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We develop a comparative analysis on the effect that unemployment insurance schemes have on unemployment duration. We consider three aspects through which unemployment insurance schemes affect duration: 1) liquidity constraints mitigation from income support can increase duration, 2) employment services at the time of registration can increase initial re-employment probability and 3) employment counseling and monitoring of job search can increase re-employment probability during the whole unemployment spell. We describe how these aspects are present in schemes of various European countries and we assess whether they can explain the overall effect that benefits display on unemployment duration. We perform first a duration analysis and then, to tackle the issue of self-selection into participation, a propensity score matching estimation. The results confirm our interpretation of the three mechanisms so that they effectively concur in the determination of the effect that benefits have on unemployment duration.

Keywords: unemployment insurance; job search; unemployment duration; duration analysis; propensity score matching.

JEL Classification: C41; J64; J65; I38

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1. Introduction

Income support schemes for unemployed are an important labour market institution that is present in almost all developed countries. This institution has attracted the attention of numerous scholars: economic theory suggests that unemployment

benefits affect unemployment duration and empirical evidence confirm, mildly, this assertion. In particular, job search theory has analyzed the relationship between unemployment duration and unemployment insurance (UI) schemes and, at a basic level, has suggested that benefits induce longer unemployment duration. This positive relationship is obtained through the reservation wage, which is increasing in the level of benefits, and through the search effort, which is decreasing in benefits (see Rogerson et al. 2005 for an analytical discussion of these effects). Clearly, higher reservation wages reduce the number of acceptable job offers while lower search effort reduces the rate of arrival of the offers: in the end, both these effects increase the time spent in unemployment and produce a positive relationship between benefits and duration. In any case, search theory has gone even deeper and has acknowledged that UI schemes are, in reality, more complex than this. In fact, actual UI schemes introduce some eligibility criteria that are necessary to receive income support: these criteria usually force workers to actively search for a job and to devise a plan (together with employment centers or similar institutions) that determines which steps are to be taken to search more effectively. Therefore, benefits schemes also give incentive to search more actively and more effectively for jobs and might succeed in increasing re-employment probabilities. Moreover, another eligibility criterion is the necessity of having worked immediately before starting to receive the benefits: this provides further incentives to search and accept jobs so that, at a later time, individuals are re-entitled to receive UI (for a theoretical discussion of the re-entitlement effect see Mortensen 1977, for evidence of its relevance see Ortega and Rioux 2010).

Even from an empirical perspective, the relationship between benefits and unemployment duration does not appear to be so clean cut: in a popular survey on this subject, Atkinson and Micklewright (1991) conclude that the evidence is mixed and, all things considered, benefits might affect positively unemployment duration but their effect is, at most, feeble.

More recently, some empirical studies have focused on the effect of eligibility criteria on search effort and unemployment duration. Those studies are often based on field experiments and perform causality analyses distinguishing between treated/non treated groups, trying to assess whether the criteria imposed to be eligible for benefits affect or not search behaviour. The conclusions of these studies are mixed: Klepinger et al. (2002) perform a causality analysis using data from Maryland UI work-search demonstration (a plan that randomly assigned benefits recipients to schemes with different search eligibility criteria) and show that stricter criteria improved search efforts and reduced unemployment duration. Somehow differently, Ashenfelter et al. (2005) exploit differences in the eligibility criteria of different American states (Connecticut, Massachusetts, Virginia and Tennessee) to conduct an experiment and find that stricter search criteria do not affect sensibly the access to benefits. Manning (2009) uses difference in differences estimations to capture the treatment effect on unemployment duration, using the change of unemployment benefits regulation that happened in UK in 1996: his results indicates that criteria affect the access to claims and stricter criteria discourage workers to effectively meet the search requirement and thus do not facilitate the transition to employment.

Another large group of studies focus on the effect of active labour market programs (ALMP) on employment, not necessarily relating them to the receipts of unemployment benefits. A relevant review of these studies is contained in Heckman et al. (1999): their review highlights how the effect of programs seems to vary a lot depending on the characteristics of the recipient of the program though, broadly, they seem to be more effective on lower skilled or more disadvantaged individuals. A more descriptive analysis of several forms of ALMPs is contained in Martin (2000): in this contribution, it is stressed the importance of combining active and passive policies and the need to analyze the interaction of these forms of policies, something that we explicitly cover in our contribution.

More recently, Kluv (2007) develops a meta-analysis on more than 100 ALMPs: its findings show that the effect of a given type of program remains quite stable across different countries, periods and other contextual factors; moreover, traditional training programs have a modest probability of improving re-employment while private sector incentive programs and job search support show a significantly better performance. Another meta-analysis is contained in Card et al. (2010): their study covers more than 199 ALMPs and point to the fact that ALMP in general are more effective in the long term rather than in the short term and that, in addition, search assistance is more effective than training programs in the short run but less effective in the medium and long run. Moreover, subsidized public sector job programs are usually less effective than other forms of ALMP.

Apart from the above reviews and meta-analyses, most of the analyses on ALMP focus on single countries. Among them, the work by Blundell et al. (2004) focuses on the effect of job assistance and wage subsidy to employer in United Kingdom and found that these programs increase the outflow toward employment of about 5%. In an analysis on France, Crepon et al. (2005) study the role of job counseling and find that it reduces both unemployment duration and unemployment recurrence. The effect of training on East German unemployed workers is examined in Lechner (2000) and, at least in the short run, no beneficial effect is detected. In another analysis on Germany, Caliendo et al. (2005) study job creation schemes (JCS) and conclude that JCSs have a negative impact on re-employment in non-subsidised jobs, though some very specific workers' categories actually have long terms benefits from these schemes. The combined role of counseling and monitoring in Netherlands is examined in Van den Berg and Van den Klaaw (2006): their results suggests that these measures are quite ineffective as monitoring simply causes a shift from informal to formal job search while counseling has, at most, a small positive effect on re-employment.

To all extents, while a large number of studies on the effect of income support and on ALMP exist, only a few of them address these issues from a comparative perspective. That is, differences in the unemployment support schemes between different countries have not been extensively studied nor these differences have been exploited to understand how specific characteristics of the schemes may affect unemployment duration. In addition, it has not been systematically assessed whether the job search support given in conjunction with the income support is able to offset the detrimental

effect of the latter on re-employment. More specifically, schemes differ across countries in terms of generosity, maximum duration, employment counseling and job search requirements and all these aspects are likely to affect significantly and simultaneously the unemployment duration of the recipients. Some rare examples of comparative studies on related topics include Tatsiramos (2006) that analyses the effect of benefits on employment stability using data for eight European countries and Corsini (2012) where a three country comparison is made and the role of wealth is also taken into account.

Our paper tries to develop a comparative analysis for a large group of European countries: Austria, Czech Republic, Hungary, Ireland, Italy, Netherlands, Spain, Sweden and UK[1]. Our aim is to relate the specific characteristics of the schemes in these countries to the effect that the participation to the income support has on re-employment probability and unemployment duration. Through the comparison of different countries and schemes, we aim at understand whether more generous benefits effectively increase duration and whether this detrimental effect can be off-set by strict search requirement and well-developed employment counseling. From a terminology point of view, we will refer henceforth to the "participation to income support program" to indicate those unemployed workers that: 1) are currently receiving unemployment benefits, 2) are subject to the entitlement requirements and 3) have access to the employment counseling offered. All these three elements are simultaneous components of the participation to the program and the participation identifies, in causality-analysis terms, the treated groups whereas the unemployed individuals that are not part of these programs make up the non-treated group.

Our investigation uses data for the year 2007 from the EU-SILC survey. To obtain a more homogenous group of observations, we focus only on workers that have just become unemployed so that the duration of unemployment before the period of observation is the same (being equal to zero) for all the individuals (for an example of work that uses this same strategy see Petrongolo 2001). Initially, we perform a survival analysis for this kind of unemployed workers (where the non-survival condition is actually finding a job) and we use Cox hazard models to estimate the determinants of duration of unemployment, allowing for country specific effect in terms of baseline hazard. Within this analysis, the participation to income support program is represented by a dummy which we include both directly and as an interaction term with time. These two components allow us to capture the immediate effect of the participation to the income support program and also the effect that participation has during later stages of the unemployment spell. This analysis is able to capture how employment probabilities vary depending on the participation to income support program but it may be conditioned by self-selection issues. In practice, while this duration analysis certainly captures the variation in re-employment probabilities between receiving or not receiving benefits and employment services, it may not be able to distinguish whether that particular variation is due to the

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[1] The choice of countries was driven to the need to represent a wide array of different economies (Anglo-Saxon, Continental, Mediterranean, Nordic, and Post-transition) so that a couple of countries were picked for each group. We did not include two large countries, France and Germany, because the release of the dataset we are using does not cover these two countries.

participation to the program or to have been selected to participate to the program. In fact, it is possible that the characteristics that induce individuals to participate to the program also have a direct effect on the re-employment probability. To account for this possibility, we also develop an analysis using the propensity score matching (PSM) methodology. The basic idea behind this methodology is to compute first a measure of how similar are individuals in terms of the likelihood to participate to the program and then to compare the outcomes of participants in terms of re-employment with the outcomes of observationally similar non-participants, allowing thus an unbiased estimation of the effect of the treatment.

The results we obtain are interesting both in regards of the effects related to generosity and those related to the degree of strictness and employment services. In particular, the effect of being a recipient of benefits does not remain constant through the unemployment spells and the actual evolution through time is related to very design of the UI scheme. The work is organized as follows: in section two we give a description of the unemployment insurance schemes in effect during the year 2007, in section three we describe the data we use in the analysis, in section four we perform the duration analysis, in section five we perform the PSM estimation and discuss possible interpretations of the results and in section six we conclude.

2. A review of income support schemes

Income support to unemployment workers is carried out through up to three different tiers of benefits: the first is unemployment insurance (UI); the second, which usually takes place when UI is exhausted, is unemployment assistance (UA) and the third is social assistance (SA) and is reserved to individuals not qualifying for the other two benefits.

While the exact mechanisms governing the three tiers differ depending on the country, there are some characteristics that remain the same and thus help in defining the very essence of the tiers. The UI tier is reserved to individuals that have already worked in the past and/or have paid contribution to the insurance scheme. The duration of the support is limited and it strictly requires the willingness to accept jobs and active job search from the claimant (though in some cases this merely implies a declaration of willingness from the claimant).

The UA tier is reserved to individuals that do not meet the requirement for the UI or that have exhausted the duration of the latter. It is usually less generous than the UI but its duration is often long and, in some cases, is unlimited. It still requires the willingness to work and an active job search.

The SA tier acts as a safety net for those individuals not qualifying for the UI or UA. It is less generous than the others benefits and is usually income (and in some cases asset) tested but does not requires previous employment or contribution. For its very nature its duration is unlimited and, with the exception of Sweden, does not have any job search requirement. To all extents this form of benefit, when present, is bestowed indefinitely to all individuals in need.

While the first tier is offered in all countries of our analysis (and, more in general, in all OECD countries) the second and third tiers are offered only in some countries. In particular Austria, Czech Republic[2] and Sweden have all the three tiers of support; Hungary, Ireland, Spain and UK have UI and UA; Netherlands has UI and SA while Italy has UI only. A description of the different UI and UA schemes and of the presence of a SA tier is summarized, for each country, in Table 1; the table also includes a synthetic measure for the overall generosity of the scheme in terms of its ranking within the OECD countries as given directly by the OECD statistics.

As it is possible to see from the table, there is a quite large variation of the characteristics of the UI and UA schemes across countries. Actual amounts are computed using different reference points (or in some cases are fixed) and they can be mean tested or adjusted according to family composition. Duration varies widely as well, being only six months in Czech Republic and Italy and reaching an unlimited duration (under the UA schemes) in Austria, Ireland and UK.

The other important aspects of the UI and UA schemes are related to the employment counseling and services offered to unemployed recipients and to the requirement and monitoring in terms of job search activity. Basically, all UI and UA schemes require that benefits' claimants have to register at the employment center declaring their willingness to accept jobs and to actively search for them. After this compulsory initial registration, actual actions in terms of counseling and search effort monitoring differ from country to country. We have defined five aspects that we believe particularly important in determining the essence of counseling and monitoring: i) the placement efforts at initial registration; ii) the existence and timing of creation of an Individual Action Plan (IAP); iii) the frequency of reports on search activity; iv) the requirements in terms of proving search effort; v) further interviews with claimants during unemployment spell. All these aspects are summarized in Table 2. In addition, we give a score from 0 to 1 to each of these categories depending on how developed and strict these aspects are in each country.

Here below we describe in details the characteristics that are summarized in Table 2.

Placement efforts at initial registration. It describes whether, at the time of registration, the EC usually offers some suitable job vacancies and whether claimants must apply to them or not. Given that initial registration is the only step that all claimants immediately and necessarily have to go through, this aspect is particularly important for the job search efficacy during the beginning of the unemployment spell. We assign 1 to countries where the EC usually proposes vacancies to which claimants must apply and 0 otherwise.

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[2] However, the UA in Czech Republic is reserved to a very narrow category of workers: see Table 1 below.

Table 1: UI Schemes Characteristics

	Generosity Ranking among OECD	SA	Amount of benefits	Max. Duration	Notes
Austria	3rd/29	Y			
UI			55-60% of PW	20-30 weeks	Older individuals get extended duration
UA			92% of UI	unlimited	Starts after UI is exhausted
Czech Rep.	23rd/29	Y			
UI			50% of PW (45% after 4th month)	6 months	Extended duration for older workers
UA			60% of PW	Depends on program	Only for workers in training programs
Hungary	20th/29	N			
UI			Initially 60% of AW, then 60% of MW	9 months	
UA			40% of MW	3 months	Extended duration for older workers
Ireland	5th/29	N			
UI			186 € per week	15 months	Amount changes depending on family composition
UA			186 € per week	unlimited	Amount changes depending on family composition and income.
Italy	27th/29	N			
UI			50% of PW (40% during last month)	7 months	Older individuals get extended duration
Netherlands	16th/29	Y			
UI			75% of PW (70% after 3rd month)	6-38 months depending on past contributions	A lower insurance exist for those not meeting contributions required
Spain	11th/29	N			
UI			70% PW (60% after 6th month)	12-24 months depending on past contributions	Has lower and higher limit that depends on family composition
UA			80% of base income (IPREM)	6 months but extendible to 18	Base Income (IPREM) is set by law and was 500€ in 2007
Sweden	13th /29	Y			S.A requires job search
UI			80% of PW for 200 days and then 70%	300 days	Voluntary
UA			360 SEK	300 days	It cannot be not claimed after UI is exhausted
UK	15th/29	N			
UI			59.15£	6 months	Lower amounts for workers below 25 years
UA			59.15 less actual income	unlimited	Actual amount depends on family composition. It does not require previous employment
AW – Average Wage; MW – Minimum Wage; PW – Previous Wage					
SA – Social Assistance; UI – Unemployment Insurance; UA – Unemployment Assistance					

Table 2: Active Employment Services and Search Requirements

	Placement efforts at initial registration	Individual Action Plan (IAP)	Frequency of report on search activity	Proof of search required	Further interviews during unemployment	Score: Initial/ Continuing /Overall
Austria	EC checks for readiness of work and may offer a vacancy. Workers' application is compulsory	It is agreed at registration	Once a week	No	At least every three months, their actual frequency depends on the IAP	2/2.5/3.5
Czech Rep.	EC checks for readiness of work and may offer a vacancy. Workers' application is compulsory	It is agreed within six months and is not compulsory	Every two weeks	No	Every two weeks	1/2/3
Hungary	EC checks for readiness of work but usually do not offer a vacancy	It is agreed shortly after registration	Once a month.	Often included in IAP	every three months, but depends on the IAP	1/3/3
Ireland	EC checks for readiness of work but usually do not offer a vacancy	It is agreed after three months	Usually once a month	No	Every three months	0/2/2
Italy	Though EC is not required to check for suitable vacancies, actual effort varies according to EC	It is agreed at registration	No reporting required	No	None is compulsory, but they may be included in the IAP.	1.5/1/1.5
Netherlands	Law does not require EC to check for suitable vacancies nor is application compulsory.	No IAP is carried out	Once a month	Yes	At least once a month, their actual frequency depends on the IAP	0/3/3
Spain	EC checks for readiness of work but usually do not offer a vacancy	It is agreed at six or twelve months	Every three months	No	Usually every two months	0/1/1
Sweden	EC checks for readiness of work but usually do not offer a vacancy	It is agreed within one month	Every six weeks	Yes	Every 4-8 weeks	0.5/2.5/2.5
UK	EC checks for readiness of work and may offer a vacancy. Workers' application is compulsory	It is agreed within two weeks	Every two weeks	Yes	Every two weeks	2/4/5

Existence and timing of creation of IAP. The IAP is a device through which EC and claimants agree on the actions to be taken to facilitate the job search process. The plan outlines the activities necessary to perform an efficient search and lists the labour market services that are offered to the claimant. It also explicitly contains sanctions that can be implemented in case the claimant fails in carrying out the agreed search actions. While the IAP is present in almost all countries, it is actually filed out at different moment of the unemployment spells. Clearly the IAP is an important step in the employment counseling and search process and, when created too late in the spell, it may condition the search activity at the beginning of the spell. We assign 1 if the EC requires the IAP to be agreed in less than a month, 0.5 in less than three months and 0 in other cases.

Frequency of reports on search activity. Benefits recipients may be required to report periodically on their search activities. We assign 1 to schemes that require to report at least once month, 0.5 less than once a month and 0 if there is no report requirement.
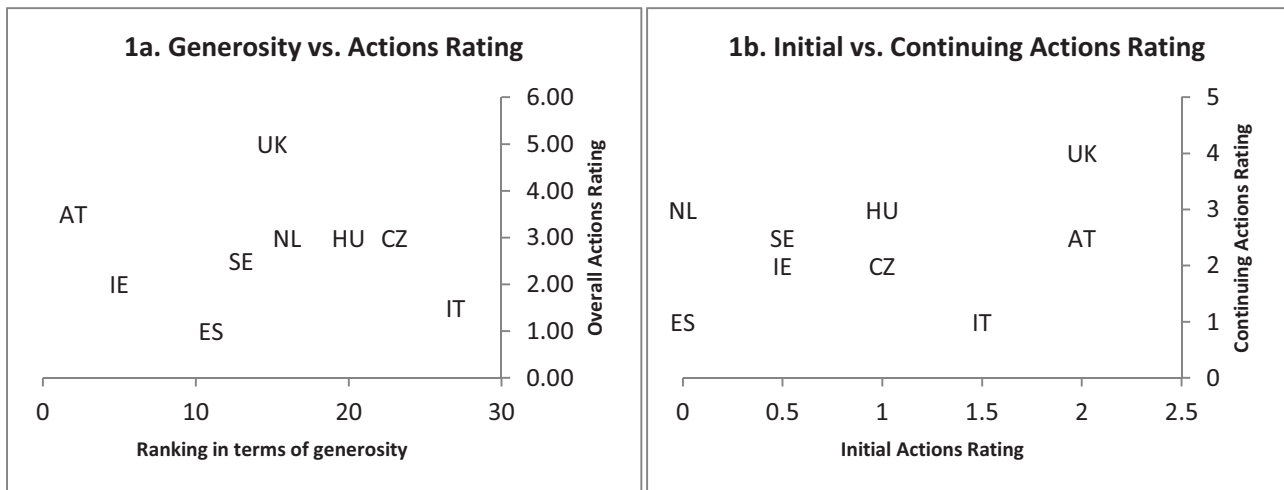
Requirements in terms of proving search effort. Apart the requirements of reporting on search activities, some ECs also require the recipients to give actual proof of a minimum number of search actions. This usually translates into giving recorded proof of having applied for a minimum number of jobs. We assign 1 to schemes that require explicitly the proof of a minimum number of applications and 0 if this requirement is not present or if recorded proof is not necessary.

Further interviews with claimants during unemployment. Apart the initial registration, claimants can also be asked to perform, during the unemployment spell, a number of extensive interviews with employment counselors. This aspect determines to which extent the employment counseling is spread out through the entire spell or if only takes place at the moment of registration. We assign 1 to schemes that require an interview at least once month, 0.5 less than once a month and 0 if no further interviews are compulsory.

Score. The score is assigned according to two time horizon: the "initial" score is the sum of points in aspects i) and ii) and gives a measure of the efforts and counseling made at the time of registration; the "continuing" score is the sum of points in aspects ii), iii), iv) and v) and gives a measure of the efforts, counseling and strictness of requirement during the whole unemployment spell.[3] Finally, an overall score is computed as the sum of the partial scores in all the five aspects.

Given the information on the generosity and on the employment services/search activities of the UI schemes for each country, we produce now a comparison for the ratings of these aspects in Figure 1a, where generosity is plotted against the overall activity rating.

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[3] Note that the existence and the moment of creation of an IAP appear in both measures. In fact, on the one hand, the very existence of a IAP affect the search activity of during the whole spell and, on the other, the celerity of the agreement on IAP influences the beginning of the search.

1a. Generosity vs. Actions Rating

UK

AT

NL   HU   CZ

SE

IE

ES

IT

Overall Actions Rating: 6.00, 5.00, 4.00, 3.00, 2.00, 1.00, 0.00

Ranking in terms of generosity: 0, 10, 20, 30

1b. Initial vs. Continuing Actions Rating

UK

NL   HU

SE   AT

IE   CZ

ES   IT

Continuing Actions Rating: 5, 4, 3, 2, 1, 0

Initial Actions Rating: 0, 0.5, 1, 1.5, 2, 2.5

The comparison does not highlight a particular plot or clustering: various combinations of generosity and activities exist. Austria probably stands out for having a particularly generous and active/strict scheme, whereas Italy is on the other end of the spectrum with scarce generosity and activity. Spain and UK also stand out for their activity/strictness rating which is particularly low and high respectively.

Another interesting comparison can be drawn between the initial and continuing actions ratings. In Figure 1b we plot the rating in terms of initial actions against that of continuing actions. On the base of the figure we can somehow group countries in three groups: in Ireland, Spain and Sweden the schemes are not particularly active/strict neither at the start nor during later stages of the benefits reception period; in Czech Republic and Hungary the schemes display average activity/strictness at both time horizon and in Austria and UK the schemes are particularly active at both time horizon. Outside these three groups there is Netherland where initial efforts are scarce but that instead appears to be quite active during later stages of unemployment and Italy that, on the other hand, is initially quite active but does not keep up this activity during the whole spell.

3. Data description

We use data for eight European countries from the EU-SILC 2008 survey, which contains detailed data on individuals and households in 2007. The survey allows us to identify newly unemployed individuals and we perform our analysis on them. We define as newly unemployed an individual who is currently unemployed and who, in the previous month, was in paid employment or self-employed. The survey contains the working status for each calendar month of 2007 and, therefore, we are able to identify the newly unemployed and to compute unemployment duration in months for those individuals who end up finding a job. According to the EU-SILC survey classification we consider unemployed an individual who has specifically declared unemployment to be his/her status and who has declared not to be currently in paid work, in self-employment nor to fall in the following categories: retired, student, military activity or other inactivity. In the computation of unemployment duration we also include workers who were still unemployed during December 2007, but their

condition results censored as we do not know when and if they eventually find a job. In total we have 2859 newly unemployed spread as follow: 187 from Austria, 275 from Czech Republic, 377 from Hungary, 166 from Ireland, 533 from Italy, 180 from Netherlands, 826 from Spain, 154 from Sweden and 161 from UK. The survey contains information about the demographic characteristics such as age, gender, marital status, education and so on, and the economic characteristics both of the individual and of the household. We use information on income from unemployment benefits to create a binary variable which is one for a worker participating the income support program and zero otherwise. Given the structure of the unemployment schemes individual receiving benefits are necessarily registered at the EC and are thus meeting eligibility criteria and are been offered the relative counseling.

Among our sample, 57.48% of individuals receive benefits: while this percentage is quite stable across countries it has some exception. In Figure 2 we report the exact percentage of recipient for each country.

Figure 2: Share of Newly Unemployed on Benefits
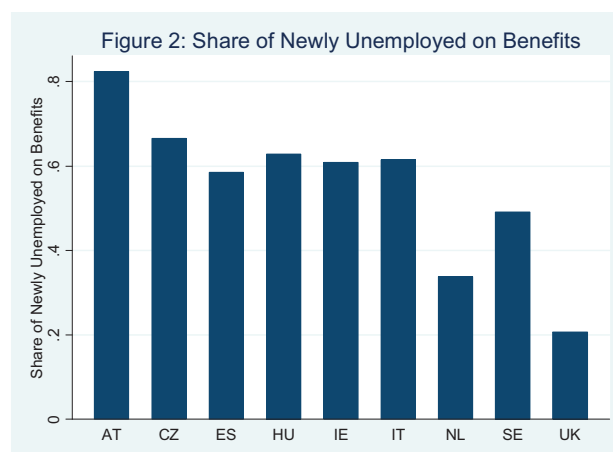
As it is clear from the figure, the percentage of recipients is quite stable through all countries with the exception of Austria where is quite larger and UK and Netherlands where is much smaller.

Another interesting data is the share of newly unemployed who found a job within the year 2007: the overall share is 38.98 and in this case the share is quite different across countries as is shown in Figure 2.

Figure 3: Share of Re-Employed within 2007
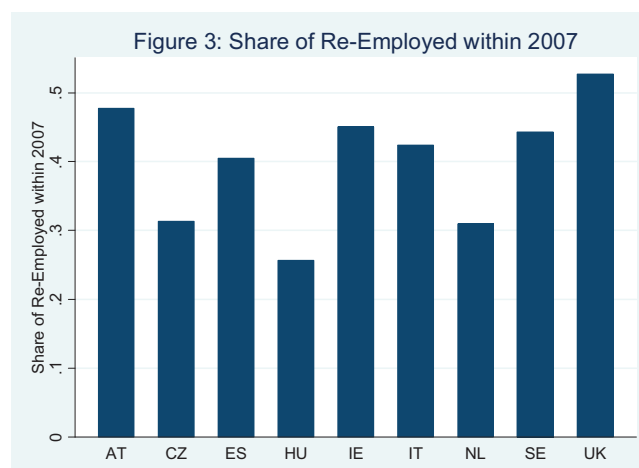
As it is clear from the figure, the share is fairly large in UK and, to a lesser extent, in Austria and Sweden while it is significantly smaller in Hungary and, partly, in Czech Republic and Netherlands.

4. Duration Analysis

In this part we perform an econometric analysis of unemployment duration. We focus on the effect that socio-demographic characteristics and the participation to income support program have on duration. Our total sample is made of 2859 individuals who, during the year 2007, became unemployed. We perform a survival analysis, that is, we aim at estimating the probability that an unemployed worker finds a job and how this probability is affected by the passing of time and by some selected covariates. Basically, we assume the existence of a function $h(t)$ that determines the probability that individuals move from unemployment to employment at time t, conditional on the fact that the individual is still unemployed at time t. This is called the hazard function. If we define as $F(t)$ the probability of not being unemployed after t periods, with $S(t)=1-F(t)$, that is, $S(t)$ is the probability of still being unemployed after t periods, also known as survival function, and with $f(t)=F'(t)$ so that $f(t)$ is the probability of switching from employed to unemployed at exactly time t, we have:

1) $h(t) = f(t)/S(t)$.

To carry out our estimation we assume that $f(t)$ takes the form of a specific distribution, and that it thus depends on a set of parameters θ describing the distribution and on a set of covariates x that influence the probability of leaving unemployment. Given a certain $f(t)$ it is possible to determine $h(t)$, and we can write the hazard function as $h(t, \theta, x)$ where θ represents the actual parameters to be estimated. We also assume that the effect of the covariate is the same in each period, an assumption that gives the Proportional Hazard Model which can be written as:

2) $h(t) = h_0(t, \theta_0) \cdot \rho(x, \theta_x)$

where $h_0(t, \theta_0)$ is known as the baseline hazard function, which is the same for all individuals and only depends on time and on the parameters describing the distribution and where $\rho(x, \theta_x)$ determines the effects of the covariates that are independent of time t. In our econometric analysis we use Cox regression and we obtain estimates of the parameters θ_x which allow us to determine which variables are relevant in explaining duration. In particular, we perform a semi-parametric Cox regression so that no specific assumption has to be made on the exact function form $h_0(t, \theta_x)$. Given that we are dealing with observations from different countries, we adopt a stratified approach and assume that baseline hazard functions to be country-specific. In addition, since we are particularly interested in the role of the UI schemes, we allow for the variables measuring benefits to have country specific coefficients. Therefore we estimate the following

3) $h(t, j) = h_{0,j}(t, \theta_0) \cdot \rho(x, \theta_x, y, \theta_{y,j})$

where j determines the country of origin and y are the variables whose coefficients are country specific.

We start our analysis by presenting the hazard estimates (Figure 4) for the nine countries: basically, these are descriptive measures of the probability of finding a job conditional on having spent a given amount of time in unemployment.

Figure 4: Hazard Estimates by Country
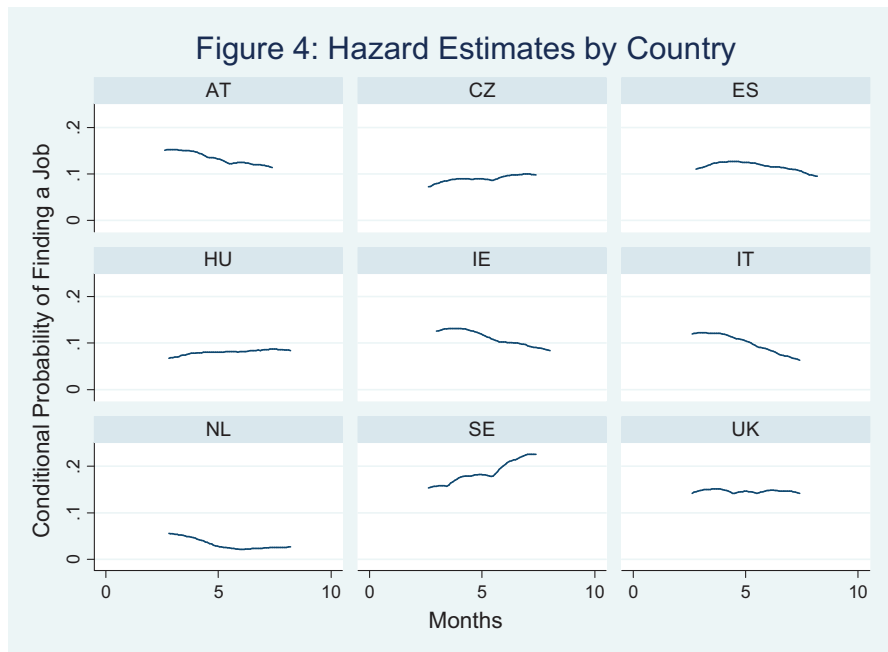
The patterns represented in Figure 3 show that the conditional probability has similar but not identical patterns through the countries. The patterns are usually quite flat though in Austria, Ireland, Italy and Netherlands they are slightly decreasing while in Sweden the conditional probability is increasing. Even more differences exist if we examine the conditional probability of finding a job for individuals with and without unemployment benefits (Figure 5).

Figure 5: Hazard Rates for Individuals with and without Benefits
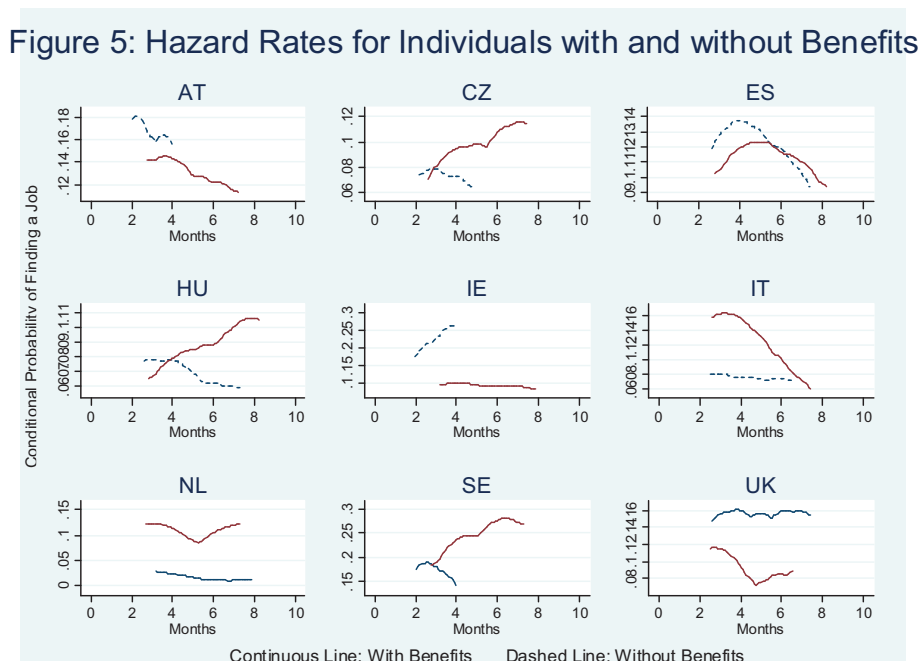
The patterns in figure 4 shows quite clearly how, at least from a descriptive point of view, individuals on benefits have different hazards rate than those without benefits. The exact hazard ratio for these two groups changes across countries and even the patterns have no systematic behavior. More importantly, the patterns of the two groups within a given country are rarely parallel and this creates a problem from an estimation point of view. In fact, the standard estimation of the Cox proportional hazard model is obtained under the assumption that the effect of a given covariate is the same through time while Figure 5 seems to indicate a violation of this assumption.[4] To overcome this problem we add to the Cox Regression another variable that is given by the interaction of unemployment benefits and time: this variable takes into account the time-varying effect of benefits and solve the problem of non-proportionality.

We now turn to the actual estimation of the Semi-Parametric Cox Regression. The key variable we use in our estimation is a binary variable that is 1 if the individual is participating to the income support program and 0 otherwise. As we already stated, participation to the program implies simultaneously monetary support and the consequential eligibility criteria and employment counseling. Given that we are particularly interested in comparing the effect of benefits on duration in the different countries, we allow for country- specific coefficients for this variable. In addition, we also add country-specific interaction terms for benefits and time. Through this, we not only solve the problem of non-proportionality we discussed above, but we can also distinguish the initial effect of benefits from the effect that they have during later stages of the unemployment spell. This is a key point because it allows us to compare the (time-varying) effect of benefits to the mechanics governing the UI scheme throughout the unemployment spell. We also add several other variables and in particular we include age (and age squared), gender, education, marital status[5]. To account for unobserved heterogeneity we add a variable that measures months spent in unemployment in 2006: this should capture unobservable characteristics of the individuals that make them more likely to stay in unemployment. Finally, we also include personal labour net earnings in 2006 measured as a share of household disposable net income in 2006. This variable should capture the impact of the job loss on the household's economic conditions: as suggested in Browning and Crossley (2001), this is also a good measure of the fall in household consumption during the spell of unemployment and, consequentially, on the financial stress and the urgency to find a job bestowed on the unemployed worker. Table 3 presents the results for estimations of the semi-parametric Cox model: in the table a positive coefficient implies a positive effect on re-employment probabilities and, thus, a negative effect on unemployment duration.

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[4] We also performed the test for proportionality assumption proposed by Grambsch and Therneau (1994) on the residuals from an estimation of the Cox hazard model. The test rejected the assumption of proportionality related to (and only to) the unemployment benefits for most of the countries.

[5] In particular we use age and age squared to take into accounts the non-linear effect of aging. Education enters the regression as two dummies which signal upper secondary (ISEC degree 3 or 4) and tertiary education (ISEC degree 5 or 6) respectively. Different measures for education were tested, but results were qualitatively the same.

Table 3: Cox Estimations of Re-employment Probabilities

		Initial Effect	Interaction with time
Unemployment Benefits			
	Austria	-0.165	-0.00668
		(0.455)	(0.170)
	Czech Republic	-0.933**	0.280**
		(0.421)	(0.127)
	Hungary	-0.832**	0.175*
		(0.397)	(0.102)
	Ireland	-0.474	0.0181
		(0.556)	(0.188)
	Italy	0.653*	-0.0669
		(0.344)	(0.103)
	Netherlands	0.0101	0.302**
		(0.546)	(0.120)
	Spain	-0.577**	0.0782
		(0.280)	(0.0829)
	Sweden	-0.712	0.276*
		(0.468)	(0.162)
	Uk	-0.247	-0.00928
		(0.495)	(0.153)
Age		0.0440**	
		(0.0214)	
Age Squared		-0.000572**	
		(0.000266)	
Higher Secondary Education		0.0407	
		(0.101)	
Tertiary Education		0.130	
		(0.120)	
Female		0.0893	
		(0.0780)	
Married		-0.117	
		(0.0971)	
Income in 2006 as % of household income		0.549***	
		(0.151)	
Months of Unemployment in 2006		-0.0152	
		0.011	
Observations		2,859	2,851

The results of the estimation show that unemployment benefits have no effect on re-employment in three countries while it has some effect in six countries. In particular, in Czech Republic, Hungary and Spain we observe an initial negative effect on re-employment probability while, in Italy, benefits display an initial positive effect on re-employment probabilities. In addition, in Netherlands and Sweden it appears that the program induces an increase in the probability of finding a job during the later stages of unemployment spell. In Austria, Ireland and UK we do not detect any significant effect of UI schemes.

Among the other variables it is worth to stress that the ratio between past individual net labour earnings and past household net disposable income displays a positive effect on re-employment probabilities. This result confirms the relevance of liquidity

constraints and financial stress on the search process and is line with the prediction of Browning and Crossley (2001b) and with the results of Corsini (2012) and Corsini (2013).

Before providing a more accurate discussion on the possible interpretations of these results we develop, in the next session, an analysis which could better account for self-selection issues.

5. Accounting for self-selection problems: a propensity score matching analysis

A possible problem in assessing the effect of participating to income support program is related to the presence of self-selection into the very participation into the program. In other words, it is not easy to understand whether a given observed effect is due to the participation to the program or to have been selected (or to have chosen) to participate to the program. In principle, it is possible that the characteristics that induce individuals to be selected (or to join) into the program also have direct effects on the re-employment probability. For example, it is possible that only more active individuals come to know the existence of the support scheme and thus, if we observe a positive relationship between participation and re-employment, this may only be due to their being more active and not to the actual participation to the program. On the contrary, it could also be possible that more skilled individuals expect to find quickly a new employment and avoid thus to join the program: in this case, only less skilled individuals join it and we could observe a negative relationship between program and re-employment that is not due, however, to the very effect of the program. Only in the presence of a truly random assignment to the program we could disregard this issues but this, in our case may not be the case. There are several estimation techniques that   address this issue: in our analysis, we try to overcome the problem of self-selection adopting the propensity score matching (PSM) methodology[6].

The basic idea behind PSM is to use information on units (individuals in our case) that do not participate in the treatment to assess what would have happened to participating units in the absence of the treatment. The comparison of the outcomes of participants (finding a job in our case) with the outcomes of observationally similar non-participants allows estimating the effect of the treatment. This methodology focuses thus on finding a non-treated unit that is "similar" to a treated unit and produces then an estimate of the intervention's impact given by the difference between the outcome of the treated with the outcome of the matched comparison case. Averaging across all these differences for the all the treated units, it is possible to obtain an estimate of the mean effect of the treatment for the treated.

One of the key issues is how to determine how similar different units are and the PSM assesses the similarities between units computing what is called "propensity score":

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[6] Very good descriptions of this methodology can be found in Becker and Ichino (2002) and Caliendo and Koeping (2008).

this measure is defined as the probability that a unit receives the treatment given a set of observed variables describing the individuals. Two units whose propensity scores have similar values are thus considered "similar".

The very computation of the propensity score is obtained with the estimation of a selection model, that is, a probit or logit model in which the participation to the treatment is regressed on the characteristics of the unit and the probability to participate is thus computed for each unit. Within our particular case, we perform the PSM analysis separately on each country and we compute the propensity score through a probit selection model which use all the variables we used in the duration analysis plus dummies that describe the region of dwelling[7] and household size.

In our analysis we assume that being part of the income support scheme defines the treatment to which individuals are exposed. Then we produce two distinct PSM estimations. In the first, the outcome is given by whether individuals found a job within 2 months of becoming unemployed: this reflects the immediate effect of being part of the program. In the second, we restrict the analysis on individuals that were still unemployed after two months and we produce a PSM estimation where the outcome is whether individuals found a job within 4 months of becoming unemployed: this reflects the effect of being part of the program during a later stage of the unemployment spell. In both cases, to test for the robustness of the analysis, we apply three different matching algorithms: the nearest neighbor matching (in which each unit's outcome is compared to the outcome of its nearest unit), the radius matching (in which each unit's outcome is compared to the outcome of units within a certain maximum radius) and the stratification matching (in which a given number of intervals of propensity score are created and units are assigned to a given interval on the base of their propensity score and the average outcome of treated units is compared to the average outcome of non-treated units within the same stratum).

5.1 Results of the PSM estimation

We present in Table 4 the results of the PSM estimation of the effect of participating to the program in terms of the re-employment probabilities. In particular, the results in Table 4 are related to the effect of the treatment (being part of the income support schemes) on the probability of finding a job within 2 months, what we have called the immediate effect of the treatment. The table also reports the number of blocks for which the balancing property was satisfied.

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[7] In particular region of dwelling is classified according to NUTS 1 classification for all countries but Czech Republic for which NUTS2 is provided. In the case of Netherlands and UK we omit this variable from the selection model because the EU-SILC database provides no information on this aspect.

Table 4: PSM Estimation of the immediate effect of participating to the program							
Country	Number of blocks	Nearest-Neighbour Matching		Radius Matching		Stratified Matching	
		Effect	Std. Error	Effect	Std. Error	Effect	Std. Error
Austria	6	-0.224	0.145	-0.097	0.125	-0.153	0.974
Czech	8	0.061	0.135	-0.026	0.087	0.021	0.129
Hungary	5	-0.021	0.047	-0.004	0.043	-0.001	0.044
Ireland	7	-0.045	0.094	-0.123*	0.073	-0.153**	0.083
Italy	8	0.137***	0.054	0.078**	0.039	0.105**	0.045
Netherland	6	-0.359**	0.154	0.033	0.064	-0.297***	0.131
Spain	8	-0.073*	0.044	-0.062**	0.031	-0.075*	0.044
Sweden	6	-.001	0.153	-0.078	0.093	0.032	0.075
UK	5	-0.128	0.124	-0.114	0.093	-0.108	0.092
Significance levels 0.1 *; 0.05 **; 0.01***							

Comparing these results with the duration analysis of previous section, we find that the negative effects which we detected for Czech Republic and Hungary are now non-significant. Moreover, benefits have now a negative effect on re-employment in Ireland and Netherlands (though these results are not fully confirmed in all matching methods). These differences in the results suggest that the effect we detected in the survival analysis were probably due to self-selection. On the contrary, the negative effect on re-employment for Spain, the positive for Italy and the non-significant effect for Sweden and UK are confirmed by the PSM estimation.

In the light of these results most of the countries follow the expected pattern: that is, in countries where benefits are generous and initial support is scarce we observe that benefits reduce re-employment. Only the results for Italy and Netherlands seems to deviate a bit from this pattern and we will better discuss these two cases in what follows.

After examining the immediate impact of the program we move to its effect during the later stages of the unemployment spell. Consequentially, we restrict the analysis to individuals whose unemployment duration is larger than two months. In some cases, this restriction implies a sample that is too small to obtain robust estimations. Therefore, we chose to analyze only those countries whose sample of longer term unemployed was larger than one hundred observations: this size was reached for Czech Republic, Hungary, Italy, Netherlands and Spain. Before we present the results, we must stress that the effect we are analyzing here is not directly equivalent to the interaction of benefits with time that was estimated in the duration analysis. In fact,

the effect we are tackling here determines whether the participation to the program displays an effect on re-employment probabilities during the later stages of unemployment spell. As such, it can be compared to the initial effect of benefits augmented with the interaction of benefits with time. The results of these PSM estimations are presented in table 5; even in this case we report in the table also the number of blocks for which the balancing property was satisfied.

Table 5: PSM Estimation of the effect of participating to the program during the later stages of unemployment spell.							
Country	Number of blocks	Nearest-Neighbour Matching		Radius Matching		Stratified Matching	
		Effect	Std. Error	Effect	Std. Error	Effect	Std. Error
Czech	9	0.186	0.189	-0.028	0.115	-0.083	0.206
Hungary	5	-0.056	0.123	-0.104	0.084	-0.090	0.111
Italy	5	0.080	0.083	0.097	0.062	0.065	0.085
Spain	6	0.064	0.072	0.013	0.228	0.015	0.237
Netherland	6	0.239***	0.064	0.204**	0.073	0.212**	0.101
Significance levels 0.1 *; 0.05 **; 0.01***							

The estimations show that in most of these five countries, individuals participating in the income support program have, during the later stages of the unemployment spells, the same re-employment probabilities as those not participating. Only in Netherlands we observe that treated individuals have higher probabilities. These results for Italy and Netherlands are now compatible with the expected pattern. As a matter of fact Italian UI scheme has non-generous benefits and employment services that are reasonably good at the beginning of the spell but inefficient during the later stages: this translates in a positive effect on the immediate re-employment probabilities and in a non-significant effect later on. As for Netherlands, its UI scheme has average generosity, employment services that are scarce at first but become very efficient during later stages: this translates in a negative effect on the immediate re-employment probabilities but in positive effect later on.

Finally, this estimation highlights a result that does not follow this pattern: in Spain in fact, we observe that benefits do not increase duration during later stages of unemployment. This is not in line we what we expected given the quite large generosity of benefits and the less than efficient employment services offered.

5.2 An overall assessment of the UI schemes
The results of the estimations obtained with the PSM method show that overall effect of unemployment benefits is null in four countries and significant, in a way or in the other in the remaining five.

The non-significant effect we found in Austria, Czech Republic, Hungary, Sweden and UK probably depends on the fact that these countries offer either good services and

high generosity or bad services and low generosity, so that the overall effect, if any, cancels out.

This should be in particular the case for Austria, whose scheme is very generous and offers excellent employment services both at the beginning and during the unemployment spell: since benefits do not show any significant effect we may conclude that the latter successfully offset the "liquidity constraints mitigation" effect. Similar interpretations can be given for Sweden and UK, even if for the UK the average generosity of benefits in the presence of well-developed services and monitoring could have suggested a better performance in terms of re-employment probabilities. UI schemes in Czech Republic and Hungary, offering modest benefits and average services also end up being neutral in their effect.

On the contrary, the participation to the UI schemes in Ireland and Spain increases unemployment duration. The former country exhibits generous benefits and average employment services while the Spanish scheme has average generosity and scarce services. The characteristics of these schemes easily explain the increase in unemployment duration that we have found. However, the Spanish system seems to not affect duration during later stage of unemployment: this is the only result that within our analysis does not find a full rationale.

In two cases we find that the participation to the program has, at least at some points, positive effects. In Italy, benefits display an initial positive effect on re-employment probabilities, probably stemming from scarce generosity (Italian system was 27th in terms of generosity) and good employment services at the time of registration (the score on initial activity was 1.5 out of 2). However, this effect is not present at later stage of the spell which is line with very low level of employment services and requirement during the later stages of unemployment spell.

In Netherlands benefits have initially a negative effect but they have positive effect at a later time: this is perfectly in line with the mix of scarce initial services but well developed counseling and monitoring during the whole unemployment spell. A similar result was also highlighted in the duration analysis for Sweden though it was not possible, for scarcity of data, to confirm the longer term effect through the PSM estimation. Given that Netherlands and Sweden are the only countries in our analysis were proof of search is required, it appears that this instrument is useful in maintaining the effectiveness of income support programs during later stages of the unemployment spells.

6. Conclusions

We developed a comparative analysis on the effect that unemployment insurance schemes have on unemployment duration. We basically highlights three different mechanism through which UI affect duration: i) liquidity constraints mitigation can increase duration, ii) employment services at the time of registration can increase initial re-employment probability and iii) employment counseling and monitoring of search requirements can increase re-employment probability through the whole unemployment spell. Since these three aspects differ in the schemes of the various countries, we assessed whether they can explain the overall effect of benefits on

unemployment duration. The results, once we account for self-selection, are consistent with our interpretation and, therefore, the three mechanisms effectively concur in the explanation of the effect that benefits have on unemployment duration in most of the countries, though they do not explain particularly well the evidence for Spain. Among the specific mechanisms, it appears that proof of search is particularly useful in maintaining the effectiveness of income support programs during later stages of the unemployment spells.

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