <i>Reference category</i> |         |
| Occupation of last job: Armed forces  | 0.7707                      | -2.42   | 0.7710                    | -2.52   |
| Occupation of last job: Legislator, senior official, manager                                  | 1.0293                      | 0.36    | 1.0334                    | 0.42    |
| Occupation of last job: Professional  | 0.8486                      | -1.80   | 0.8445                    | -1.78   |
| Occupation of last job: Technician or associate professional                                  | 1.0419                      | 1.10    | 1.0334                    | 0.97    |
| Occupation of last job: Shop worker or shop and market sales worker                           | 0.8713                      | -6.32   | 0.8733                    | -5.77   |
| Occupation of last job: Skilled agricultural or fisheryworker                                 | 0.8416                      | -3.95   | 0.8509                    | -3.51   |
| Occupation of last job: Craft or related trades worker  | 0.7814                      | -9.37   | 0.7824                    | -9.29   |
| Occupation of last job: Plant and machine operator or assembler                               | 0.8882                      | -2.72   | 0.8839                    | -2.47   |
| Occupation of last job: Elementary occupation   | 0.7348                      | -6.58   | 0.7388                    | -6.33   |
| Occupation of last job: Missing   | 1.1132                      | 0.90    | 1.1396                    | 1.04    |
| <i>Sector of last job: Services</i>   | <i>Reference category</i>   |         | <i>Reference category</i> |         |
| Sector of last job: Agriculture   | 0.7373                      | -3.69   | 0.7384                    | -3.56   |
| Sector of last job: Industry  | 1.0296                      | 0.89    | 1.0384                    | 1.00    |
| Sector of last job: Missing   | 0.8602                      | -2.19   | 0.8330                    | -2.92   |
| <i>Degree of urbanization: Intermediate</i>   | <i>Reference category</i>   |         | <i>Reference category</i> |         |
| Degree of urbanization: Densely populated   | 1.0328                      | 1.26    | 1.0310                    | 1.20    |
| Degree of urbanization: Thinly populated  | 0.9041                      | -1.42   | 0.9050                    | -1.36   |
| Degree of urbanization: Missing   | 0.9711                      | -0.70   | 0.9759                    | -0.56   |
| <i>Situation before seeking employment: Working</i>   | <i>Reference category</i>   |         | <i>Reference category</i> |         |
| Situation before seeking employment: Full-time education                                      | 0.9462                      | -0.58   | 0.9380                    | -0.67   |
| Situation before seeking employment: Conscript on compulsory or military or community service | 1.2767                      | 2.71    | 1.2385                    | 2.42    |
| Situation before seeking employment: Domestic/family responsibilities                         | 0.7062                      | -5.29   | 0.7231                    | -4.83   |
| Situation before seeking employment: Other  | 0.6897                      | -1.84   | 0.6861                    | -1.83   |
| Situation before seeking employment: Missing  | 0.8878                      | -0.39   | 0.9046                    | -0.33   |
| Number of adults (15-64 years) in household   |                             |         | 0.9977                    | -0.31   |
| Number of children (<=4 years) in household   |                             |         | 0.9547                    | -1.64   |
| Number of children (5-14 years) in household  |                             |         | 0.9621                    | -2.56   |
| Number of elderly (> = 65 years) in household   |                             |         | 0.9391                    | -1.90   |

**Table 1 Ordered logit estimation of search intensity (Continued)**

| <i>Employed spouse in household</i>     | <i>Reference category</i> | <i>Reference category</i> |
|---|---------------------------|---------------------------|
| No spouse in household                  |                           | 1.0672 1.65               |
| Inactive/unemployed spouse in household |                           | 0.8995 -2.04              |
| Pseudo R <sup>2</sup>                   | 0.0459                    | 0.0457                    |
| Observations                            | 316,066                   | 289,026                   |

Source: EU-LFS, years 2006–2008, own calculations. – Notes: The table displays exponentiated coefficients that can be interpreted as effect on the odds ratio. – The regressions also include maximum sets of country dummies, NUTS 1 region dummies (deviations from country means), and year dummies. Regressions make use of sampling weights. z-values are based on robust standard errors, clustered at the country level. z-values greater than 1.96 (2.58) in absolute value denote statistical significance at the 5 (1) per cent level.

search intensity as the corresponding Wald tests of joint statistical significance reveal.<sup>6</sup> *Ceteris paribus*, search intensity is lowest for individuals who had an elementary occupation in the previous job, were employed in the agricultural sector, and had domestic/family responsibilities or were in some other, undefined situation (e.g. temporary retirement) before seeking employment, all indications of a rather disadvantaged position in the labour market, and accordingly, less benefits to be expected from job search.

On the other hand, the degree of urbanization is not a significant predictor for job search intensity, which may partly be due to the fact that the maximum set of NUTS 1 region dummies (whose estimated coefficients are not reported for the sake of space) already capture a great part of the regional environment.

Adding household variables to the regression does not alter the previous conclusions on individual characteristics in a qualitative sense. The analysis of household variables yields further interesting insights.<sup>7</sup> Search intensity decreases with the number of children living in the household. The negative correlation with the number of children could be due to the time resources that have to be spent on them and hence cannot be used to search for work. In theoretical terms, the presence of children seems to make job search more costly for the unemployed. An alternative but complementary interpretation is that the expected benefits of job search are also negatively affected if children are present in the household. On the one hand, this may be due to a low availability of offers of jobs that allow for a high enough flexibility to assume family responsibilities. On the other hand, it may reflect that any realisable wage income has potentially to be weighed against care costs. This implies that even a relatively high expected income may not be accompanied by a corresponding increase in search intensity if expected child care costs are high, too.

There is no statistically significant difference in the search intensity between individuals having an employed spouse living in the household and the ones without a spouse in the same household. By contrast, having a non-working spouse living in the household is associated with a significantly lower search effort. Thinking in terms of financial need, we would expect the latter to be positively correlated with search intensity. Again, there are several potential explanations for this finding. First, due to assortative mating (i.e. the tendency of individuals with similar inclinations to marry each other) or common shocks (e.g. to household wealth), couples might share some characteristics not accounted for by the other variables that limit the opportunity or the readiness to search for work. In this case there would be no causal relationship but a correlation driven by factors that are unobservable to the researcher. Second,

and more worrying from a policy perspective, the availability of certain search channels may be reduced if the spouse is not working. For example, “Asking friends, relatives, and trade unions, etc.” may be less of an option if the social network does not have useful information on the matter, simply because most of its members are not in employment, either. Similarly, “Direct applications to employers” may also be more difficult if relevant inside information is missing. Indeed, the importance of social networks in determining labour market outcomes has been highlighted theoretically by, e.g., Montgomery (1991) and Calvó-Armengol and Jackson (2004) and empirically by, e.g., Rees (1966) and Loury (2006). In the context of job search behaviour, the empirical relevance of social networks has been underscored in recent papers by Caliendo et al. (2011); Cappellari and Tatsiramos (2010), and Cingano and Rosolia (2012). We will examine these issues in more detail in Section 4.4.

As the relationship described above may hide important differences between men and women, we run separate regressions by gender. In contrast to the above regressions, this allows us to analyse not only aggregate level differences between men and women, but also behavioural differences with respect to different factors. Regression results are displayed in Table 2. Indeed, whereas there is no noteworthy difference between the sexes with respect to the correlations between search intensity and the socio-demographic characteristics as well as the variables capturing the labour market history of the individual, the correlations of search intensity with the household variables differ considerably. In short, household characteristics matter more for women than for men. In particular, the number of children in the household is negatively correlated with search intensity of women but not of men.

The correlation of search intensity with the labour market status of the spouse differs, too. Search intensity is lowest for both women and men if the partner is non-employed. However, for women, not having a spouse living in the household is positively related to search intensity compared to the base category – having an employed spouse living in the household. This gives some indication that the traditional family model with a dominant male bread-winner and a female partner who takes care of the children and does not search very intensively for own paid work is still present in the EU.

#### 4.2. Search patterns

After an extensive examination of the determinants of overall search effort, we now turn to an analysis of the specific search methods. In a first step we are interested in the question which search methods tend to be used together and which ones are used independently from each other. With this knowledge we may be able to assign the methods to different groups and, subsequently, to interpret them.

Tables 3 and 4 display the results of the factor analysis after rotation. We extract three common factors, which together explain 67 per cent of the total variance.<sup>8</sup> Among the different methods, “Taking a test, interview or examination” and “Contacting the public employment office (PEO) to find work” display the highest degree of idiosyncrasy, i.e. the largest share of the variance not accounted for by the common factors (cf. the column headed “Uniqueness”). The factor loadings, that is, the pairwise correlations between the factors and the original variables, help us to structure the data

**Table 2 Ordered logit estimation of search intensity by gender**

|   | Women                     |         | Men                       |         |
|---|---------------------------|---------|---------------------------|---------|
|   | Odds ratio                | z-value | Odds ratio                | z-value |
| <i>Age 15-24</i>  | <i>Reference category</i> |         | <i>Reference category</i> |         |
| Age 25-54   | 0.8978                    | -2.50   | 0.9765                    | -0.71   |
| Age 55-64   | 0.4327                    | -5.26   | 0.5535                    | -5.74   |
| <i>ISCED 0-2</i>  | <i>Reference category</i> |         | <i>Reference category</i> |         |
| ISCED 3-4   | 1.4868                    | 11.19   | 1.4629                    | 13.82   |
| ISCED 5-6   | 1.8837                    | 6.51    | 1.9149                    | 14.75   |
| No employment in preceding 8 years  | 0.6298                    | -6.37   | 0.6147                    | -7.63   |
| <i>Unemployment duration &lt; 6 months</i>  | <i>Reference category</i> |         | <i>Reference category</i> |         |
| Unemployment duration 6-11 months   | 1.1047                    | 1.87    | 1.0866                    | 1.39    |
| Unemployment duration > 11 months   | 1.0259                    | 0.51    | 0.9584                    | -0.52   |
| <i>Occupation of last job: Clerk</i>  | <i>Reference category</i> |         | <i>Reference category</i> |         |
| Occupation of last job: Armed forces  | 0.3845                    | -4.73   | 0.8420                    | -1.35   |
| Occupation of last job: Legislator, senior official, manager                                  | 0.9289                    | -0.76   | 1.0578                    | 0.85    |
| Occupation of last job: Professional  | 0.7809                    | -3.31   | 0.9106                    | -0.76   |
| Occupation of last job: Technician or associate professional                                  | 0.9455                    | -1.31   | 1.1496                    | 2.04    |
| Occupation of last job: Shop worker or shop and market sales worker                           | 0.8388                    | -4.44   | 0.9348                    | -0.85   |
| Occupation of last job: Skilled agricultural or fishery worker                                | 0.8629                    | -1.84   | 0.8319                    | -2.79   |
| Occupation of last job: Craft or related trades worker  | 0.6977                    | -8.15   | 0.8297                    | -5.31   |
| Occupation of last job: Plant and machine operator or assembler                               | 0.8474                    | -2.78   | 0.9104                    | -1.31   |
| Occupation of last job: Elementary occupation   | 0.7150                    | -5.25   | 0.7720                    | -5.54   |
| Occupation of last job: Missing   | 1.1600                    | 1.25    | 1.1123                    | 0.78    |
| <i>Sector of last job: Services</i>   | <i>Reference category</i> |         | <i>Reference category</i> |         |
| Sector of last job: Agriculture   | 0.6861                    | -11.81  | 0.7652                    | -2.31   |
| Sector of last job: Industry  | 1.0471                    | 1.36    | 1.0079                    | 0.12    |
| Sector of last job: Missing   | 0.9393                    | -0.65   | 0.7408                    | -4.52   |
| <i>Degree of urbanization: Intermediate</i>   | <i>Reference category</i> |         | <i>Reference category</i> |         |
| Degree of urbanization: Densely populated   | 1.0482                    | 1.58    | 1.0005                    | 0.02    |
| Degree of urbanization: Thinly populated  | 0.9068                    | -1.62   | 0.9023                    | -1.14   |
| Degree of urbanization: Missing   | 1.0229                    | 0.48    | 0.9290                    | -1.55   |
| <i>Situation before seeking employment: Working</i>   | <i>Reference category</i> |         | <i>Reference category</i> |         |
| Situation before seeking employment: Full-time education                                      | 0.9282                    | -0.86   | 0.9446                    | -0.54   |
| Situation before seeking employment: Conscript on compulsory or military or community service | 1.4384                    | 2.62    | 1.4119                    | 3.43    |
| Situation before seeking employment: Domestic/family responsibilities                         | 0.7396                    | -4.86   | 0.8053                    | -5.55   |
| Situation before seeking employment: Other  | 0.7095                    | -1.89   | 0.6827                    | -1.66   |
| Situation before seeking employment: Missing  | 0.9582                    | -0.17   | 0.9017                    | -0.25   |
| Number of adults (15-64 years) in household   | 0.9836                    | -1.63   | 1.0053                    | 0.40    |
| Number of children (<=4 years) in household   | 0.8867                    | -2.84   | 1.0197                    | 0.75    |
| Number of children (5-14 years) in household  | 0.9364                    | -3.53   | 0.9789                    | -1.05   |
| Number of elderly (> = 65 years) in household   | 0.9465                    | -1.55   | 0.9472                    | -1.66   |
| <i>Employed spouse in household</i>   | <i>Reference category</i> |         | <i>Reference category</i> |         |
| No spouse in household  | 1.1855                    | 3.50    | 0.9241                    | -1.68   |

**Table 2 Ordered logit estimation of search intensity by gender (Continued)**

|   |         |       |         |       |
|---|---------|-------|---------|-------|
| Inactive/unemployed spouse in household | 0.9179  | -2.38 | 0.8023  | -3.28 |
| Pseudo R <sup>2</sup>                   | 0.0483  |       | 0.0460  |       |
| Observations                            | 149,770 |       | 139,256 |       |

Source: EU-LFS, years 2006–2008, own calculations. – Notes: The table displays exponentiated coefficients that can be interpreted as effect on the odds ratio. The regressions also include maximum sets of country dummies, NUTS 1 region dummies (deviations from country means), and year dummies. Regressions make use of sampling weights. z-values are based on robust standard errors, clustered at the country level. z-values greater than 1.96 (2.58) in absolute value denote statistical significance at the 5 (1) per cent level.

matrix and to interpret the factors. Following common practice, we only interpret factor loadings that exceed 0.5 in absolute value.

The first factor is mainly correlated with the two methods relating to the use of advertisements. Thus, these two are highly correlated with each other but not clearly related to any of the other methods. It is therefore suggestive to simply call this factor “Ads”. The second factor is positively related to the methods “Direct applications to employers” and “Asking friends, relatives, and trade unions, etc.” and negatively correlated with the method “Contacting the PEO to find work”. Hence, we might call this factor “Informal vs. formal search channels”. This is an interesting pattern because it seems to illustrate the opposing roles of taking one’s own initiative on the one hand and relying on public institutions on the other hand. Thus, in general, these two strategies do not go hand in hand. To the extent that the PEO aims at serving as a catalyst for the use of other search methods, this cannot be satisfactory. On the other hand, it may well be efficient because under these circumstances, the PEO is able to direct all its resources to those individuals that do not have access to alternative search channels or where the latter are unlikely to be successful.

Finally, the third factor is positively correlated with the two methods “Contacting a private employment agency to find work” and “Taking a test, interview, or examination”. These are the two least used methods among the seven selected ones and it is interesting that they seem to be correlated with each other. If this correlation is not driven by other variables, it might be that individuals are asked to take the interview or examination with the agency itself or that the agencies are able to arrange them with external companies. This factor might be called “Specialised search channels”.

For research purposes and from a policy perspective, the factor “Informal vs. formal search channels” is the most interesting one. Figure 2 shows how mean scores of this factor differ by country. It becomes apparent that Latvia has the highest and Germany the lowest use of informal relative to formal search methods. Moreover, in most of the Mediterranean countries – except for Portugal – direct applications and search via personal networks clearly outweigh the use of the PEO. The same is true for the Central and Eastern European countries where apart from Slovakia, the use of direct methods relative to the PEO is above the EU-LFS average.

**Table 3 Factor analysis of search methods: Proportion of total sample variance after Varimax rotation**

|                        | Factor 1 | Factor 2 | Factor 3 |
|------------------------|----------|----------|----------|
| Proportion of variance | 0.2426   | 0.2375   | 0.1933   |
| Cumulative             | 0.2426   | 0.4801   | 0.6734   |

Source: EU-LFS, years 2006–2008, own calculations. – Notes: Factor analysis makes use of sampling weights.

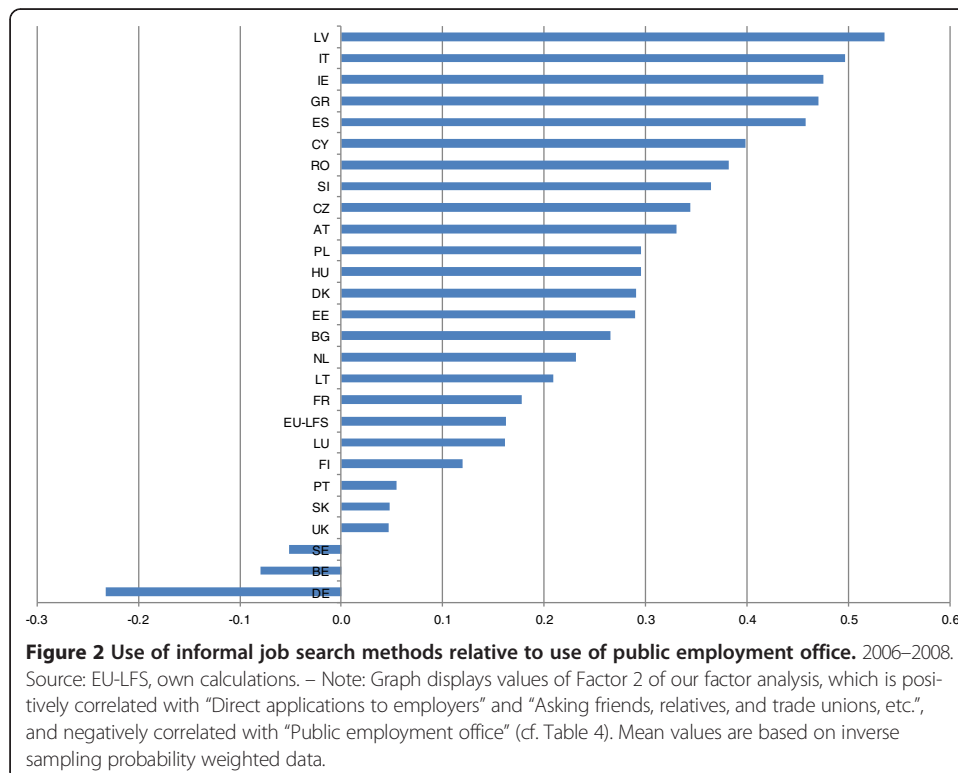
**Table 4 Factor analysis of search methods: Factor loadings after Varimax rotation**

|   | Factor 1      | Factor 2       | Factor 3      | Uniqueness |
|---|---------------|----------------|---------------|------------|
| Public employment office                          | 0.3295        | <b>-0.6557</b> | 0.2176        | 0.4142     |
| Private employment agency                         | 0.1342        | -0.0397        | <b>0.8358</b> | 0.2818     |
| Direct applications to employers                  | 0.2136        | <b>0.6803</b>  | 0.3857        | 0.3428     |
| Asking friends, relatives, and trade unions, etc. | 0.2623        | <b>0.7476</b>  | 0.0547        | 0.3693     |
| Inserting or answering advertisements             | <b>0.8277</b> | -0.0893        | 0.2408        | 0.2489     |
| Studying advertisements                           | <b>0.8578</b> | 0.2539         | 0.0460        | 0.1975     |
| Taking a test, interview or examination           | 0.1906        | 0.3700         | <b>0.6284</b> | 0.4319     |

Source: EU-LFS, years 2006–2008, own calculations. – Notes: Figures in bold denote factor loadings larger than 0.5 in absolute value. – Factor analysis makes use of sampling weights.

A natural question to ask is whether the relatively low use of the public employment services particularly in the Mediterranean countries potentially reflects a lower (perceived) quality of these services, i.e. a lower productivity in generating acceptable job offers as compared to the rest of Europe. We are not aware of any evidence suggesting that this may indeed be the case and with the data at hand we are not able to explore this possibility further.

Instead, it might be that the lower use of the PEO is simply the other side of the coin of a better access to informal search channels. Stronger and more extended family ties could be the reason for this pattern. For example, research by Bentolila and Ichino (2008) shows that households hit by unemployment are more likely to receive financial support from their (extended) family in Italy and Spain than is the case in Britain. The authors also suggest that in the Mediterranean countries, family members are more likely to live in the same geographical area. It is therefore conceivable that the help of





family members also extends to job search, thereby reducing the importance of the public employment agencies. This does not need to be a cause for worry since existing research suggests that informal search channels are among the most effective ones in leading to a new job (e.g. Rees 1966; Holzer 1988).

On the other hand, it could be the case that a relatively low use of public employment services is accompanied by a low level of job search requirements and monitoring of the unemployed (cf. McVicar 2008). If this was true, this would be a cause for concern because the latter instruments have been shown to be important in reducing unemployment duration (cf. e.g. Borland and Tseng 2007, as well as the discussion in OECD 2005, Chapter 4 and OECD 2007, Chapter 5). Venn (2012) reports that in many countries, eligibility criteria for unemployment benefits include job search requirements, but this does not mean that job search has to be through the PEO. Indeed, using the indicators reported by Venn (2012), we did not find a correlation between the degree of job search requirements and the probability of searching via the PEO at the country level. Detailed results are available upon request from the authors.

#### 4.3. Search methods

In this subsection we investigate the predictors of using specific search methods. In particular, we focus on the two methods which we consider to be of highest interest from a research and policy perspective, that is “Contacting the PEO to find work” and “Search via friends, relatives, and trade unions, etc.”, which both load highly on the second factor identified in the preceding analysis, but with opposing signs. A descriptive overview of the use of all considered job search methods by country is given in Table 5.

We estimate separate probit regressions for the two methods. As in the regressions on search intensity, we control for age, the level of educational attainment, the recent labour market history, the regional environment, the household characteristics detailed above, as well as for the country of residence and the year of the survey. Furthermore, we again report separate regression results for men and women. Due to the use of household characteristics, we again lose the observations of Denmark, Finland, and Sweden.

Table 6 displays the marginal effects and associated z-values. As was the case with overall search intensity, the correlations of the specific search methods with individual characteristics are pretty similar for women and men. As far as these correlations are concerned, we can detect some interesting age patterns. Older unemployed individuals (55 to 64 years) are less likely than medium-aged individuals (25 to 54 years) to use any of the two methods. However, there are differences for young job seekers (15 to 24 years). They have the highest likelihood of searching via personal networks – although the difference between them and medium-aged individuals is not statistically significant for men – but do not differ in a statistically significant way from the oldest age group in the probability of searching via the PEO.

There are two other (sets of) variables which exhibit strikingly different correlations with the two search methods under consideration. The first is the occupation of the last job. Those individuals who had a skilled occupation in their last job, such as technicians, professionals, and in particular legislators, senior officials, and managers have the lowest probability of searching via the PEO, but among the highest probability of searching via personal networks. Thus, a pattern of selection becomes apparent, where

**Table 5 Proportion of unemployed using specific search methods by country in %**

|            | Public<br>employment<br>office | Private<br>employment<br>agency | Direct<br>applications | Friends,<br>relatives, trade<br>unions, etc. | Inserting/<br>answering<br>ads | Studying<br>ads | Test,<br>interview, or<br>examination |
|------------|--------------------------------|---------------------------------|------------------------|--|--------------------------------|-----------------|---------------------------------------|
| AT         | 79                             | 15                              | 73                     | 80   | 50                             | 90              | 55                                    |
| BE         | 69                             | 43                              | 31                     | 35   | 24                             | 56              | 11                                    |
| BG         | 46                             | 14                              | 49                     | 65   | 16                             | 36              | 8                                     |
| CY         | 48                             | 2                               | 57                     | 77   | 15                             | 63              | 18                                    |
| CZ         | 90                             | 17                              | 78                     | 89   | 21                             | 84              | 34                                    |
| DE         | 93                             | 19                              | 20                     | 39   | 58                             | 58              | 12                                    |
| DK         | 44                             | 3                               | 69                     | 53   | 68                             | 85              | 17                                    |
| EE         | 30                             | 4                               | 36                     | 63   | 29                             | 54              | 6                                     |
| ES         | 43                             | 32                              | 74                     | 84   | 31                             | 60              | 24                                    |
| EU-<br>LFS | 65                             | 21                              | 52                     | 61   | 42                             | 68              | 17                                    |
| FI         | 60                             | 15                              | 53                     | 40   | 42                             | 87              | 21                                    |
| FR         | 64                             | 32                              | 61                     | 59   | 52                             | 86              | 22                                    |
| GR         | 63                             | 9                               | 87                     | 89   | 29                             | 71              | 20                                    |
| HU         | 74                             | 25                              | 73                     | 84   | 42                             | 86              | 6                                     |
| IE         | 56                             | 30                              | 82                     | 85   | 29                             | 93              | 32                                    |
| IT         | 28                             | 19                              | 60                     | 80   | 24                             | 58              | 34                                    |
| LT         | 53                             | 5                               | 45                     | 58   | 14                             | 55              | 3                                     |
| LU         | 77                             | 16                              | 55                     | 63   | 20                             | 88              | 4                                     |
| LV         | 42                             | 6                               | 72                     | 91   | 25                             | 86              | 11                                    |
| NL         | 50                             | 47                              | 62                     | 57   | 52                             | 76              | 35                                    |
| PL         | 75                             | 7                               | 65                     | 82   | 36                             | 80              | 15                                    |
| PT         | 61                             | 9                               | 48                     | 38   | 19                             | 27              | 5                                     |
| RO         | 12                             | 6                               | 48                     | 56   | 43                             | 64              | 12                                    |
| SE         | 73                             | 5                               | 45                     | 25   | 19                             | 53              | 1                                     |
| SI         | 71                             | 22                              | 79                     | 86   | 75                             | 83              | 57                                    |
| SK         | 80                             | 6                               | 36                     | 60   | 14                             | 47              | 4                                     |
| UK         | 67                             | 24                              | 49                     | 50   | 59                             | 82              | 0                                     |

Source: EU-LFS, years 2006–2008, own calculations. Notes: Based on inverse sampling probability weighted data. The method “Test, interview, or examination” is not surveyed in the UK.

the PEO is contacted, above all, by those individuals that, arguably, have less favourable characteristics to find a job. This is a common finding in the literature (e.g. Weber and Mahringer 2008). It also goes hand in hand with the empirical observation that jobs obtained through the PEO pay, on average, lower wages and/or are shorter-lived (e.g. Osberg 1993; Addison and Portugal 2002; Weber and Mahringer 2008; Gregg and Wadsworth 1996 draw a more optimistic picture for Britain). However, it is not (necessarily) informative about the quality of the public employment services but may rather reflect the fact that the PEO can play an important role in reducing the search costs of individual job searchers, which are particularly high for the low-skilled (Fougère et al. 2005). Furthermore, employers tend to post their higher-level jobs at other search outlets. Thus, according to Osberg (1993, p. 352) “[...] a choice of job-search strategy by a jobless worker is simultaneously a choice of wage-offer distributions”. Individuals aiming at better-paying jobs will therefore search via those other channels in the first

**Table 6 Probit estimation of specific search methods by gender**

|   | Women                     |         |                           |         | Men                       |         |                           |         |
|---|---------------------------|---------|---------------------------|---------|---------------------------|---------|---------------------------|---------|
|   | Public employment office  |         | Friends                   |         | Public employment office  |         | Friends                   |         |
|   | Marg. Effect              | z-value | Marg. Effect              | z-value | Marg. Effect              | z-value | Marg. Effect              | z-value |
| <i>Age 15-24</i>  | <i>Reference category</i> |         | <i>Reference category</i> |         | <i>Reference category</i> |         | <i>Reference category</i> |         |
| Age 25-54   | 0.0301                    | 2.02    | -0.0293                   | -2.29   | 0.0405                    | 3.81    | -0.0135                   | -1.63   |
| Age 55-64   | -0.0068                   | -0.28   | -0.0831                   | -2.20   | 0.0098                    | 0.40    | -0.0653                   | -3.82   |
| <i>ISCED 0-2</i>  | <i>Reference category</i> |         | <i>Reference category</i> |         | <i>Reference category</i> |         | <i>Reference category</i> |         |
| ISCED 3-4   | 0.0236                    | 1.80    | 0.0232                    | 1.14    | 0.0078                    | 0.91    | 0.0263                    | 1.47    |
| ISCED 5-6   | -0.0006                   | -0.03   | 0.0136                    | 0.45    | -0.0210                   | -1.62   | 0.0048                    | 0.17    |
| <i>Unemployment duration &lt;6 months</i>                           | <i>Reference category</i> |         | <i>Reference category</i> |         | <i>Reference category</i> |         | <i>Reference category</i> |         |
| Unemployment duration 6-11 months                                   | 0.0265                    | 1.55    | 0.0205                    | 1.94    | 0.0277                    | 1.22    | -0.0022                   | -0.18   |
| Unemployment duration > 11 months                                   | 0.0411                    | 1.91    | 0.0084                    | 0.60    | 0.0198                    | 0.75    | -0.0088                   | -0.92   |
| No employment in preceding 8 years                                  | -0.0187                   | -1.01   | 0.0082                    | 0.65    | 0.0136                    | 0.87    | -0.0121                   | -0.94   |
| <i>Occupation of last job: Clerk</i>                                | <i>Reference category</i> |         | <i>Reference category</i> |         | <i>Reference category</i> |         | <i>Reference category</i> |         |
| Occupation of last job: Armed forces                                | -0.0200                   | -0.19   | -0.3184                   | -3.80   | -0.0098                   | -0.12   | 0.0186                    | 0.62    |
| Occupation of last job: Legislator, senior official, manager        | -0.0592                   | -2.87   | 0.0527                    | 3.70    | -0.0889                   | -4.09   | 0.0684                    | 2.81    |
| Occupation of last job: Professional                                | -0.0548                   | -2.38   | 0.0180                    | 0.55    | -0.0589                   | -1.63   | 0.0291                    | 0.74    |
| Occupation of last job: Technician or associate professional        | -0.0183                   | -2.45   | 0.0177                    | 1.31    | -0.0125                   | -0.54   | 0.0512                    | 1.85    |
| Occupation of last job: Shop worker or shop and market sales worker | -0.0123                   | -0.78   | 0.0483                    | 3.95    | 0.0080                    | 0.66    | 0.0515                    | 2.24    |
| Occupation of last job: Skilled agricultural or fishery worker      | 0.0307                    | 0.74    | 0.0490                    | 2.74    | 0.0324                    | 0.94    | 0.0121                    | 0.65    |
| Occupation of last job: Craft or related trades worker              | 0.0131                    | 0.81    | -0.0007                   | -0.05   | 0.0332                    | 1.58    | 0.0427                    | 4.96    |
| Occupation of last job: Plant and machine operator or assembler     | 0.0122                    | 0.80    | 0.0451                    | 2.33    | 0.0414                    | 2.42    | 0.0251                    | 1.91    |
| Occupation of last job: Elementary occupation                       | 0.0061                    | 0.31    | 0.0257                    | 1.37    | 0.0391                    | 2.86    | 0.0081                    | 0.89    |
| Occupation of last job: Missing                                     | 0.1333                    | 5.11    | 0.0366                    | 2.72    | 0.1223                    | 8.64    | 0.0357                    | 1.51    |
| <i>Sector of last job: Services</i>                                 | <i>Reference category</i> |         | <i>Reference category</i> |         | <i>Reference category</i> |         | <i>Reference category</i> |         |
| Sector of last job: Agriculture                                     | -0.0379                   | -0.93   | -0.0005                   | -0.04   | 0.0026                    | 0.21    | 0.0068                    | 0.31    |
| Sector of last job: Industry  | 0.0100                    | 1.35    | 0.0081                    | 1.37    | 0.0081                    | 1.08    | 0.0134                    | 1.06    |
| Sector of last job: Missing   | -0.0511                   | -3.59   | -0.0104                   | -0.69   | -0.0607                   | -3.84   | -0.0475                   | -2.26   |
| <i>Degree of urbanization: Intermediate</i>                         | <i>Reference category</i> |         | <i>Reference category</i> |         | <i>Reference category</i> |         | <i>Reference category</i> |         |
| Degree of urbanization: Densely populated                           | -0.0304                   | -2.37   | -0.0162                   | -2.44   | -0.0225                   | -2.18   | -0.0264                   | -2.19   |
| Degree of urbanization: Thinly populated                            | 0.0310                    | 1.42    | 0.0067                    | 0.31    | 0.0191                    | 1.21    | 0.0122                    | 0.38    |
| Degree of urbanization: Missing                                     | -0.0014                   | -0.07   | 0.0109                    | 0.86    | 0.0315                    | 2.25    | -0.0101                   | -0.49   |

**Table 6 Probit estimation of specific search methods by gender (Continued)**

| <i>Situation before seeking employment: Working</i>   | <i>Reference category</i> |       | <i>Reference category</i> |       | <i>Reference category</i> |       | <i>Reference category</i> |       |
|---|---------------------------|-------|---------------------------|-------|---------------------------|-------|---------------------------|-------|
| Situation before seeking employment: Full-time education                                      | -0.1593                   | -4.21 | -0.0488                   | -2.40 | -0.1061                   | -4.39 | -0.0170                   | -0.61 |
| Situation before seeking employment: Conscript on compulsory or military or community service | 0.1318                    | 2.08  | -0.2152                   | -1.04 | 0.0723                    | 1.84  | 0.0468                    | 0.99  |
| Situation before seeking employment: Domestic/family responsibilities                         | -0.1410                   | -3.66 | -0.0058                   | -0.42 | -0.1222                   | -2.94 | 0.0039                    | 0.14  |
| Situation before seeking employment: Other  | -0.1178                   | -4.01 | -0.0705                   | -1.34 | -0.0687                   | -3.00 | -0.0844                   | -1.25 |
| Situation before seeking employment: Missing  | 0.0149                    | 0.64  | -0.0900                   | -3.42 | 0.0651                    | 1.54  | -0.0789                   | -2.32 |
| Number of adults (15–64 years) in household   | -0.0055                   | -0.61 | 0.0016                    | 0.41  | 0.0025                    | 0.57  | -0.0017                   | -0.62 |
| Number of children (<=4 years) in household   | 0.0037                    | 0.39  | -0.0290                   | -2.87 | 0.0118                    | 1.23  | 0.0025                    | 0.31  |
| Number of children (5–14 years) in household  | -0.0086                   | -1.16 | -0.0033                   | -1.27 | 0.0006                    | 0.12  | 0.0048                    | 1.33  |
| Number of elderly (> = 65 years) in household   | 0.0065                    | 0.63  | -0.0181                   | -2.00 | 0.0051                    | 0.73  | -0.0272                   | -2.59 |
| <i>Employed spouse in household</i>   | <i>Reference category</i> |       | <i>Reference category</i> |       | <i>Reference category</i> |       | <i>Reference category</i> |       |
| No spouse in household  | 0.0715                    | 2.37  | 0.0015                    | 0.09  | 0.0228                    | 0.82  | -0.0191                   | -1.90 |
| Inactive/unemployed spouse in household   | 0.0758                    | 1.98  | -0.0398                   | -1.95 | 0.0490                    | 2.35  | -0.0414                   | -2.25 |
| Pseudo R <sup>2</sup>   | 0.2025                    |       | 0.1324                    |       | 0.2346                    |       | 0.1309                    |       |
| Observations  | 149,770                   |       | 149,770                   |       | 139,256                   |       | 139,256                   |       |

Source: EU-LFS, years 2006–2008, own calculations. – Notes: The table displays marginal effects obtained from probit regressions. The regressions also include maximum sets of country dummies, NUTS 1 region dummies (deviations from country means), and year dummies. Regressions make use of sampling weights. z-values are based on robust standard errors, clustered at the country level. z-values greater than 1.96 (2.58) in absolute value denote statistical significance at the 5 (1) per cent level.

place. Hence, expected benefits rather than costs – which should in general be low – are likely to determine the choice of this particular search method.

The second striking difference relates to the labour market status of the spouse – if present in the household. Having an inactive or unemployed spouse in the household is associated with a lower probability of searching via personal networks and a higher probability of searching via the PEO compared to the base category, having an employed spouse in the household. Again acknowledging the potential role of selection and common shocks, this finding lends more support to the hypothesis that individuals without or at least with less immediate contact to the working population might be less aware of or have less access to search channels other than the PEO.

Concerning the remaining variables, one noteworthy and surprising finding is that unemployed persons in densely populated areas are less likely than unemployed persons in areas with an intermediate degree of urbanization to use either of the two methods. One could have imagined that access to social networks is easier and hence, more frequently used for job search in densely populated areas. However, given that there is no difference between regions with different degrees of urbanization in terms

of overall job search intensity, we can conclude that the lower use of the PEO and search via personal networks must be compensated by a higher use of other search channels. For example, it is conceivable that in densely populated areas standard search channels such as advertisements already generate sufficient job offers.

#### 4.4. Institutions and job search behaviour

The previous sections have paid particular attention to correlations between individual and household characteristics and job search behaviour. However, even when controlling for these characteristics, important differences remain between countries, as the highly significant sets of country dummies confirm. Thus, the job search behaviour of the unemployed is likely to be influenced by the institutional features of the national labour markets. We therefore investigate how cross-country differences with respect to job search – as measured by the country dummies in the respective regressions – are correlated with institutions across the EU Member States (cf. Section 3).

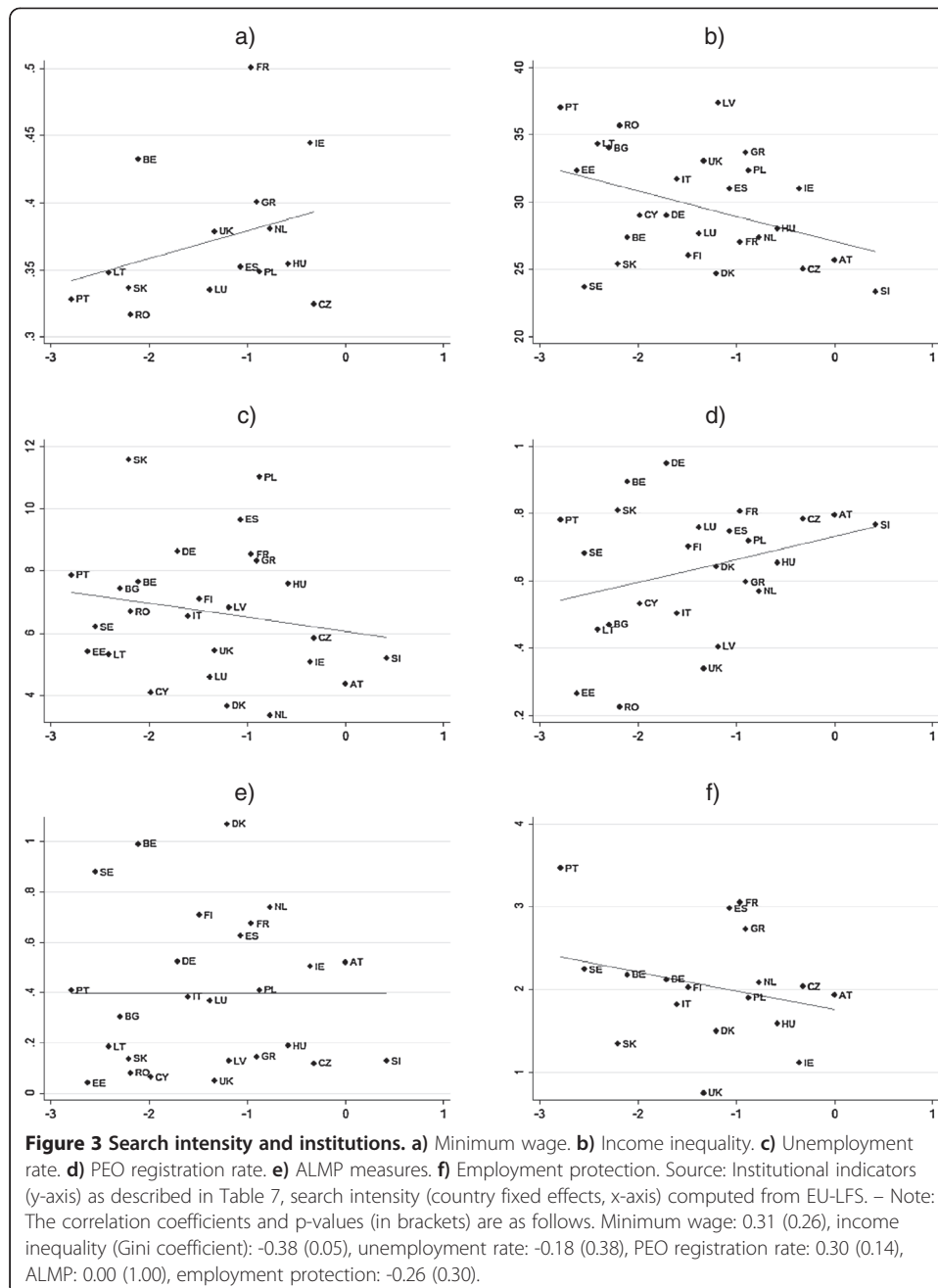
In this part of the analysis, we concentrate on overall search intensity, as well on the use of the two specific search channels analysed in the previous section, that is, search through the PEO and through friends, relatives, trade unions, etc. (hereafter “friends” for short). In particular, we identify six institutional or macroeconomic indicators which are correlated in a meaningful way with search intensity (cf. Table 7). For three of these indicators, the correlations with the two specific search channels mentioned above are also instructive and are therefore reported. It should be stressed that while this exercise may provide some suggestive evidence and point to potential avenues for further research, it is based on a limited set of country observations only so that statistical significance at conventional levels can rarely be obtained. Moreover, we establish mere associations and not any causal relationships.

The correlations are displayed in Figure 3 (search intensity) and Figure 4 (specific search methods). The first labour market institution that is clearly associated with wage expectations and that should, therefore, have an influence on the job search behaviour of the unemployed is minimum wage legislation. In this context, two effects can be at work. On the one hand, a binding minimum wage *ceteris paribus* increases expected wages, which in turn raises the search intensity of the unemployed. On the other hand, minimum wages may reduce the number of jobs available (Neumark and

**Table 7 Source and description of institutional variables**

| Variables               | Source                  | Description   |
|-------------------------|-------------------------|---|
| ALMP exp.: measures/GDP | Eurostat                | Public expenditure on labour market policy interventions; type of action: measures; expressed as a percentage of GDP.   |
| Gini coefficient        | Eurostat                | Relationship between the cumulative shares of the population arranged according to the level of equivalised disposable income and the cumulative share of the equivalised total disposable income received by them. |
| PEO registration rate   | EU-LFS, own computation | Share of unemployed (in our regression sample) that are registered with the public employment office. Computed from EU-LFS data set.  |
| Unemp. rate             | Eurostat                | Number of unemployed as a percentage of the active labour market population; calculated with reference to the population 15–74 years old.   |
| EP all empl             | OECD                    | Employment protection overall.  |
| Minimum wage            | OECD                    | Minimum relative to average wages of full-time workers.   |

Source: OECD (2011) and Eurostat (2011). – Notes: “EP” stands for employment protection, “ALMP” for active labour market policy, and “Exp.” for expenditure. Institutional indicators are measured as mean values over the years 2006–2008. OECD data sources feature a lower number of country observations.



Wascher 2008), which makes job search less attractive. From our empirical analysis, it becomes apparent that search intensity is positively correlated with the level of the minimum wage (Figure 3a). Therefore, this could be viewed as suggestive evidence that the first effect, higher expected wages, has a stronger impact on search intensity than the second effect.

This interpretation of the association between minimum wages and search intensity is corroborated by the evidence on income inequality in this context. In particular, the correlation between income inequality and search intensity is negative (Figure 3b), i.e. the unemployed search more intensively in countries where income inequality is



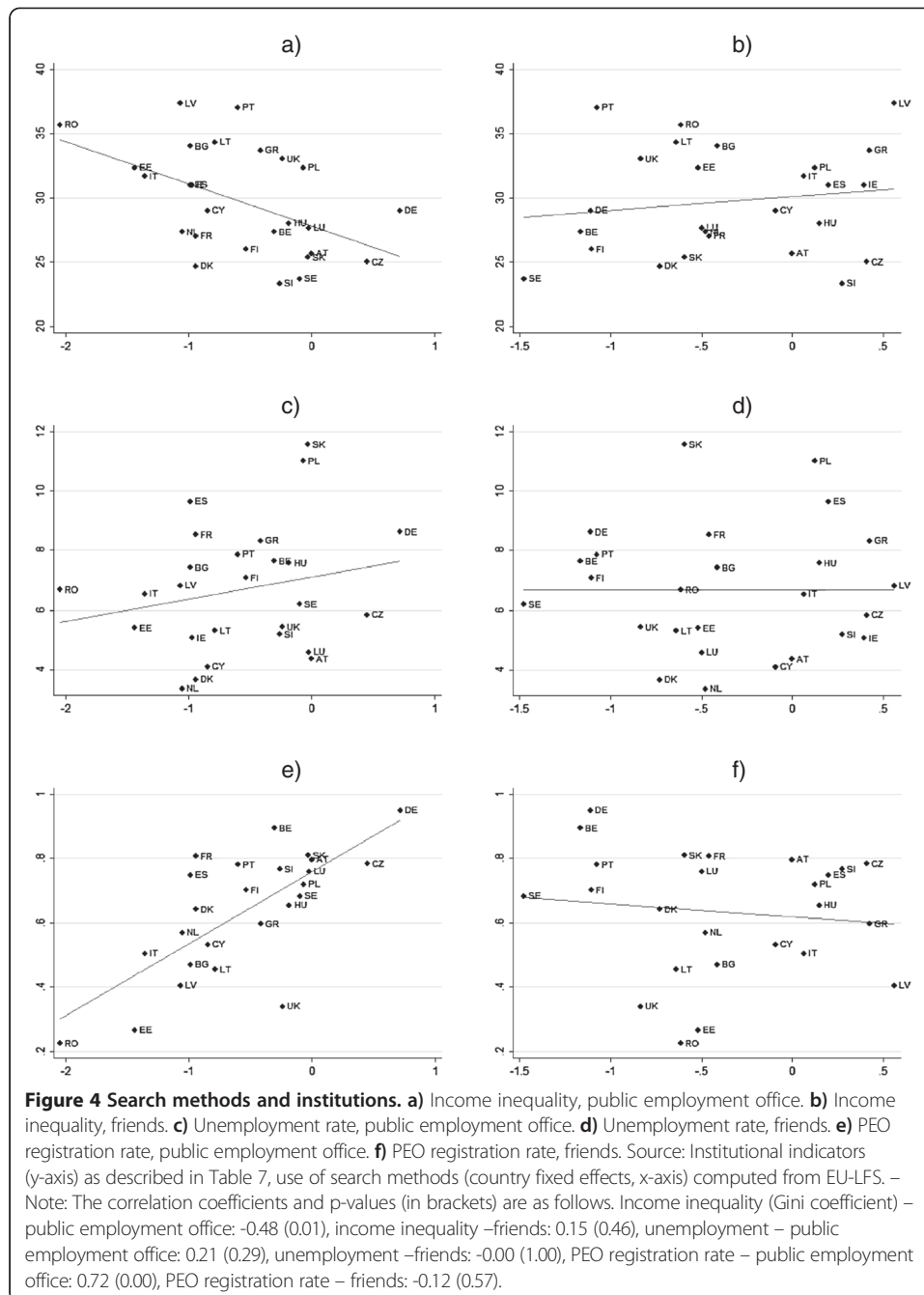
relatively low. It can be expected that for most unemployed, expected wages are shaped by the lower end of the wage offer distribution. Since the latter is in general strongly affected by minimum wage legislation, similar mechanisms are likely to be at work. A further inspection reveals that this result is mainly driven by the fact that high wage inequality goes together with a significantly lower use of the PEO (Figure 4a). Job search through friends, on the other hand, is slightly elevated in countries with higher wage inequality (Figure 4b). These findings could be due to the fact that the search channel “friends” generally allows for a more targeted job search than search through the PEO. Thus, search through the former channel may help to overcome the overall reduction of the expected wage, which makes search through friends more attractive when wage inequality is higher. Another potential explanation is that in countries where governments in general play a larger role, there is both more income redistribution and also a stronger reliance on public employment services.

The unemployment rate is weakly negatively correlated with search intensity (Figure 3c). This is despite the fact that in countries with high unemployment, unemployed individuals search more through the PEO than in countries with low unemployment (Figure 4c), and that the use of the search channel “friends” is uncorrelated with unemployment at the national level (Figure 4d). Therefore, the other search channels seem to drive the negative correlation between search intensity and unemployment. The relatively low search intensity in countries with high unemployment could again be due to lower wage expectations in these countries and also due to a lower job availability. Furthermore, the finding that high unemployment is associated with a higher use of the PEO is in line with Osberg (1993) who, however, detects this relationship within a country (Canada) over the business cycle.

Another indicator that is likely to be linked to search behaviour is the registration rate at the PEO, which might be due to, e.g., specific job search requirements imposed by the PEO or more general support in the job finding process. Indeed, the registration rate is positively correlated with search intensity (Figure 3d). Unsurprisingly, this is driven by a strong positive correlation between the PEO registration rate and search through the PEO (Figure 4e). In contrast, the correlation between the PEO registration rate and job search via friends is uncorrelated at the country level (Figure 4f). These results imply that the net “effect” of higher PEO registration is positive: In countries with a high registration rate, search through the PEO is higher but does not seem to come at the expense of other search methods, i.e. there is apparently no (complete) crowding out of other search methods. Generally, the strong positive correlation between registration at the PEO and its use as a search channel seems to indicate that cross-country differences should rather be interpreted in terms of the institutional framework than as the outcome of individual search choices.

By contrast, expenditure on active labour market policy (ALMP) measures as a share of GDP is hardly correlated with search intensity (Figure 3e). Therefore, at least at the country level, there is no indication for a positive effect of ALMP measures on search intensity.

Finally, job search intensity is weakly negatively correlated with the level of employment protection (Figure 3f). This could be an indication that employment protection not only reduces the number of lay-offs in an economy, but that it also makes it harder for the unemployed to find a suitable job. Therefore, job search has a lower expected value, which may well lead to less search in countries with higher employment protection.<sup>9</sup>



## 5. Conclusion

In this paper, we investigate the job search behaviour of unemployed individuals in the EU, using information at the level of the individual from the EU-LFS. We focus on both individual determinants of search behaviour and cross-country differences, making use of the fact that the data are harmonised for the countries included in the data set.

In particular, we examine four related topics. First, we analyse overall search intensity and how it is determined by individual and household characteristics. Second, we investigate whether specific search methods are generally used together, thus forming “bundles” of search methods. Third, we analyse in detail two specific search methods,

search through the public employment office (PEO) and search through friends and networks. Finally, we scrutinise to what extent search intensity and the use of specific search methods are correlated with the institutional features of the EU Member States.

The main findings are the following. First, individual characteristics and labour market histories play an important role. It becomes apparent that those individuals that, arguably, have better chances to find a job, i.e., that are more highly skilled and still fairly young, have a higher job search intensity. Furthermore, there is a hump-shaped pattern of search intensity with respect to unemployment duration, with long-term unemployed individuals using the lowest number of search methods. Finally, holding all other characteristics constant, unemployed women search less intensively than men.

Second, household characteristics are important determinants of search intensity. In general, individuals living in households with more children search less intensively. Moreover, having a non-working spouse in the household is also associated with less search efforts and with a stronger reliance on the PEO. For unemployed women, there is in general a more negative correlation between search intensity and household characteristics.

Third, we find important evidence for the use of search bundles. In particular, as a general result the use of the PEO is at best independent of, if not negatively related to, the other search methods. To a large extent this is likely to be driven by selection mechanisms. The PEO seems to be approached predominantly in cases where alternative search channels are not available or unlikely to yield a positive outcome.

Finally, even after controlling for individual and household characteristics, important differences regarding the job search behaviour remain between countries. At least to some extent, these cross-country differences can be linked to differences in labour market characteristics and institutions. Our analysis indicates that this is in particular true for minimum wages and the importance of the PEO in a country. Therefore, while at an individual level, search through the PEO is likely to be driven by selection effects (see above), higher registration rates at the PEO, which may be due to country-specific rules requiring registration, seem to yield a positive effect in terms of higher search intensity. Here, further research is clearly warranted.

Although the analyses in this paper do not allow us to conclude whether search choices are optimal or not, the results suggest a role for policy makers in targeted support for specific groups among the unemployed. For example, efforts should be made such that search becomes less costly and more worthwhile for women, particularly if they have many family responsibilities. Non-working couples seem to constitute another risk group. The results indicate that they are in a worse position to make use of search methods other than the PEO, which may be due to the fact that they have already become alienated from the labour market. This is a cause for worry because under these circumstances, labour-market segregation along family lines may emerge, and unemployment may become more persistent. Furthermore, although it may to some extent be efficient that different groups among the unemployed make use of different search methods, it should nevertheless be ensured that all unemployed job seekers are aware of all available search channels and in a good position to use them.

Finally, we find that in several countries that have been particularly hard-hit by the global economic and financial crisis – among them Spain, Italy, Greece, and Ireland – search via informal channels clearly outweighs the use of the public employment services as a job search method. If governments in these countries aim to adopt active labour market

policy measures to fight the job crisis, these efforts should probably be accompanied by strengthening the role of the public employment services in the placement process. However, the question of whether the search behaviour of the unemployed and related policies improve or worsen the matching efficiency in the labour market, and hence the speed of economic recovery, is left to future research.

## Endnotes

<sup>1</sup>In earlier years, the exact set of surveyed methods differs between countries. As far as the residual category is concerned, it is striking that is filled with zeros for all the observations of some countries, but on the other hand entirely filled with ones for a country such as Portugal, for example. Without a more detailed knowledge of what these “other search methods” comprise, it is difficult to disentangle to what extent this reflects real differences in search behaviour and to what extent this is simply due to the survey design. However, none of our results changes in a qualitative way if we include the residual category.

<sup>2</sup>Only the method “Taking a test, interview, or examination” is not strictly comparable across all countries because it is not surveyed in the UK.

<sup>3</sup>In principle, since the number of search methods is a cardinal variable consisting of non-negative integers, one could also think of estimating count data models. However, a cardinal interpretation is misleading if the number of search methods is used as a proxy for search intensity. For example, while we maintain the assumption that someone using four job search methods searches more intensively than someone using only two methods, we do not assume that her search intensity is (exactly) twice as high.

<sup>4</sup>Since we also include country fixed effects and would like to use the latter as a measure of cross-country differences in subsequent analyses, we recode the region dummies as deviations from the overall country mean and omit one region per country.

<sup>5</sup>In principle, it could also be the case that this finding is due to older unemployed reducing their search efforts if they are close to reaching the retirement age. We have analysed this possibility by dropping all individuals aged 60 and above from our sample in a robustness check. However, the negative correlation between search intensity and the oldest age category – which is 55 to 59 years in this alternative specification – remains basically unaltered, indicating that the result is not only driven by individuals who are about to retire. Regression results are available upon request.

<sup>6</sup>The Wald test statistics amount to 461.45 (occupation of last job), 77.20 (sector of last job), and 54.56 (situation before seeking employment), respectively, all of which have an associated p-value of 0.0000.

<sup>7</sup>One question is to what extent household characteristics add explanatory power to the regressions. Judged by the Pseudo  $R^2$ , which is even lower in the specification including household characteristics than in the baseline specification, one might conclude that it does not help to improve the regression model. Note, however, that the Pseudo  $R^2$  values should not be compared to each other because the models have been estimated on different samples due to the fact that Denmark, Finland, and Sweden had to be omitted from the extended regression model. A Wald test indeed indicates that household characteristics are jointly highly significant with a test statistic of 108.79 and an associated p-value of 0.0000.

<sup>8</sup>One common approach is to keep all the factors that correspond to an eigenvalue greater than one. While in our application the first two (unrotated) factors feature eigenvalues greater than one, the eigenvalue of the third factor is 0.85. However, the first two factors account for only 55 per cent of the overall sample variance. In order to increase the explanatory power of the factors, we decided to keep the third factor.

<sup>9</sup>Note, however, that this correlation is largely driven by Portugal. If Portugal is dropped from the analysis, the correlation is basically zero.

#### Competing interest

The IZA Journal of European Labor Studies is committed to the IZA Guiding Principles of Research Integrity. The authors declare that they have observed these principles.

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