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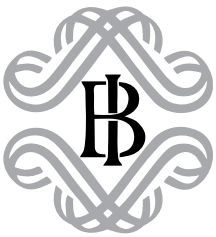

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DOES THE ILO DEFINITION CAPTURE ALL UNEMPLOYMENT?

by Andrea Brandolini,* Piero Cipollone* and Eliana Viviano **

Abstract

The labour market status of many non-working persons is at the boundary between unemployment and inactivity. Like the unemployed, they seek and are available for work; unlike them, their last search action was not recent enough to meet the ILO definition of unemployment. In this paper we examine by non-parametric tests how the transition probabilities of these out-of-the-labour-force job seekers differ from those of the unemployed as well as the other non-participants. First, using data from the European Community Household Panel, we show that in most EU countries these job seekers constitute a distinct labour market state. Second, we rely on information only available in the Italian Labour Force Survey to derive a measure of search intensity which we use to break down the out-of-the-labour-force job seekers. On the basis of their transition probabilities, the most active are indistinguishable from the unemployed.

JEL classification: J64, J22, R23.

Keywords: unemployment, ILO classifications, transition probabilities.

Contents

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1. Introduction[1]

The concept of unemployment is something everyone seems to understand. Yet its measurement is not straightforward and rests on a number of arbitrary choices. The labour force statistics divide the adult population into three, mutually exclusive groups: the employed, the unemployed and the inactive, i.e. people out of the labour force. The employed comprise all persons who during a reference period were in paid employment (including family workers). The unemployed comprise those persons who were without work and immediately available to start work during the same period and who had actively looked for a job at some time during the preceding four weeks. People neither employed nor unemployed are considered inactive and are excluded from the labour force.

People out of the labour force are thus a composite group formed by persons who do not want a job, persons who are not searching but might take a job if offered, and persons who are searching for a job but took their last step more than four weeks before the interview. We calculate that, on average, in European countries about a fifth of all people who declared they were seeking work in the 1990s were left out of the labour force on the basis of the four-week requirement. The sheer size of this group—henceforth labelled "potential labour force", or simply "potentials"—calls for a scrutiny of the four-week criterion. Interestingly, while it is recognised that this requirement may significantly affect the level of measured unemployment,[2] there are no cogent reasons to choose four weeks as opposed to any other period.[3]

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[2] For instance, the Organisation for Economic Co-operation and Development (1987, p. 130) reports that increasing the job-search period from one to four weeks raised the measured unemployment rate by about a tenth both in Australia in 1975 and in the United Kingdom in 1984-86.

[3] The International Labour Office (ILO) guidelines of 1982, which set the criteria followed by national statistical agencies to compile labour force statistics, did not specify the length of the search period so that each country could adapt it to its own institutions and characteristics (see International Labour Office, 1990). In 1983 the Organisation

In this paper we investigate the role of the four-week criterion by addressing two related questions. Are the potentials really different from the unemployed? Conversely, are they similar to the other inactive members of the population? A standard way to evaluate labour market classifications is to compare transition probabilities between different states (e.g. Flinn and Heckman, 1983; Jones and Riddell, 1999). If transition probabilities from two states towards all others are statistically similar, then the two states cannot be regarded as truly distinct. We follow this approach with two innovations: we impose less structure on the data by constructing a non-parametric test instead of resorting to logit or probit models; we perform a comparative analysis, which allows us to highlight important features in common among European labour markets. We carry out two different exercises.

First, we test whether transition probabilities differ between the unemployed, the potentials and the other inactive persons in European countries. Data are drawn from the European Community Household Panel, a harmonised annual longitudinal survey conducted by national statistical offices from 1994 to 2001 under Eurostat co-ordination. Our results suggest that the (annual) transition probabilities of potentials are always different from those observed for other non-participants, while in some cases they can be considered similar to those of the unemployed. On this basis, the European labour markets would be better described by four distinct states (employed, unemployed, potentials and other inactive population) than by the three-way characterisation of the ILO

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for Economic Co-operation and Development (OECD) Working Party on Employment and Unemployment Statistics "... specifically mentioned the suitability of a four-week period, especially for purposes of international comparisons between OECD countries" (Organisation for Economic Co-operation and Development, 1987, p. 130). Sorrentino (2000, p. 17, fn. 7) reports that "at that time, countries were using reference periods varying from 1 week to 60 days". The four-week standard was soon adopted by Eurostat and most OECD countries. It had been in use in the United States since 1967, together with the requirement of using an active job search method, following the recommendations of the President's Committee to Appraise Employment and Unemployment Statistics (the Gordon Committee) in 1962. Prior to 1967 the time period for job seeking was ambiguous since it was not specified in the questionnaire. According to the "article of record" on the 1967 revisions, "the use of a 4-week period for the measurement of job seeking activity is the shortest of the various alternatives suggested by the Gordon Committee. This was done to minimize the inclusion of persons with very loose attachments to the labor force and to keep the time reference for job seeking from getting too far out of line with that of jobholding. ... A time period for job seeking which extends beyond the survey week itself was selected, since, by its very nature, job-hunting does not necessarily involve specific identifiable activity every week. The more typical pattern of behavior probably involves periods of activity (i.e., checking with employers) followed by periods of waiting. Some forms of looking are continuous, i.e., registration with public employment agencies, but others are not" (Stein, 1967, as quoted in a personal communication by Sharon Cohany). In 1979 the National Commission on Employment and Unemployment (the Levitan Commission) reconsidered the labour force definitions adopted in the United States. Stein (1980, p. 18) reports that the "most controversial definitional issue" was that of discouraged workers; the proposal to classify them as unemployed by extending the job search period to six months was eventually rejected by a vote of 5 to 4 (see Finegan, 1981, p. 88, fn. 1).

guidelines, confirming the conclusion reached by Jones and Riddell (1999) for Canada.

Second, we identify the search intensity that separates the unemployed from the potentials by looking at the data. We proxy search intensity by the "number of months since the last search action" using data from the Italian labour force survey, the only EU survey where this information is available. We first compare the (quarterly) transition probabilities of the unemployed with those of the group of the most intensive job seekers among the potentials. Then we repeat the test by enlarging the latter group in steps, adding job seekers whose last action is the further back in time. The potentials turn out to be behaviourally indistinguishable from the unemployed when their last search action occurred "not long before" the ILO four weeks (up to 11 months for certain groups in the population). Letting the boundary between unemployment and potential labour force be determined by the data, rather than by the arbitrary four-week criterion, would raise the Italian unemployment rate in 2000 from 11 to 13 per cent.

Note that the correct identification of labour market states is not just a matter of classification or an exercise in measurement. On the one hand, the level of unemployment is a highly sensitive issue in the public debate. On the other hand, the framing of economic and monetary policies requires the assessment of labour market conditions. While tightness has traditionally been measured by the number of unemployed, theory tells us that it is also affected by the number of "less intensive" job seekers. The recent literature on the matching process, for instance, recognises that hiring rates depend not only on the unemployed but also on people out of the labour force, possibly with a lower probability of success with respect to the unemployed (e.g. Broesma and Van Ours, 1999; Mumford and Smith, 1999).

The paper is organised as follows. Section 2. discusses the importance of the potential labour force and tests whether it is a distinct state from unemployment and inactivity in European labour markets. The non-parametric test is presented in subsection 2.2. Section 3. compares the behaviour of potentials with different levels of search intensity with that of the unemployed in Italy. Section 4. summarises the main results and draws the main lessons.

2. Participation and inactivity in European labour markets

In European countries the unemployment rate is computed, like many other labour market statistics, from data collected in national labour force surveys (LFS) co-ordinated by Eurostat. People aged 15 and over are classified as unemployed if they meet all the following requirements: (1) they are without work; (2) they state that they are seeking employment; (3) they are available to start work within the following two weeks; (4) they sought employment at some time during the previous four weeks (see Eurostat, 1996).

Thus, non-working individuals are not only asked whether they were searching for work, but also how intensively: somebody who did not take at least one search step during the preceding four weeks is excluded from the unemployed, and from the labour force, even if conditions (1) to (3) are met. It follows that the population out of the labour force is a composite aggregate, which can be further subdivided in relation to the degree of labour market attachment. At least three subgroups can be identified:

1. Job seekers whose last search action occurred more than four weeks before the interview. These persons and the unemployed differ only as to the time passed after the last action. We call them “potential labour force” or “potentials” to emphasise their similarity to the unemployed.
2. Individuals who are not searching for a job, but who would be willing to start one if offered. They are typically called “discouraged workers”.[4]
3. People neither searching nor willing to work. This group of inactive population is referred to as “unattached” to the labour market.

The ILO four-week requirement is a crude way to separate individuals who are really searching for a job from those who are not. It sets a minimum level of search intensity that job seekers have to show in order to be classified as unemployed: at least one search action (such as sending an application to a potential employer, visiting an employment agency or, in Europe, simply looking at newspaper advertisements) must be undertaken in a four-week period.[5] However, this

[4] Here we draw a distinction between potentials and discouraged workers depending on whether a search action was taken sometimes in the past. In common usage potentials are counted as discouraged workers (e.g. Finegan, 1981).

condition may be exceedingly rigid. From the theoretical standpoint, the total effort put into a job search depends on individual resources, search costs and expected returns and it is endogenously determined, given the labour market conditions. As a consequence, we may wonder whether this arbitrarily set minimum level of search intensity is a good criterion to distinguish between active and less active job seekers and, at the same time, whether it is correct to assimilate less intensive job seekers to other inactive people.

On the other hand, the time elapsed since the last search action is not the only characteristic that serves to separate out the unemployed from other job seekers. The "type" of search action also helps to qualify a person as unemployed. The ILO resolution of 1982 lists a number of these activities,[6] but allows each country to re-define and complete the list taking into account its characteristics and institutions. The main issue outstanding is how to deal with "passive job seekers". For instance, persons whose only search method is looking at newspaper advertisements are classed as unemployed in European countries, but not in the United States.[7] In the same vein, countries differ in the way they classify people whose only search action is to register with an employment office. A recent European regulation has excluded them from the unemployed, but only a few countries have so far adopted this more restrictive criterion (for a critical discussion, with reference to the Spanish case, see Garrido and Toharia, 2004). The differences across EU member states show up in the number of search methods listed in LFS questionnaires: 17 in Italy, 14 in Spain, 11 in France, and so forth.

In this paper we focus on how the length of the search period impinges on the measurement of unemployment regardless of the search method. This is mainly because the four-week criterion is almost universally adopted, whereas search methods are less harmonised across countries. Assessing the impact of alternative admissible methods would require a painstaking country-by-

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[5] Alternatively, search intensity may be identified with the probability of applying for a job during a given period or with the number of applications sent per unit of time (e.g. Petrongolo and Pissarides, 2001).

[6] "The specific step may include registration at a public or private employment exchange; application to employers; checking at worksites, farms, factory gates, market or other assembly places; placing or answering newspapers advertisements; seeking assistance of friends or relatives; looking for land, building, machinery or equipment to establish own enterprise; arranging for financial resources; applying for permits and licenses, etc." (cited by Organisation for Economic Co-operation and Development, 1987, p. 140).

[7] Sorrentino (2000, pp. 11-3) shows that adopting the U.S. standard and excluding these job seekers from the count of the unemployed would reduce the stock of unemployed in spring 1998 by 2.2 per cent in the European Union, and as much as 5.4 per cent in Italy.

country analysis, while adding little to the main thrust of the paper. However, we should bear in mind that search methods, too, contribute to distinguish the more active job seekers from the less active ones.

In the remainder of this section we weigh potentials against the unemployed and the rest of the inactive population. Since we have no access to detailed LFS data for EU countries and they do not contain all the information we need for our tests, we rely on the comparative data of the European Community Household Panel (ECHP). The ECHP is a fully harmonised annual longitudinal survey conducted by national statistical offices from 1994 to 2001 under Eurostat co-ordination (see Peracchi, 2002, for a description and an assessment). The survey focuses on households' income and standard of living, but it also collects information on demographic characteristics and job search behaviour. Importantly for our purposes, the format of questions concerning labour market status and behaviour closely resembles that available in LFSs.[8]

We use the database released in 2003 containing the first seven waves (1994-2000). The data for Belgium, Denmark, France, Greece, Ireland, Italy, the Netherlands, Portugal and Spain are available for the whole period, while those for Austria and Finland cover a shorter period as these countries joined in 1995 and 1996, respectively. For Germany, Luxembourg and the United Kingdom we consider only data for the period 1994-1996, because in these countries the ECHP was discontinued in 1996 and replaced by existing national panel surveys that do not contain the information needed to apply ILO definitions. Lastly, we exclude Sweden because the data available in the ECHP database, which are derived from the Swedish Survey of Living Conditions, are only cross-sectional. (See EuroPanel Users Network, 2004, for an introduction to the ECHP database.)

In Table 1 we compare, for the selected EU countries, the ECHP evidence on the composition of the working-age population by labour market status with the corresponding evidence from the LFSs. The periods for the LFS figures are matched to those of the respective ECHP data (1994-2000 in general, but 1995-2000 for Austria, and so forth).[9] The evidence from the ECHP is not

[8] More precisely, we make use of six different variables of the ECHP public-use file: "main activity status at the time of interview" (PE001); "looking for a job" (PS001); "main reason not looking for a job" (PS001A); "in the past four weeks, have you taken active steps to find a job" (PS004 and PS005), "if a suitable job was available now, would you be able to start within the next two weeks?" (PS008). These variables are sufficient to define the four labour market states examined in this paper.

[9] ECHP observations are weighted by cross-sectional weights.

fully comparable with that from the LFSs because of differences in the time of the survey interview (spring for the LFSs, autumn for the ECHP) and in the definition of working-age population (persons aged 15 to 64 in the LFS and 16 to 64 in the ECHP). Nonetheless, the two sources provide basically the same description of the composition of the working-age population. This suggests that our main conclusions are not driven by the use of the ECHP data.

By far the largest group of non-working persons is that of the unattached individuals, followed by the unemployed. Potentials and discouraged workers account for a much smaller, but not negligible, share. Their importance is better understood by looking at their size as a fraction of the number unemployed. This proportion varies widely across countries: it ranges from 12 per cent in Greece to 69 per cent in Denmark. Discouraged workers are less numerous, totalling, on average, around 6 per cent of unemployment. In brief, 1 in 5 job seekers (i.e. the sum of the unemployed and the potentials) is not considered among the unemployed because of the four-week ILO requirement. The ILO criterion is crucial in determining the size of European unemployment.

2.1 How many labour market states in Europe?

The investigation of labour market transitions is a well established method of assessing the distinction between unemployment and inactivity. Clark and Summers (1979), for example, found this distinction to be weak in the United States in view of the large flows into employment directly from outside the labour force (and vice versa). They observed that persistence in unemployment may appear to be lower than it actually is. When an unemployed worker withdraws from the labour force and then re-enters within a short period, it is implausible that these events correspond to a "substantive change in job-seeking intentions" (p. 31). Nevertheless, official statistics record two relatively brief spells of unemployment, whereas a single lengthy spell would be a more appropriate description. Flinn and Heckman (1983) countered these findings by comparing the hazard rates of a sample of young white men with a high school diploma obtained in 1969, selected from the U.S. National Longitudinal Survey of Young Men. They concluded that the unemployed and the inactive population cannot be considered one and the same. This result ought to be generalised with caution. As noted by Jones and Riddell (1999), the labour market attachment of the whole inactive population—which includes students, housewives and retired workers along with discouraged job seekers—is too heterogeneous to be compared with that of the unemployed. Studying a special longitudinal dataset derived from the Canadian LFS for the years 1979-1992, Jones and Riddell

showed that people who desire but are not searching for work constitute a distinct group from both the unemployed and the other non-participants. Moreover, a subgroup of these discouraged workers displays behaviour close to that of the unemployed: their inclusion among the latter would have increased Canadian unemployment rates by about one percentage point.[10]

Table 2 reports the annual probabilities of transition into employment of unemployed, potentials and other non-participants (i.e. discouraged and unattached) for the 14 EU countries of our sample, computed on the ECHP data. The figures are averages over all available pairs of year-apart consecutive waves. Six pairs of consecutive years are considered for Belgium, Denmark, France, Greece, Ireland, Italy, the Netherlands, Portugal and Spain (1994-1995, ..., 1999-2000), five pairs for Austria (1995-1996, ..., 1999-2000), four pairs for Finland (1996-1997, ..., 1999-2000), and two pairs for Germany, Luxembourg and the United Kingdom (1994-1995 and 1995-1996). Data are weighted by longitudinal weights. (The number of observations available for each country is reported in the Appendix.) The transition probabilities to employment of the potentials are much greater than those of the other inactive population and are generally closer to those of the unemployed. There is virtually no difference between unemployed and potentials in Germany, Ireland and the Netherlands: in the other countries the chances of potentials are in general lower by 10 to 16 percentage points. By contrast, dissimilarities between potentials and other inactives are greater, over 15 percentage points in all countries except Denmark, Finland, Italy, Greece and Spain. The impression that potentials are more similar to the unemployed than to non-participants is reinforced by breaking down the population by age (two age groups: 16-34 and 35-64) and sex. For example, among young males in Germany, Ireland and the United Kingdom, the potentials show higher probability of transition to employment than the unemployed; the same holds for young females in Germany and Ireland, and adult males in the Netherlands and Austria; in general, differences are sharper for older people (Figure 1). By contrast, the chances of getting a job are definitely higher

[10] Data from the U.S. National Longitudinal Survey of Young Men for high school graduates who received their diplomas in 1979 were also analysed by Gönül (1992). She found that unemployment and out-of-the-labour-force are different states for young females, but not for young males. Tano (1991) used monthly transitions over the period 1967-1989 from the Gross Change Data, a sub-sample of the U.S. Current Population Survey. Unemployment and out-of-the-labour-force were found to be two distinct states for the young (aged 16 to 24), but not for adults (aged 25 to 44). Applying Flinn and Heckman's model to data from the longitudinal version of the LFS, Schweitzer (2003) found that in the United Kingdom in the 1990s the transition probabilities to employment of several categories of non-participating persons were insignificantly different from or even significantly greater than those of the unemployed. Using longitudinal data from the LFSs, the transitions to employment were also found to be significantly different across groups of non-employed in Canada in the period 1997-2000 by Jones and Riddell (2002) and in Spain in the period 2001-2003 by Garrido and Toharia (2004).

for the potentials than for other inactive people, regardless of age and sex (Figure 2).

This evidence suggests that the ILO measure of search intensity correctly distinguishes between unemployed and less intensive job seekers, but it fails to divide the potential labour force from the remaining inactive population. This conclusion drawn from simply looking at the figures is formally tested in the next two sections.

2.2 A non-parametric test to compare transition probabilities

Consider a model with $I = 4$ states in the labour market: employed (E), unemployed (U), potentials (P), and other inactive population, i.e. discouraged and unattached (N). The labour market dynamics can be summarised by a 4×4 transition matrix Π, where π_{ij} corresponds to the probability of moving from state i at time t to state j at time $t+1$, $i, j = E, U, P, N$:

$$\Pi = \begin{pmatrix} \pi_{EE} & \pi_{EU} & \pi_{EP} & \pi_{EN} \\ \pi_{UE} & \pi_{UU} & \pi_{UP} & \pi_{UN} \\ \pi_{PE} & \pi_{PU} & \pi_{PP} & \pi_{PN} \\ \pi_{NE} & \pi_{NU} & \pi_{NP} & \pi_{NN} \end{pmatrix}. \tag{1}$$

In this general framework, two labour market states i and k cannot be considered truly distinct if people classified in either state move with similar probabilities to all other states, i.e. if

$$\pi_{ij} = \pi_{kj} \tag{2}$$

for each $j \neq i, k$.[11] If $\pi_{PE} = \pi_{NE}$ and $\pi_{PU} = \pi_{NU}$ the potentials and the other non-participants are in equivalent states. In this case the traditional ILO three states are a realistic characterisation of the labour market. Alternatively, if $\pi_{UE} = \pi_{PE}$ and $\pi_{UN} = \pi_{PN}$ potential labour force and unemployment are the same state. There are still only three independent states, but now the ILO-unemployed and the potentials are not truly distinct and the ILO search intensity measure does not help to discriminate between different labour market conditions. Lastly, if transition probabilities indicate that the potentials differ from both the unemployed and the other non-participants, then the labour market would be better described by a classification based on four states.

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[11] By ignoring comparisons between π_{ij} and π_{kj} for $j = i, k$ we are implicitly assuming that the classification in i or k at time $t+1$ is randomly determined. Therefore, the destination states i and k can be collapsed into a unique state and we need to check the equality with respect to 3 final $t+1$ states.

In order to check conditions like (2) we need to estimate the empirical counterparts of π_{ij} and π_{kj} and to verify if they are equal. Unlike previous works in this area we do not assume a specific functional form to estimate the probability π_{ij}.[12] Rather, we construct a non-parametric test of the equality (2), both in the asymptotic and bootstrap version. This strategy should help to reduce the possibility of spuriously accepting or rejecting the equality (2) because of model misspecification.

The empirical counterpart of π_{ij} corresponds to the ratio between the number of people leaving state i at time t for state j at time $t+1$, N_{ij}, and the total number of people in state i at time t, $N_{i.}$ (i.e. $\widehat{\pi}_{ij} = \frac{N_{ij}}{N_{i.}}$). Unfortunately, this estimator cannot be calculated in the presence of attrition—a phenomenon common to longitudinal surveys that arises when it is not possible"..... to obtain data from a sample unit at any wave after it has been selected into the survey" (Jiménez-Martín and Peracchi, 2002, p. 83)—because N_{ij} is not observable. Hence, we define the following estimator for π_{ij}:

$$\widehat{p}_{ij} = \alpha_{ij}\frac{N_{ij}}{N_{i.}} = \alpha_{ij}\widehat{\pi}_{ij}, \tag{3}$$

where α_{ij} is the share of individuals moving from state i to state j who are still observed at time $t+1$. In what follows we assume that attrition does not depend on the labour market state at time t, i.e. $\alpha_{ij} = \alpha_{.j}$ for all $i = 1,...,I$. Under this assumption, if we show that $\widehat{p}_{ij} = \alpha_{.j}\widehat{\pi}_{ij} = \widehat{p}_{kj} = \alpha_{.j}\widehat{\pi}_{kj}$, we can conclude that $\pi_{ij} = \pi_{kj}$.

Let π_z be the vector composed by all transition probabilities from z to any other possible labour market state j, i.e. the vector of π_{zj}'s, with $j = 1,...,I$; let $\widehat{p}_z$ be its estimator (defined as in (3)). From the central limit theorem we know that $\widehat{p}_z$ is asymptotically distributed as a normal.

Suppose that we want to compare transition probabilities from states i and k. Define the vector $d = \pi_i - \pi_k$ and its estimator $\widehat{d} = \widehat{p}_i - \widehat{p}_k$ (d is simply a distance in the univariate case). The statistics $\sqrt{q}\Sigma_d^{-1/2}(\widehat{d} - d)$ is asymptotically distributed as a standardised normal, where Σ_d is the variance of $\widehat{d}$ and q is a function of N_i and N_k.[13] Consider a standardised version of d, the

[12] For example, Flinn and Heckman (1983) and Gönül (1992) adopt an exponential functional form to model hazard rates from different labour market states. Jones and Riddel (1999) use a multinomial logit model to estimate transition probabilities.

[13] Given the independence of classification in state i or k, $q^{-1}\Sigma_d = \frac{1}{N_i}\Sigma_i + \frac{1}{N_k}\Sigma_k$, where Σ_i and Σ_k are the asymptotic variance-covariance matrices of $\widehat{p}_i$ and $\widehat{p}_k$, respectively.

Mahalanobis norm,

$$D = \sqrt{q}[(\widehat{d} - d)^T \Sigma_d^{-1} (\widehat{d} - d)]^{1/2}. \tag{4}$$

Under the null that transition probabilities out of i and k are equal, the distance D must be small. Thus, under H_0, $d = 0$ and equation (4) reduces to

$$D = \sqrt{q}[\widehat{d}^T \Sigma^{-1} \widehat{d}]^{1/2}, \tag{5}$$

where Σ is the variance-covariance matrix of $\widehat{p}_i = \widehat{p}_k = \widehat{p}$ and $q = \frac{N_i N_k}{N_i + N_k}$.[14] Equation (5) provides a non-parametric test for the equality of states i and k. Under the random attrition hypothesis, the null hypothesis H_0 and regularity conditions, $D^2 \rightarrow \chi_I^2$, where I is equal to the number of destination states (in our case, $I = 3$).[15]

When the sample size is too small for asymptotic results to apply, a distribution for D^2 can be derived by the bootstrap method. Consider the empirical counterpart of D^2, $\widehat{D}^2$, calculated on the observed sample, and define the achieved significance level (p-value) of the test as the probability of observing a value at least as large as $\widehat{D}^2$ when the null is true:

$$C = Pr\left\{\widehat{D}^{*2} \geq \widehat{D}^2\right\}, \tag{6}$$

where $\widehat{D}^{*2}$ is a random variable having the distribution of the observed $\widehat{D}^2$ under the null. Small values for C are evidence against H_0.

By adapting the permutation test (see Efron and Tibshirani, 1993), a bootstrap test can be defined to recover a distribution for $\widehat{D}^{*2}$. Let the observed sample be made of n individuals, of whom $N_{i.}$ are classified in state i at time t and $N_{k.} = n - N_{i.}$ in state k. Under H_0 the observed sample is just one realisation of all possible combinations $\begin{pmatrix} n \\ N_{i.} \end{pmatrix}$ of n identical individuals partitioned in

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[14] Under H_0, $\Sigma_i = \Sigma_k = \Sigma$, $q^{-1}\Sigma_d = \frac{N_i + N_k}{N_i N_k}\Sigma$ and, hence, $q = \frac{N_i N_k}{N_i + N_k}$. Note also that under H_0 individual classified in state i or k can be considered to belong to the same state. Let then $\widehat{p}$ be the vector of the estimated transition probabilities from this unique state towards all possible $t+1$ destination states $\widehat{p}_j$, $j = 1, ..., I$. Σ is then the variance-covariance matrix of the multinomial process described by $\widehat{p}$. It is easy to show that the main diagonal element of $N\Sigma^{-1}$ is equal to $\frac{1}{\widehat{p}_j} + \frac{1}{1 - \Sigma_j^I \widehat{p}_j}$. The out of diagonal element is instead equal to $\frac{1}{1 - \Sigma_j^I \widehat{p}_j}$.

[15] Because of the positive attrition probability $\sum_{j=1}^{I} \widehat{p}_{ij} < 1$, so that exit from the sample constitutes in practice a $I+1$ destination state (the fourth state in our case).

two mutually exclusive groups. When H_0 is true the distance between state i and state k transition probabilities should be negligible.

The distribution for $\widehat{D}^{*2}$ is obtained by the following algorithm.

- Consider the set of $n = N_{i.} + N_{k.}$ individuals a unique set of job seekers at time t.
- Select randomly and without replacement $N_{i.}$ individuals for state i and attribute the remaining $N_{k.} = n - N_{i.}$ to state k. This sample is referred to as sample b, $b = 1, 2, ...$
- Calculate the transition probabilities out of states i and k in sample b, $b = 1, 2, ...$ and derive the vector $\widehat{d}(b) = \widehat{p}_i(b) - \widehat{p}_k(b)$ and $\Sigma(b)$ for each bootstrap sample b.
- Calculate $\widehat{D}^{*2}(b)$ for sample b, $b = 1, 2, ...$.
- Iterate B times.

This algorithm provides an estimate of the distribution for $\widehat{D}^{*2}$ under H_0. The achieved significance level (p-value) can be approximated by the estimated probability that $\widehat{D}^{*2}(b)$ is higher than $\widehat{D}^2$, i.e.:

$$\widehat{C} = \Sigma_{b=1}^{B} \Psi \left\{ \widehat{D}^{*2}(b) > \widehat{D}^2 \right\} / B. \tag{7}$$

where Ψ is an indicator function which returns the value 1 if the condition in brackets holds and 0 otherwise.

2.3 Unemployed, potentials and other non-participants

The test defined in the previous section allows us to evaluate whether the potentials constitute a separate group from both the unemployed and the inactive in European labour markets. We again make use of our ECHP sample, excluding only Luxembourg because of the small sample size. Before discussing the results, four problems are worth mentioning. First, transition probabilities refer to changes occurring at a distance of one year. As some people move frequently from employment to non-employment, it would have been preferable to examine transitions over a shorter period of time (e.g. a quarter). Second, sample size is much smaller in the ECHP surveys than in the national LFSs, forcing us to restrict our attention to only four demographic groups (young and adult males

and females). To increase the number of observations, we have pooled all available waves. In countries where we have all seven waves, this should also minimise the possibility that our results depend on particular cyclical conditions. Note, however, that while the job-finding probabilities of the unemployed and the potentials vary over the cycle, the difference between the two does not seem to vary. This result was found for Canada by Jones and Riddel (1999) and is confirmed by our estimates for Italy.[16] Third, persons living in households originally included in the ECHP had in principle to be followed in all subsequent waves and tracked if they moved within the EU. As put by Eurostat (2002, p. 8), the ECHP was designed "... to provide representative cross-sectional pictures over time by constant renewal of the sample through appropriate follow-up rules", but its full representativeness was impeded by the "losses due to sample attrition". The depletion of the ECHP sample due to explicit refusal to respond, failure to follow up the unit, or break-up of the household was far from negligible in most of the countries participating in the ECHP (see Lehmann and Wirtz, 2003, pp. 2-3, and Peracchi, 2002, on non-response and attrition in the first three waves). The extent of attrition varies considerably across countries: attrition rates between the first and second wave, for instance, range from 6 per cent or less in Italy and Portugal to as much as 24 per cent in the United Kingdom (Peracchi, 2002, p. 78). We tested the assumption of random attrition which underlies statistic D^2 by gender and age group (ages 16-34 and 35-64) and we found that it is not contradicted by the data.[17] Fourth, the ECHP surveys are generally based on stratified sampling frames (Peracchi, 2002, p. 66). As the statistic D^2 is derived under the hypothesis of simple random sampling, the results presented below are an approximation.

We first focus on the comparison between potentials and other inactive persons. P-values are reported in the upper part of Table 3, separately by sex and two age groups (ages 16-34 and 35-64). For all sub-samples and all EU countries considered here, p-values are nil or very close to nil, suggesting that the null hypothesis $d = 0$ is strongly rejected. This evidence is generally robust because available observations are often around or over 1,000. In cases where the sample size is small, as in Austria or Finland, the bootstrap p-values in the bottom part of Table 3 confirm the asymptotic results.[18] We therefore conclude that, in European countries, the labour market

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[16] Using data from the Italian LFS, we computed the yearly labour market transitions from 1993 to 2002, a period which includes a recession and an expansion, and we did not detect any cyclical pattern.

[17] We carried out a non-parametric test similar to that used by Jiménez-Martín and Peracchi (2002) for the Spanish LFS data. Results are available upon request.

[18] $\widehat{C}$ is estimated with $B = 1,000$ bootstrap replicates for each of the EU countries considered.

attachment of potentials is significantly different from other non-participating persons.

The fact that the potentials differ from the other non-participants does not necessarily imply, however, that they are one and the same as the unemployed. If we consider a standard test at the 5 per cent level, the p-values reported in Table 4 indicate that unemployment and potential labour force are not equivalent labour market states in the majority of cases, but many exceptions exist, as already shown in Figures 1 and 2: all groups in Ireland and in the Netherlands, men of both age groups in Germany, younger men in Denmark and France, younger men and all women in the United Kingdom, older men in Belgium and Greece, older job seekers in Portugal, all men and older women in Austria. In brief, in 22 out of 52 cases the test suggests that unemployment and potential labour force may not be distinct states.

In conclusion, potential labour force may be considered an intermediate state between unemployment and non-participation—a state which is, however, close to unemployment for many groups of workers.

3. Search intensity and the boundary between potentials and unemployed

In the previous section we found that in Europe potential labour force is in general a distinct state from both unemployment and inactivity. By and large, the ILO four-week requirement helps to divide job seekers into two groups whose search intensity is actually different. On the other hand, potentials are a heterogeneous group. They include people whose last search action occurred not long before the ILO four weeks as well as people who have not been taking any concrete search step for several months. The evidence that potential labour force and unemployment are distinct states may well be consistent with some subgroup of potentials behaving much like the unemployed. In other words, the test of section 2. does not tell us whether “four weeks” is the more appropriate time interval to sort “more” from “less” intensive job seekers. In this section we delve into this issue by exploiting the information on individual search intensity which is specifically available in the Italian LFS.

3.1 The Italian LFS

Until the early 1990s, the Italian Statistical Agency (Istat) used a broader notion of unemployment than the ILO definition, and all job seekers—including those labelled here "potentials"—were considered unemployed. The standardised ILO definition has been adopted, in accordance with Eurostat guidelines, since October 1992. However, Istat has continued to ask all job seekers how many months have passed since their last search action. Figure 3 shows the frequency distribution of this variable: the vast majority of potentials report that their last search step was taken less than 12 months before the interview.[19]

The collection of such information is a unique characteristic of the Italian LFS; to our knowledge, it is not gathered in any other EU country, in Canada or in the U.S. Current Population Survey. Most LFSs report information on the time since the last contact with public employment offices, a poor proxy of the last search step—especially where public employment offices play a minor role in job matching. Therefore, the Italian LFS provides a unique chance to examine the composition of job seekers out of the labour force. The Italian LFS has a longitudinal dimension based on a rotating scheme of the type 2-2-2, i.e. respondents are interviewed for two consecutive quarters, are then out of the sample for the next two quarters, and are finally re-interviewed for two further quarters.[20] The LFS, however, is not designed as a panel and households moving to other municipalities are not followed but substituted by households with similar characteristics. Istat (2002) estimates that each year an average of only 2 per cent of the total population changes place of residence. Moreover, the linkage of individual records is made problematic by the lack of a unique personal identifier and by the errors in the household identifier. As a consequence, Istat has constructed algorithms which match individuals on the basis of time invariant personal characteristics (e.g. sex, date of birth, etc.) and information that can vary only in one direction, such as educational attainment (Ceccarelli et al., 2002; see also Paggiaro and Torelli, 1999). The longitudinal dataset currently released by Istat contains, however, only observations matched across waves *one-year* apart. Here we use observations matched on a *quarterly* basis across the four waves of 2000, made

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[19] As shown by the spikes in Figure 3, this variable is subject to rounding effects caused by the tendency of respondents to approximate the exact number of months to the quarter or the year. Reporting errors are likely to be less important, however, when the action was taken during the last year. The variable is top-coded at 99.

[20] Thus, in each quarter the sample consists of four rotation groups, in any two consecutive quarters there are two overlapping rotation groups and, for any rotation group, the second pair of interviews occurs one year later in the same quarters as the first pair.

available to us as part of a joint research project with Istat. Attrition and reporting errors preclude complete matching. However, the loss of information is limited, around 6 per cent for the quarterly matched files (against 10 per cent for the yearly ones).[21] Pooling data for all four quarters of 2000 makes up a total of more than 320,000 observations.

3.2 A test of search intensity and "grey areas" in the Italian labour market

The number m of months since last search step is interpreted here as an inverse measure of search intensity: the larger m, the lower is the frequency of search actions and the less intensively a person is seeking job.[22] As a consequence, we should expect that the probability of a transition into employment is inversely related to m. At the same time, the higher m, the less attached are people to the labour market and the more likely are they to stop searching in the next period. This intuition is confirmed by Figure 4, where we plot the transition probabilities of the job seekers towards employment and non-participation as a function of m. (The unemployed correspond to $m = 1$.) These simple relationships are the basis for a test of the ILO four-week requirement by investigating whether the transition probabilities of the unemployed and of the more actively searching among the potentials are different.

We preliminarily verify that the LFS evidence is consistent with that from the ECHP by replicating the test discussed in section 2. Observations are subdivided not only by sex and age,[23] but also by residence area, in order to take into account the relevant differences between the Centre-North and the South of Italy.[24] Because of the very large number of observations available (see the Appendix), we only compute the p-values of the statistic D^2. The results, reported in Table 5, suggest that the equality $P = U$ cannot be rejected only for older women living in the South and they

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[21] We do not test here whether attrition reduces sample representativeness over time. However, see the conclusion reached by Jiménez-Martín and Peracchi (2002, p. 100) in their study of the Spanish LFS: "... similar to what has been found for other surveys, we find little evidence that attrition causes important biases in quarterly transition probabilities estimated from the matched data. The main exceptions are transitions of young people from inactivity to employment and transitions of those aged 50+ from employment to out of the labour force".

[22] More precisely, since we observe only the time passed from the last search action to the interview, m is a truncated measure of search intensity.

[23] In the Italian LFS working-age population includes people aged 15-64, rather than 16-64 as in the ECHP.

[24] The Centre-North includes Valle d'Aosta, Piedmont, Lombardy, Trentino Alto Adige, Veneto, Friuli Venezia Giulia, Liguria, Emilia Romagna, Tuscany, Umbria, Marche, Lazio; the South includes Abruzzi, Molise, Campania, Basilicata, Puglia, Calabria, Sicily, Sardinia.

confirm the adequacy of at least a four-state representation of the Italian labour market, because the equality $P = N$ is unambiguously rejected.[25] Let $P(m)$ denote the group of potentials whose last search step was taken no more than m months before the interview. The transitions of group $P(m)$ are compared with those of the unemployed U and of the other inactive N for different values of m. Notice that, the higher m, the more diluted is labour market attachment, since the group of potentials $P(m)$ is expanded by including people who are less intensive job seekers. The results are reported in Table 6 for $m = 2, 4, 6, 12, 24$. Two points can be made. First, the uniformly nil p-values for all values of m indicate that potentials are always distinct from other non-participants, even when their last search step occurred long before the ILO interview. Second, at the 5 per cent level, the boundary between unemployment and potential labour supply appears to be blurred for certain categories: older men whose last search step was taken no more than 6 months before the interview in the Centre-North; older women whose last search step was taken no more than 4 months before the interview in the Centre-North; older men whose last search step was taken no more than 12 months before the interview in the South; young females who last sought work up to two months before the interview in the South; older women living in the South. Especially in southern regions, where job seekers are typically more numerous and job opportunities fewer than in the rest of the country, four weeks may be too short a time interval to identify different types of job seekers.

To appreciate the implications of our results for the unemployment rate, we report in Table 7 the ILO rates and the rates obtained by including among the unemployed all groups of potentials for which the hypothesis $U = P(m)$ is not rejected at the 5 per cent significance level. The comparison in Table 7 shows significant "hidden" unemployment in 2000, especially in the weakest segments of the labour force. The unemployment rate could have been up to 9 percentage points higher than it was on the basis of the ILO definition among older women in the South. While the unemployment rate would have increased only marginally in the North and Centre, in the South it would have been revised from 21 to 25 per cent. The overall national unemployment rate would have gone from 11 to 13 per cent.

[25] We replicated the test not only on quarterly data but also on annual transitions, separately for each year from 1993 to 2002. The results are fully consistent with those based on ECHP data. Results are available upon request.

4. Conclusions

Over sixty years ago Long remarked that: "It is not often fully understood that conceptual limits of unemployment are not definite boundaries, but rather wide battlefields over which economic and social philosophies are still fighting" (1942, p. 2). The point was reiterated half a century later in the report of a Working Party on the Measurement of Unemployment in the UK established by the Royal Statistical Society: "We must emphasize again that the decision as to what is to be counted as 'unemployment' in any particular context is a political, and not a statistical, question. The statistician's role is to spell out the implications of such a decision and to determine how an appropriate measure can best be constructed" (Bartholomew et al., 1995, p. 337). However, the difficulty to agree on a single definition of unemployment reflects not only its multiple meanings but also the heterogeneity of the group of persons seeking work. The problem is ultimately to balance the effort to account for this heterogeneity with the need for fixed standards to ensure comparability of labour market indicators over time and across countries.

In this paper we have investigated the impact of the ILO standards on the measurement of European and Italian unemployment. Using the first seven waves of the ECHP for 1994-2000 and four quarterly waves of the Italian LFS for 2000, we have identified a subset of job seekers whose behaviour is at the boundary between unemployment and inactivity. Like the unemployed, these persons report that they seek and are available for work; but since they last sought work more than four weeks before the interview, they fail one of the conditions specified by the ILO to be considered unemployed. This "grey area" of the labour market is labelled "potential labour force".

We have shown, first, that the potentials are in general a distinct group from the ILO unemployed, on one side, and the other non-participants, on the other. This evidence confirms for EU countries the results obtained by Jones and Riddell (1999) for Canada. Second, using the richer information available in the Italian LFS, we have found that the potential labour force is itself a heterogeneous group, where the persons searching more intensively for work exhibit the same transition probabilities as the unemployed. The search intensity—as measured by the time passed from the last search action to the interview—that separates these people from the rest of the potentials varies across socio-demographic groups. For instance, for men aged 35 to 64 the demarcation line is 6 months in the Centre-North as opposed to 12 months in the South. Taken at face value, this evidence implies that four weeks may be too short a period to identify the unemployed in some population subgroups.

While the results presented in this paper highlight the arbitrariness of the four-week criterion set by the ILO, it would be wrong to conclude that the problem is simply one of identifying the "right" time interval. Our analysis of the Italian data shows that there is a continuum of job-search intensities which leads any alternative time interval to appear as arbitrary as the four-week period. So, what lessons can be drawn from our exercise?

First, the existence of large differences not only among countries, but also among socio-demographic groups within the same country, calls for a study of the characteristics of job-searching behaviour. There is need for a closer scrutiny of the four-week criterion as well as of the admissible search methods and of other requirements. For instance, the treatment of "passive job search", which is dealt with differently in the United States and in Europe, is an issue worth further investigation.

Second, forcing a sharp distinction between those "really" wanting a job, the "unemployed", and other people who would like a job but are searching less intensively or not at all, provides an unrealistic description of the labour market. In our view, statistical agencies should move from providing a single measure of unemployment to offering a range of (standardised) measures of the pool of job seekers distinguished by the intensity of their search. The time elapsed since the last search action, available in the Italian LFS, is an example of the type of information which can be used to rank job seekers. But the attention could focus on other variables as well, such as the number of steps taken in a unit period or the type of method used. Enriching the set of information in this way is desirable whatever concept of unemployment we have in mind: from a "macroeconomic" perspective, it gives us a better measure of the amount of unused labour available in the economy; from a "social" viewpoint, it approximates the notion of joblessness as deprivation by broadening the unemployment pool to include "discouraged" workers.

Third, the availability of estimates of the job-seeker pool broken down by search intensity would allow synthetic indices to be built, in which job seekers are weighted by the effort they put into their job search (or some other indicator). The current unemployment measure is a special case of this approach, where job seekers are assigned weight 1 if they meet ILO requirements and 0 otherwise. However, while these more sophisticated indices may be useful for certain purposes (e.g. as summary indicators of labour market tightness)[26], they still convey the idea that there is a

[26] For instance, the Bank of England's *Inflation Report* of August 1999 utilises "an alternative measure of unemploy-

single headline figure of unemployment and hide the complexity of search behaviour behind the aggregation process.

The integration of statistics on unemployment as defined by the ILO with internationally agreed statistics on the potential labour force—regardless of the method used to measure search intensity—seems a fruitful way of enhancing our understanding of labour market dynamics.

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ment, which weights together the number of people in each group [of unemployed and inactive] using the probabilities [of becoming employed in next three months] relative to the probability that someone unemployed for six months or less will find a job" to conclude that "on this measure too, labour market conditions appear to be tight by recent historical standards" (Bank of England, 1999, p. 30).

Tables and Figures

Table 1: Percentage composition of the working-age population by labour market status

	LFS			ECHP					
	empl.	unempl.	out l. f.	empl.	unempl.	out of the labour force			
							potentials	*discouraged*	*unattached*
Germany	64.5	6.1	29.4	64.5	5.7	29.8	*1.3*	*0.2*	*28.3*
Denmark	74.8	4.8	20.4	74.1	4.9	21.0	*3.4*	*0.4*	*17.2*
Netherlands	67.7	3.8	28.5	67.8	3.9	28.3	*1.1*	*0.1*	*27.1*
Belgium	57.5	5.6	36.9	59.0	4.1	37.0	*1.7*	*0.7*	*34.6*
Luxembourg	59.3	2.0	38.8	61.2	2.7	36.1	*0.8*	*0.0*	*35.3*
France	60.0	8.2	31.8	60.6	7.0	32.4	*1.7*	*0.1*	*30.6*
United Kingdom	68.2	6.7	25.1	68.8	7.4	23.8	*1.2*	*0.3*	*22.3*
Ireland	57.8	6.1	36.1	58.1	6.5	35.4	*1.2*	*1.3*	*32.9*
Italy	51.5	6.8	41.6	51.8	8.6	39.7	*2.8*	*0.5*	*36.4*
Greece	55.0	6.4	38.6	54.5	6.7	38.9	*0.8*	*0.5*	*37.6*
Spain	50.0	12.3	37.7	48.3	12.4	39.4	*1.7*	*0.3*	*37.4*
Portugal	64.8	4.2	31.0	67.7	3.6	28.6	*1.5*	*0.2*	*26.9*
Austria	67.7	3.6	28.7	67.5	2.9	29.6	*1.0*	*0.3*	*28.3*
Finland	64.3	9.9	25.8	63.4	8.4	28.2	*3.5*	*0.4*	*24.3*

Source: authors' calculations based on Eurostat and ECHP data.

Averages over 1994-2000, except Austria (1995-2000), Finland (1996-2000), and Germany, Luxembourg and the United Kingdom (1994-1996).

Table 2: Annual transition probabilities to employment in the 1990s (per cent)

	Unemployed	Potentials	Other inactive
Germany	38.7	35.3	14.5
Denmark	48.0	32.5	20.7
Netherlands	45.1	46.6	14.5
Belgium	38.0	24.2	8.3
Luxembourg	45.4	32.1	6.6
France	31.5	25.6	10.2
United Kingdom	43.2	32.7	14.5
Ireland	35.7	33.3	15.6
Italy	25.2	15.5	5.3
Greece	35.0	20.7	8.6
Spain	35.1	22.0	8.1
Portugal	46.5	34.8	13.9
Austria	46.7	34.3	12.2
Finland	41.4	28.1	16.5

Source: authors' calculations based on ECHP data.

Averages over six pairs of consecutive years (1994- 1995, ..., 1999-2000) except Austria (1995-1996, ..., 1999-2000), Finland (1996-1997, ..., 1999-2000) and Germany, Luxembourg and the United Kingdom (1994- 1995, 1995-1996).

Table 3: Test for the hypothesis P = N

	Men		Women	
	age group 16-34	age group 35-64	age group 16-34	age group 35-64
	P-values			
Germany	0.000	0.000	0.000	0.000
Denmark	0.038	0.000	0.040	0.000
Netherlands	0.031	0.000	0.000	0.000
Belgium	0.000	0.000	0.000	0.000
France	0.000	0.000	0.000	0.000
United Kingdom	0.048	0.032	0.044	0.000
Ireland	0.000	0.000	0.000	0.000
Italy	0.000	0.000	0.000	0.000
Greece	0.000	0.000	0.000	0.000
Spain	0.000	0.000	0.000	0.000
Portugal	0.000	0.000	0.000	0.000
Austria	0.000	0.000	0.000	0.000
Finland	0.000	0.000	0.035	0.000
	Bootstrap p-values			
Germany	0.005	0.000	0.000	0.000
Denmark	0.000	0.000	0.015	0.000
Netherlands	0.052	0.000	0.000	0.000
Belgium	0.000	0.000	0.000	0.000
France	0.000	0.000	0.000	0.000
United Kingdom	0.013	0.002	0.012	0.000
Ireland	0.003	0.000	0.000	0.000
Italy	0.000	0.000	0.000	0.000
Greece	0.000	0.000	0.000	0.000
Spain	0.000	0.000	0.000	0.000
Portugal	0.000	0.000	0.000	0.000
Austria	0.000	0.000	0.000	0.000
Finland	0.016	0.000	0.008	0.000

Source: authors' calculations based on ECHP data.

Table 4: Test for the hypothesis U = P

	Men		Women	
	age group 16-34	age group 35-64	age group 16-34	age group 35-64
	P-values			
Germany	0.060	0.074	0.000	0.000
Denmark	0.110	0.000	0.003	0.000
Netherlands	0.635	0.112	0.822	0.735
Belgium	0.005	0.502	0.000	0.035
France	0.601	0.000	0.000	0.000
United Kingdom	0.882	0.000	0.212	0.099
Ireland	0.101	0.099	0.512	0.665
Italy	0.000	0.000	0.000	0.000
Greece	0.035	0.855	0.000	0.000
Spain	0.000	0.000	0.000	0.000
Portugal	0.028	0.515	0.000	0.691
Austria	0.113	0.791	0.000	0.063
Finland	0.000	0.000	0.000	0.000
	Bootstrap p-values			
Germany	0.078	0.108	0.000	0.000
Denmark	0.074	0.000	0.004	0.000
Netherlands	0.526	0.142	0.790	0.794
Belgium	0.004	0.302	0.000	0.034
France	0.480	0.000	0.002	0.000
United Kingdom	0.860	0.000	0.212	0.110
Ireland	0.150	0.122	0.302	0.592
Italy	0.000	0.000	0.000	0.000
Greece	0.016	0.868	0.002	0.002
Spain	0.002	0.000	0.000	0.000
Portugal	0.028	0.358	0.002	0.662
Austria	0.112	0.786	0.000	0.082
Finland	0.005	0.000	0.002	0.000

Source: authors' calculations based on ECHP data.

Table 5: Test for the hypotheses P = U and P = N in Italy

	P-values			
	Men		Women	
	age group 15-34	age group 35-64	age group 15-34	age group 35-64
	$P = U$			
Centre-North	0.000	0.000	0.000	0.000
South	0.000	0.000	0.001	0.095
	$P = N$			
Centre-North	0.000	0.000	0.000	0.000
South	0.000	0.000	0.000	0.000

Source: authors' calculations based on Istat, LFS longitudinal data.

Table 6: Test for the hypotheses P = U and P = N by search intensity in Italy

	P-values			
	Men		Women	
	age group 15-34	age group 35-64	age group 15-34	age group 35-64
	$P = U$			
	Centre-North			
2 months	0.001	0.653	0.025	0.410
4 months	0.000	0.086	0.000	0.112
6 months	0.000	0.081	0.000	0.005
12 months	0.000	0.001	0.000	0.001
24 months	0.000	0.000	0.000	0.000
	South			
2 months	0.001	0.184	0.050	0.575
4 months	0.000	0.112	0.047	0.635
6 months	0.001	0.178	0.002	0.588
12 months	0.000	0.107	0.005	0.212
24 months	0.000	0.025	0.005	0.195
	$P = N$			
	Centre-North			
2 months	0.000	0.000	0.000	0.000
4 months	0.000	0.000	0.000	0.000
6 months	0.000	0.000	0.000	0.000
12 months	0.000	0.000	0.000	0.000
24 months	0.000	0.000	0.000	0.000
	South			
2 months	0.000	0.000	0.000	0.000
4 months	0.000	0.000	0.000	0.000
6 months	0.000	0.000	0.000	0.000
12 months	0.000	0.000	0.000	0.000
24 months	0.000	0.000	0.000	0.000

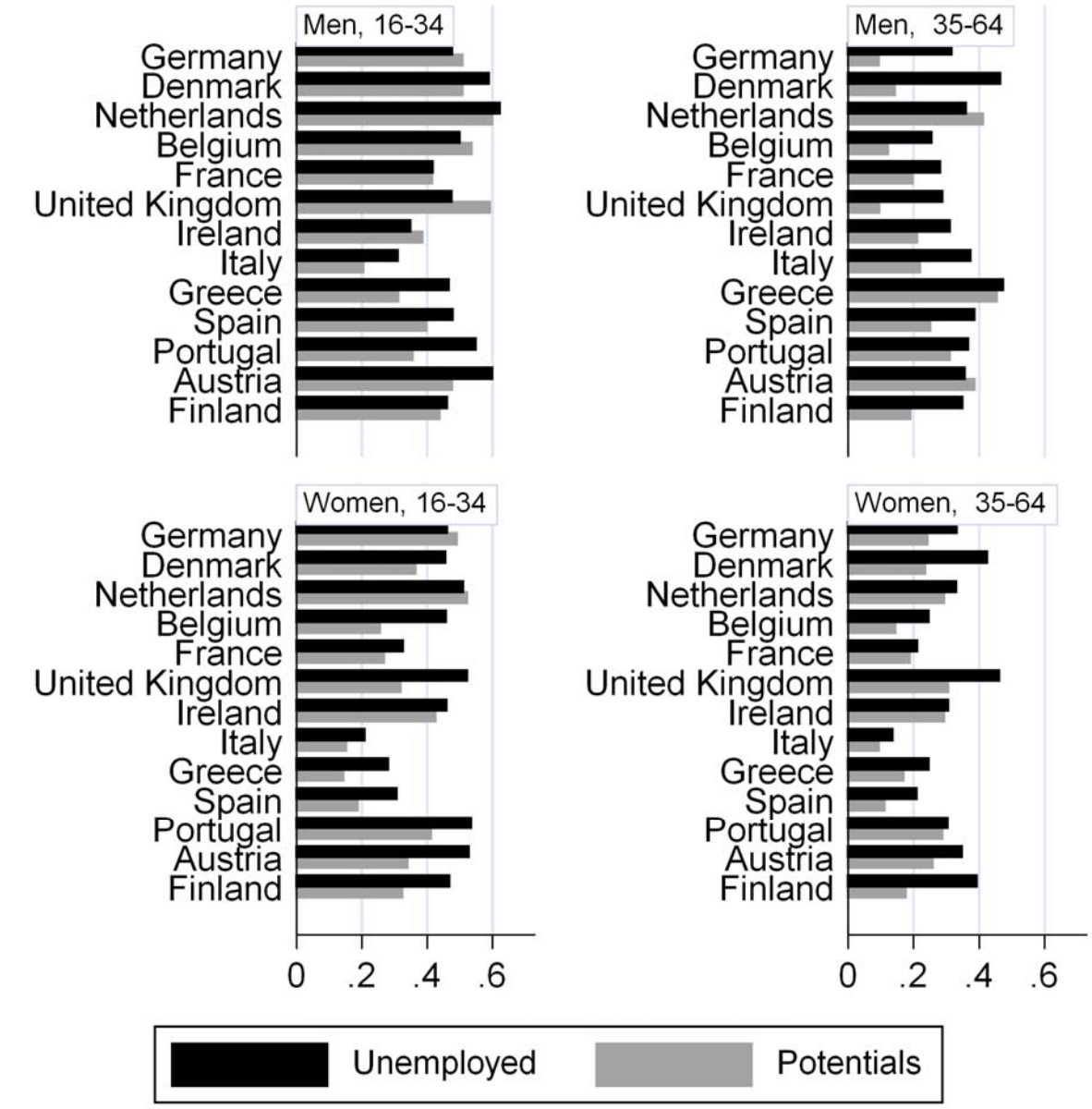
Source: authors' calculations based on Istat, LFS longitudinal data.

Table 7: ILO and re-estimated unemployment rates in Italy, April 2000

	Men		Women		Total		Total
	age group 15-34	age group 35-64	age group 15-34	age group 35-64	age group 15-34	age group 35-64	
	ILO rates						
Centre-North	7.5	2.2	13.0	5.6	10.0	3.5	6.7
South	30.0	7.8	47.6	16.4	36.6	10.4	21.0
Italy	18.8	5.0	30.3	11.0	23.3	7.0	10.8
	re-estimated rates						
Centre-North	7.5	2.7	13.0	7.4	10.0	4.6	7.3
South	30.0	10.4	52.3	25.9	38.9	15.6	25.1
Italy	18.8	6.6	32.7	16.7	24.4	10.1	12.7

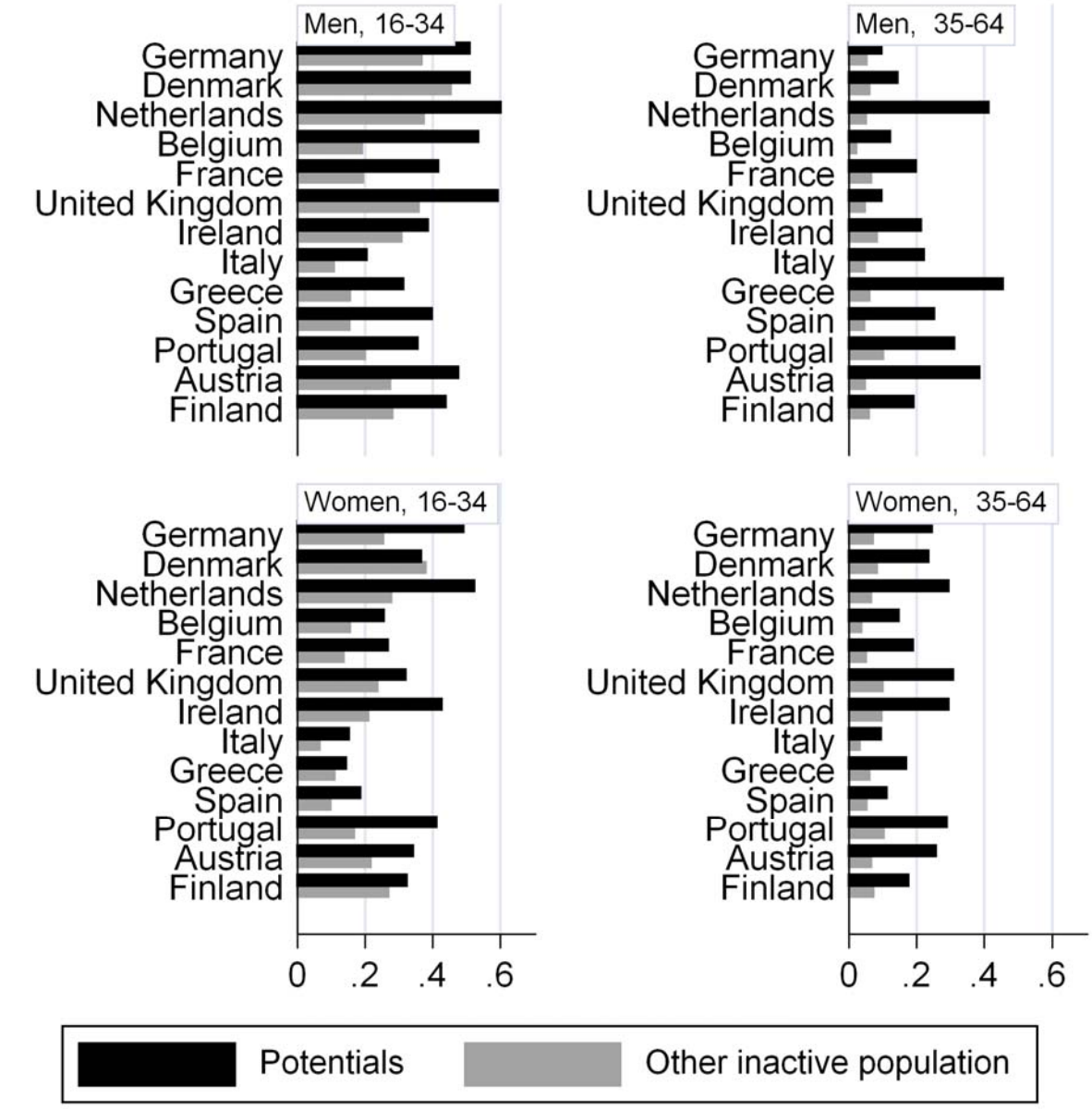
Source: authors' calculations based on Istat, LFS longitudinal data.

Figure 1: Annual transition probabilities to employment in the 1990s, by age and sex



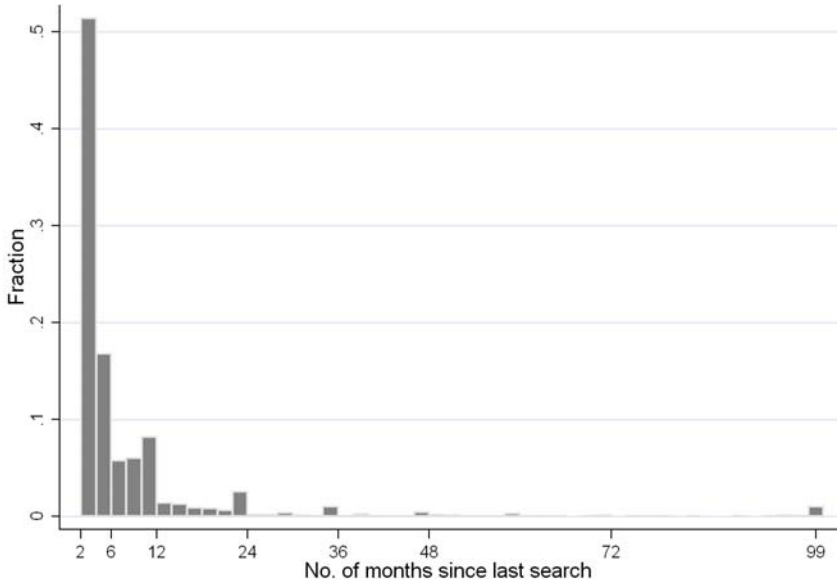
Source: authors' calculations based on ECHP data.

Figure 2: Annual transition probabilities to employment in the 1990s, by age and sex



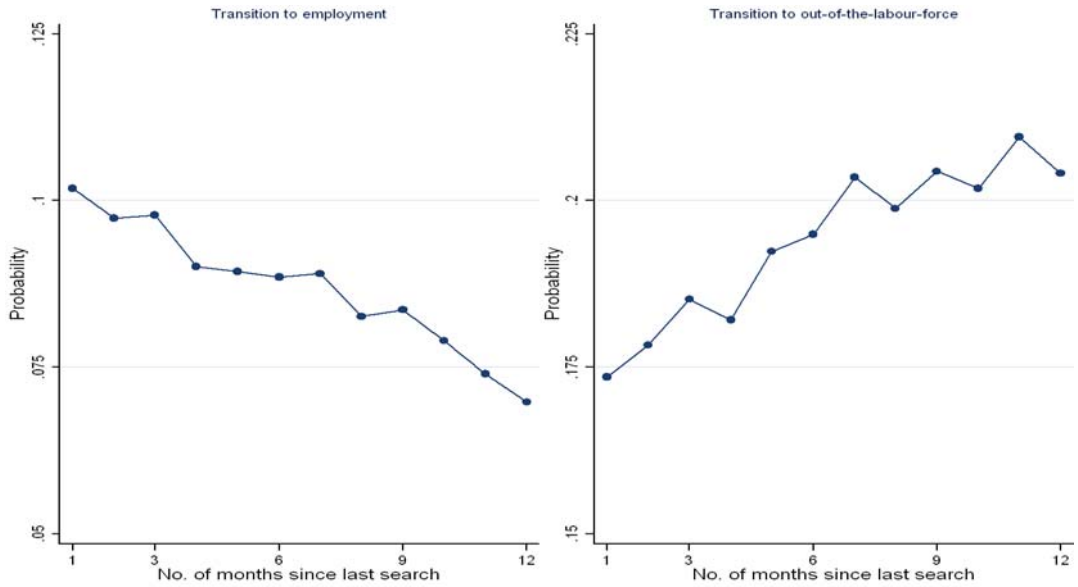
Source: authors' calculations based on ECHP data.

Figure 3: Distribution of the number of months since last search step in Italy



Source: authors' calculations based on Istat, LFS longitudinal data.

Figure 4: Quarterly transition probabilities by search intensity in Italy



Source: authors' calculations based on Istat, LFS longitudinal data.

Appendix: Sample size

	ECHP							
	Men		Women		Men		Women	
	age: 16-34	age: 35-64	age: 16-34	age: 35-64	age: 16-34	age: 35-64	age: 16-34	age: 35-64
	Germany				Denmark			
Unemployed	187	239	297	415	273	274	351	311
Potentials	33	36	66	99	89	99	218	157
Other inactive pop.	699	1,150	959	2,570	479	774	902	1,453
	Netherlands				Belgium			
Unemployed	264	263	412	573	278	216	439	336
Potentials	84	42	137	161	73	74	136	153
Other inactive pop.	1,018	2,231	1,994	5,983	1,340	1,456	1,747	3,646
	Luxembourg				France			
Unemployed	31	20	43	29	1,183	674	1,550	1,035
Potentials	6	5	15	9	190	136	360	336
Other inactive pop.	188	353	375	786	3,414	3,457	4,787	7,119
	United Kingdom				Ireland			
Unemployed	462	408	278	234	779	596	557	302
Potentials	36	44	66	66	87	84	85	74
Other inactive pop.	309	915	1,015	2,229	1,741	1,456	2,793	6,075
	Italy				Greece			
Unemployed	2,982	845	3,390	1,199	982	479	1,645	607
Potentials	521	146	935	542	68	29	171	106
Other inactive pop.	4,422	4,620	6,709	13,138	2,696	2,434	4,686	8,883
	Spain				Portugal			
Unemployed	2,542	1,601	3,351	1,708	518	326	732	388
Potentials	231	116	430	299	133	98	314	196
Other inactive pop.	4,386	3,342	6,503	11,558	2,511	2,155	3,846	6,922
	Austria				Finland			
Unemployed	203	131	236	207	455	478	461	573
Potentials	46	34	90	82	167	100	195	156
Other inactive pop.	1,082	1,746	1,663	3,886	1,335	1,306	1,743	1,527
	Italian LFS							
	Centre-North				South			
Unemployed	1,578	762	2,289	1,334	3,897	4,003	1,781	1,727
Potentials	542	271	994	859	1,621	712	2,319	1,162
Other inactive pop.	8,365	11,856	10,923	26,357	7,430	4,803	11,896	17,693

Source: authors' calculations based on ECHP and Istat, LFS longitudinal data.

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