ALMALAUREA WORKING PAPERS no. 19

September 2011

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Educational Mismatch and Wait Unemployment

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Patrizia Ordine[*], Giuseppe Rose[**]

Abstract
This work investigates educational mismatch and its interrelationships with individual unemployment duration. By studying unemployment histories of Italian workers we show that overeducated have longer unemployment spells than well matched workers. Using duration models we show that hazard rates of graduates are higher than those of undergraduates only for transitions toward occupations that require the competencies provided by the universities. This process is strictly related to innate ability and geographical location. Our findings are consistent with an interpretation of educational mismatch as a penalizing phenomenon in the individuals' working life associated to long term unemployment. We argue that a policy that gives more relevance to individual ability in the schooling attainment may reduce educational mismatch.

1. Introduction

In this paper we study the occurrence of overeducation and its empirical relationship with unemployment duration. Our intent is to bring some new insights into the debate concerning the interpretation of this phenomenon and, as a consequence, to figure out some policy indications to reduce its extent among graduates. In the economic literature, educational mismatch - in the form of overeducation - describes the extent to which individuals possess a level of education in excess of that required in their specific job. This phenomenon significantly affects graduate and undergraduate workers. Recent studies report that overeducation involves up to forty percent of the working population (Mavromaras et al., 2010; Ordine and Rose, 2011). Recently, the European Union also has focused its interest on this topic considering that the identification of mismatches between labor supply and demand is important as they can, potentially, be very costly to the economy by restricting productivity growth (European Commission, 2008). However, the interpretation of this phenomenon is controversial. Overeducation may be the consequence of low individual ability for that level of education or it may just be a matter of choice related to compensating advantages. Educational mismatch could also result from a voluntary short-term strategy to enter the labor market. Conversely, it may be the outcome of long periods of unemployment giving rise to an exacerbation of waiting unemployment phenomena. It is apparent that the policy implications associated to these possible interpretations are quite different. If educational mismatch is an involuntary and persistent phenomenon in the individuals' working life, implying productivity constraints, it should become an issue of particular policy concern especially

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for economies characterized by public-funded higher education systems, since resources might be wasted on non productive investments.

In this study we investigate a neglected issue concerning educational mismatch i.e., we investigate the possible interrelationships linking individual unemployment spells to the occurrence of overeducation. In fact, most of the existing studies concentrate their efforts in assessing the relevance of this event in determining wages (among others, Lamo and Messina, 2010; and Tsai, 2010). We turn on a different perspective and we relate overeducation to unemployment spells' duration of workers. In this way, by pointing out the peculiar unemployment histories of workers ending up in positions that do not require their skills, our empirical analysis brings important new insights into the debate concerning the possible explanations for this phenomenon. Our study focuses on a survey of a representative sample of about 5,000 Italian workers recorded in 2006 carried out by the Italian Institute for Vocational Training (ISFOL). By estimating Kaplan-Meier failure functions we highlight that in Italy overeducation appears to be an occurrence that takes place after long periods of unemployment. In order to evaluate the possible factors at work in shaping the hazard probabilities and the duration dependence that we see in the data, we implement a Competing Risk Analysis where we distinguish two separate destination states out of unemployment: right-match and wrong-match jobs. For each transition we estimate semiparametric Cox model specifications and we also present estimates deriving from parametric Weibull models where we introduce controls for unobserved heterogeneity. Our results highlight that the observed matching differences among individuals are strongly related to heterogeneity in terms of their individual ability. As a result, mismatched workers appear as individuals with longer unemployment histories and lower individual talents than those of their well matched peers. In this scenario we wonder about the consequences of these protracted unemployment spells and on the possibly additional effects of unemployment scarring. Indeed, long periods of unemployment may imply poor quality of the workers inducing unemployment persistence that terminates into overeducation. On top of that, long lasting unemployment spells may induce a deterioration of acquired skills so that graduates waiting for a good job may eventually be appealing only for low-skilled occupations. In this context, overeducation represents an inefficient outcome since human capital investment, either private or public is dissipated.

In terms of policy, we discuss how the identification of the right measures able to cope with educational mismatch is strictly related to the determinants of this phenomenon and to the characteristics of individuals queuing in the labor market. If graduates' ability is a main determinant of access to right jobs and faster transitions to good occupations, the presence of educational mismatch should reflect some inefficiency either in the process of self-selection into education or in the establishment of the university selectivity level. In both cases an appropriate settlement of the costs of education, in terms of effort or money, may help in reducing the extent of mismatch. Nevertheless, considering that there is no ex-ante correlation between households' wealth and individuals' ability, a rise in tuition fees may be inappropriate since it may hit high ability individuals belonging to poor families, although they have potentially high returns to education. In this regard, we believe that policy on education should be evaluated in the light of the fact that liquidity constraints do exist. We argue that a useful policy instrument may reside in setting the appropriate level of selectivity of the higher education system since by inducing the appropriate level of effort in schooling attainments, it shapes the correlation between educational choices and individual ability.

2. Background, Data, and Unemployment Duration Patterns
2.1 Educational Mismatch in the Italian Labor Market
We undertake our empirical investigation using Italian data. We believe that the Italian case is especially interesting given the extent of overeducation and the institutional and productive contexts. Indeed, recent studies report that in Italy a large share of graduates and undergraduates

seems to enter job positions that do not require their skills. At the same time, the European Union often calls for a rise in the share of educated labor force in order to achieve education levels similar to those of other OECD countries. This puzzling scenario occurs within an institutional setting where both schooling and university systems are almost free and without any binding selectivity criteria. The debate on overeducation in Italy is based on evidence supplied by recent studies highlighting the incidence of the phenomenon and investigating its trend and its determinants. After the empirical study of Almalaurea (2005), highlighting problems of congruence of the specific degrees and the skill content of professions, we assisted to a flourishing of studies on this theme. Di Pietro and Urwin (2006) focus on education and skills mismatch amongst Italian graduates arguing that overeducation may arise since employers may be mis-specifying jobs as `graduate' jobs in order to take advantage of an excess supply of graduates. They also identify a relatively weak penalizing wage effect arising from educational mismatch associated with the formal requirements of a job. There exists a moderate consensus on the hypothesis that the problem derives from the excess supply of educated workers with respect to demand in the presence of an inflexible labor market where firms do not have any incentive to modify their production processes to fully utilize the available skills. Ordine and Rose (2009a) evaluate the extent of overeducation in Italy considering degree subjects in three geographical macroareas and show that in Italy, the share of overeducated workers is around 39% but it changes dramatically across degree subjects.[1] They notice that overeducation is diffused homogeneously in the macroareas where, on the other hand, the industrial structure is very different. As it is well known, the South of Italy is less developed and less industrialized than the North, with a large share of public employment and high rates of unemployment (Brunello et al., 2001). Di Pietro and Cutillo (2006) try to relate overeducation to a measure of education quality derived from newspapers' college ranking but the authors do not find any significant causal relationship. At the opposite, Ordine and Rose (2009b) present empirical estimates showing that the extent of overeducation depends on education quality. Using a sample of Italian graduates and after controlling for pre-college ability, academic fields, households' and jobs' characteristics, they find that having a degree from research-oriented universities significantly reduces the probability of being overeducated. At the same time, the geographical environment strongly influences the overeducation phenomenon. These empirical findings support a theoretical model where inefficient self-selection into education resolves in mismatch in the job market.

2.2 Data and Unemployment Duration Patterns
In order to present some empirical evidence on the unemployment spells' duration of individuals with different job match, we use a survey carried out by the Italian Institute for Vocational Training of Workers (ISFOL) containing information on the labor market outcomes of a representative sample of about 5,000 workers recorded in 2006.[2] This survey provides information on workers' status (employed/unemployed) and on the length of their unemployment spells. The data set records the time needed to obtain the present job (in months) or the censored time for those still unemployed at the time of the interview. Only uninterrupted spells of unemployment are considered. This data set provides indications to determine if workers are in job positions where the competencies acquired at school/university are effectively needed and allows us to evaluate the extent of educational mismatch and the unemployment spell duration associated with the characteristics of the job match. In Table 1 we define our variables while Table 2 and Table 3 contain some representative statistics of our sample. In particular, in Table 3 we describe the characteristics of individuals with different job match qualities. It is important to make clear that our measure of educational mismatch is a subjective one since we consider in a wrong match individuals who affirm that their degree is not a necessary requirement for their job.

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[1] See also Ballarino and Bratti (2009).
[2] For a detailed description of the survey see Giammatteo (2009).

Table 1:Description of variables

Employed	Variable indicating if the respondent is employed at the time of the interview.
Unemployed	Variable indicating if the respondent is unemployed at the time of the interview.
Unemployment Duration	Variable indicating the length of unemployment spell to find the present job if the respondent is employed or the length of unemployment spell since starting the job search process if the respondent is unemployed at the time of the interview. Duration is measured in months.
Overeducation	Dummy variable for the answer to the question: "Is your degree a required qualification for your job?", Overeducation=1 if the answer is not, 0 otherwise.
Female	Dummy variable indicating the respondent's sex, Female=1, 0 otherwise.
Age	Respondent's age at the interview.
Married	Dummy variable indicating if the respondent is married, Married=1, 0 otherwise.
Son	Dummy variable indicating if the respondent has a son/daughter, Son=1 in the presence of a son/daughter, 0 otherwise.
South	Dummy variable indicating if the respondent is resident in the South of Italy according to the ISTAT classification, South=1, 0 otherwise.
Unemployment Benefits	Variable indicating if the respondent received unemployment benefits during its unemployment spell. Information includes the number of months of benefits duration.
Father education	Dummy variable indicating if the respondent's father is a graduate. Father education=1 if the respondent's father is a graduate, 0 otherwise.
Education: High-school	Dummy variable indicating if the respondent owns a high-school degree. High-School=1, 0 otherwise.
Education: Graduate	Dummy variable indicating if the respondent has a university degree. Graduate=1 if the respondent is a graduate, 0 otherwise.
Degree subject	A vector of 5 0-1 dummy variables indicating degree subjects: 1) Science=1 if mathematics, science, chemistry, geo-biology; 2) Medicine=1 if medicine; 3) Econ.&Law=1 if political science, economics, statistics, law; 4) Humanities=1 if humanities, linguistic, teaching, psychology; 5) Engineering=1 if engineering, architecture.
Secondary school grade	Dummy variable for final score at secondary school SS Score=1 if secondary school final score is medium-high; SS Score=0 otherwise.
High school grade	Dummy variable for final score at high school HS Score=1 if high school final score>55/60 or high school final score>90/100; HS Score=0 otherwise.
University grade	Dummy variable for final score at university. University Score=1 if university score≥100/110; University Score=0 otherwise (scale 66-110).

Some important aspects of the duration pattern of unemployment spells may be gathered by inspecting the Kaplan-Meier estimated hazard function $h(t)$ i.e., 1 minus the estimated survivor function $S(t)$ which is the probability of survival into unemployment after time t with:

$$h(t) = 1 - S(t) = 1 - \prod_{j|t_j<t}\left(\frac{u_j-e_j}{u_j}\right) \tag{1}$$

where u_j is the number of individuals unemployed at time t_j and e_j is the number of failures into employment at time t_j. The product is over all observed failure times less than or equal to t. The Kaplan-Meier estimated hazard function $h(t)$ - also known as the conditional failure rate - is the instantaneous rate of failure, with the emphasis on the word rate i.e., it has units $1/t$ and measures the rate of exit out of unemployment during time.

There exists a substantive literature comparing the outcomes deriving from subjective and objective measures of overeducation (obtained by technical evaluation of professional job analysts of job positions). However, there is no consistent evidence that these different approaches give rise to systematic and significant bias of the incidence or wage effects of overeducation (McGuinness, 2006). It is worth noting that, in our empirical investigation we consider unemployment histories either terminating in 2006 into employment or continuing after that date with unemployment and job search. In this way, our sample results of individuals entering the unemployment pool at different times whose exit is evaluated at the same date.

Table 2: Frequency and Average of variables in the sample. Employed and Unemployed, 2006.

	Employed		Unemployed	
	Frequency	Average	Frequency	Average
Observations	2493	50.3	2471	49.7
Unemployment Duration	2493	9.8	2471	16.2
Female	915	36.7	845	34.2
Age	2493	30.4	2471	32.7
Married	774	31.0	944	38.2
South	658	26.4	970	39.2
Unemployment Benefits	-	-	174	7.0
Father education	203	8.1	117	4.7
Education: High-school	1271	51.0	1249	50.5
Education: Graduate	671	26.9	480	19.4
Secondary school grade	1892	73.6	1760	71.2
High school grade	197	15.5	140	11.2
University grade	211	31.4	144	30.0
Degree on time	249	37.1	142	29.6
Overeducation	1403	56.2	-	-

Note: Unemployment duration is in months. The averages are sample averages. For final marks (secondary, high school, and university) averages are with respect to the number of individuals in the group. Variables' description presented in Table 1.

As it appears from Figures 1-5, the general pattern of these functions is non-linear and increasing with a faster growth at the beginning of the spell which becomes smoother with the elapsed time into unemployment. Figure 1 depicts the empirical failure rate estimates for individuals with different education levels. The curve for graduates lies above that of their less educated counterpart. In general, this reflects a faster transition out of unemployment for more educated people.[3]

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[3] We remark that differences between the reported Kaplan-Meier functions are statistically significant. The Wilcoxson and Peto-Peto tests strongly reject the null of identical hazard rates with p-value equal to 0.000. The same applies for the following figures. Results are available from the authors.

**Table 3: Frequency and Average of variables in the sample. Employed, 2006**.

	Employed Right-Match		Employed Wrong-Match	
	Frequency	Average	Frequency	Average
Observations	1090	43.7	1403	56.2
Unemployment Duration	1090	9.2	1403	10.2
Wage	656	945	881	807
Female	413	37.9	502	35.8
Age	1090	29.3	1403	31.2
Married	269	24.7	505	36.0
South	302	27.7	356	25.3
Father education	120	11.1	83	5.9
Education: High-school	540	49.5	731	52.1
Education: Graduate	468	43.0	203	14.5
Secondary school grade	1090	9.3	1403	10.2
High school grade	102	18.9	95	13.0
University grade	149	31.8	62	30.5
Degree on time	176	37.6	73	36.0

Note: Unemployment duration is in months. The averages are sample averages. For final marks (secondary, high school, and university) averages are with respect to the number of individuals in the group. Variables' description presented in Table 1.
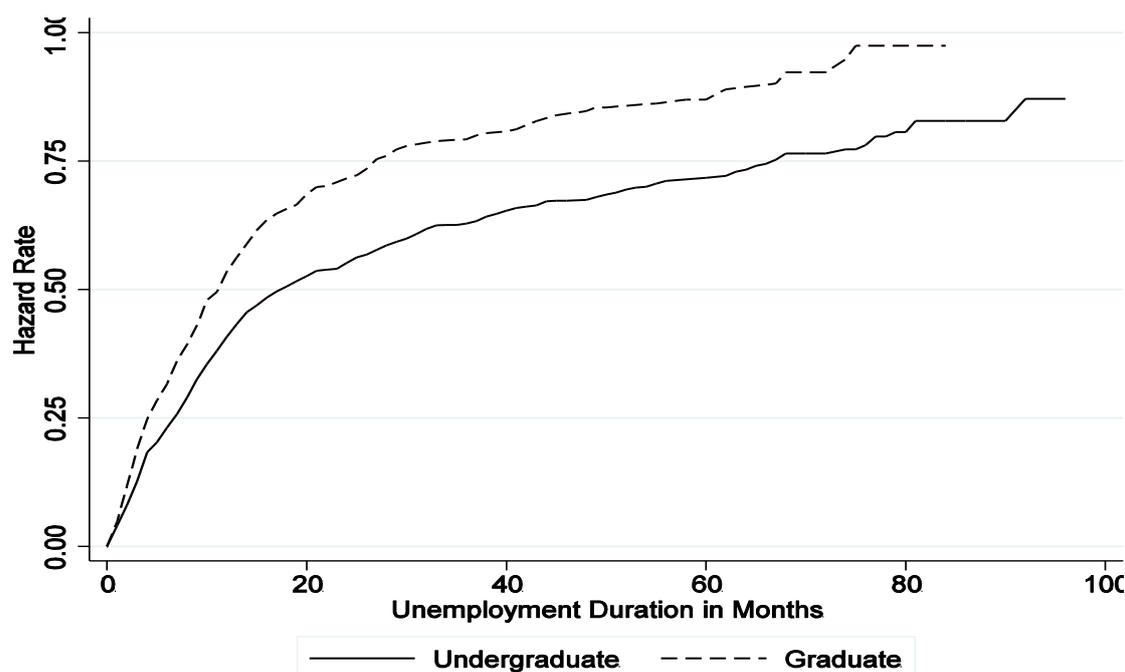
Figure 1 - Kaplan-Meier failure estimates by Education. Failure: Employment. Note: The vertical axis reports rate of exit out of unemployment.

The same exercise has been done for individuals living in areas with a different level of economic development i.e., the less developed South of Italy in comparison with the rest of the country (Figure 2). In this case we observe that the failure rate is, as expected, lower for people located in the South area. In Figure 3, we compare the exiting rate of individuals with different quality of job matches i.e., well-matched versus overeducated individuals. In this case, the Kaplan-Meier estimates detect exiting rates for well matched individuals that are much higher than those characterizing mismatched workers.
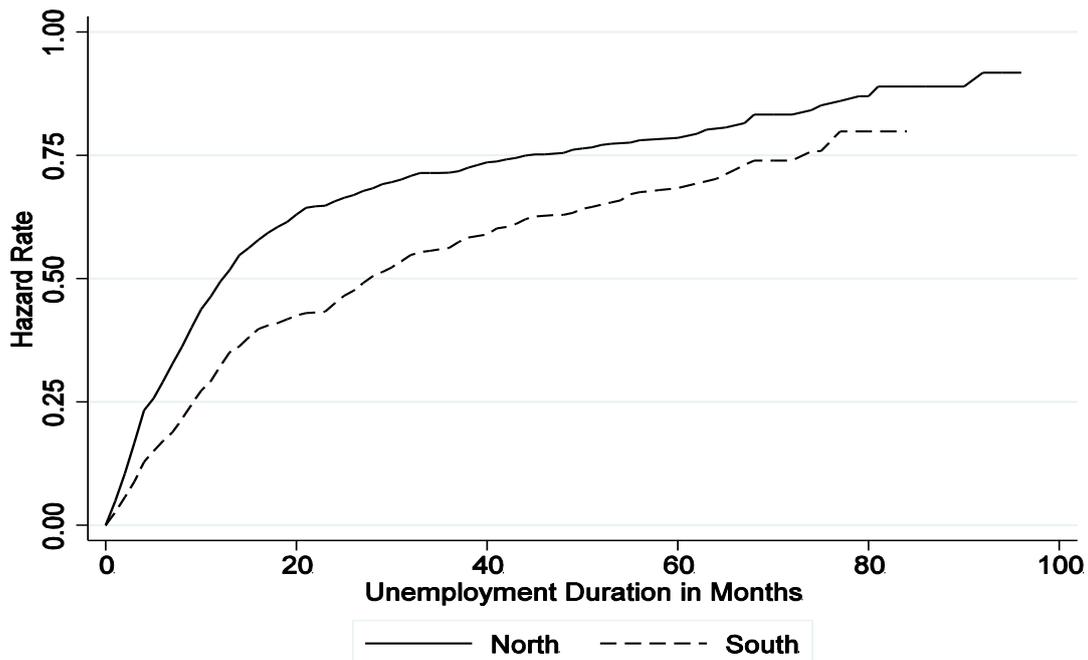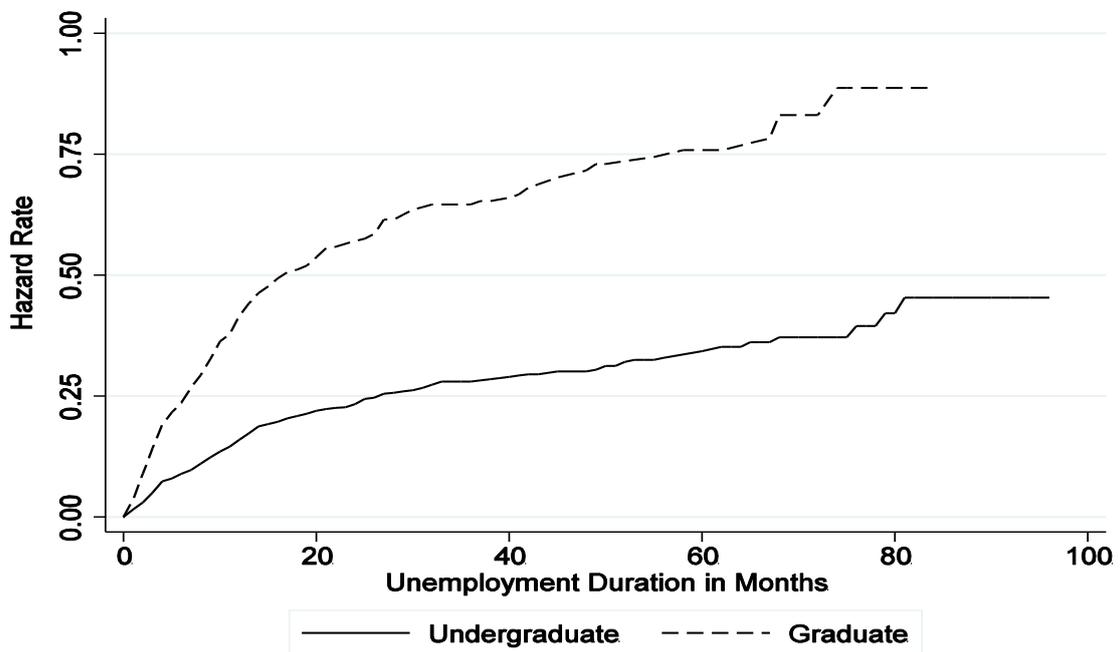
Figure 2 - Kaplan-Meier failure estimates by Region. Failure: Employed. Note: The vertical axis reports rate of exit out of unemployment.

The evidence presented in Figure 3 implies that overeducated workers appear as individuals with a well defined unemployment history, since they wait into unemployment consistently more than well matched workers. As a consequence, individuals ending up in job positions that do not require their skills present longer unemployment spell than those well matched. Further, we compare people with different educational levels in terms of their unemployment spell duration to obtain a job where their competencies are effectively used. In Figure 4 we show the hazard function of individuals that report transitions toward occupations congruent with their education level. In this case, hazard rates of graduates lie far above those of undergraduates. In contrast, Figure 5 refers to individuals who terminate their unemployment spells in a wrong match. This figure highlight that although unemployment duration is higher for individuals that exit toward bad occupations, differences between individuals with different education levels are not too pronounced and surprisingly the curve for graduates lies below that of undergraduates. This would imply that when graduates are overeducated they have a spell length even higher than that of their undergraduate counterpart. In conclusion, our descriptive analysis highlights that:

- As expected, the hazard rate into employment is higher for individuals more educated and located in more developed regions;

- However, the hazard rate of graduates is higher than that of undergraduates only for transitions towards occupations that require the competencies provided by the universities. Otherwise, the chance of obtaining a job is higher for an undergraduate than for a graduate. This is true especially in the less developed South of the country.
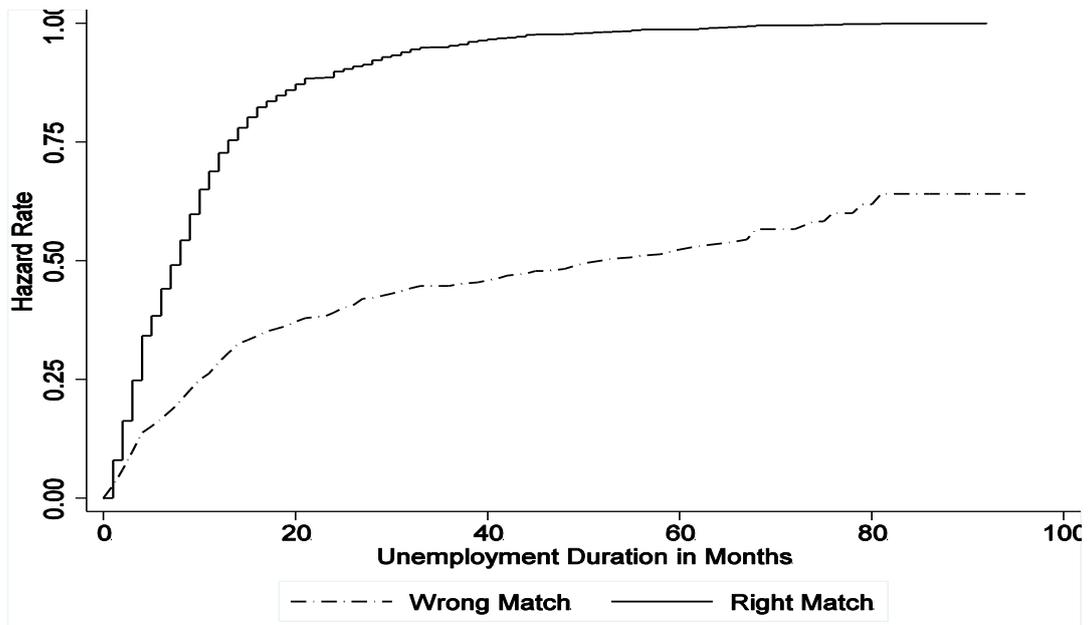
Figure 3 - Kaplan-Meier failure estimates by type of Match. Failure: Employed either with a Right or a Wrong match. Note: The vertical axis reports rate of exit out of unemployment.

Figure 4 - Kaplan-Meier failure estimates by Education. Failure: Employed with a Right match. Note: The vertical axis reports rate of exit with a right match out of unemployment.
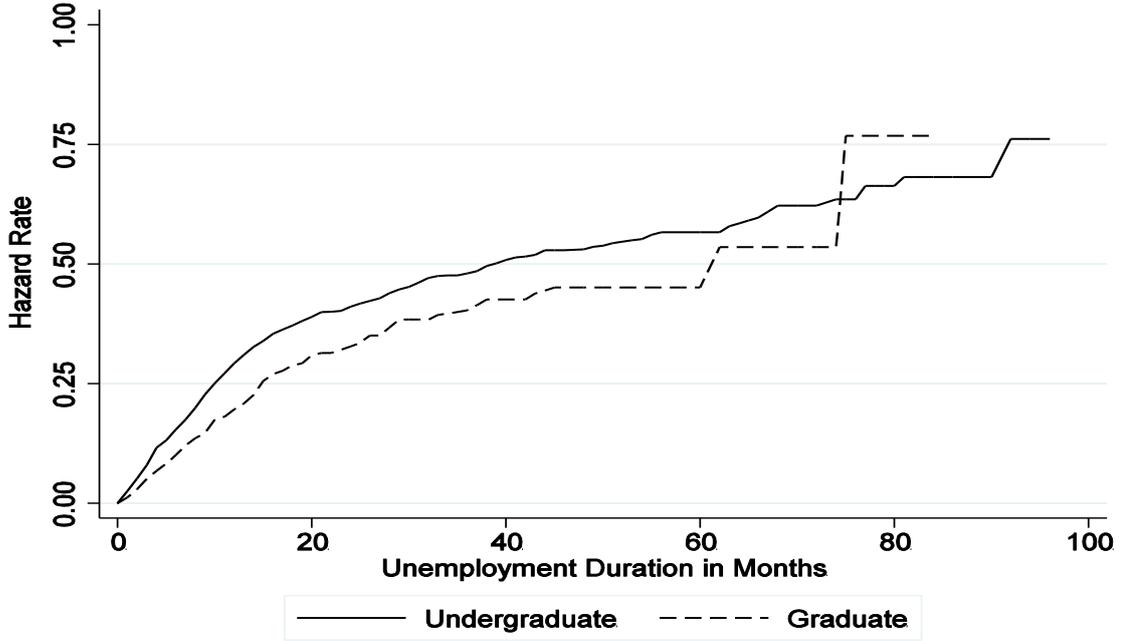
Figure 5 - Kaplan-Meier failure estimates by Education. Failure: Employed with a Wrong match. Note: The vertical axis reports rate of exit with a wrong match out of unemployment.

3. CRM Analysis on Unemployment Spell Length

Although informative, the presented preliminary analysis based on the empirical estimates of the hazard functions does not control for possible factors at work in shaping the observed duration dependence. In particular, the observed differences between individuals with right and wrong matches might be due to differences in their characteristics in terms of skills, ability or family background. These variables may affect the patterns of hazard probabilities and the duration dependence that we see in the data. In order to take these differences into account, we evaluate the transitions out of unemployment by estimating proportional hazard Competing Risk Models (CRM). We assume a competing risks formulation in which independent competing risks determine the duration of unemployment. In our case we suppose that unemployment may terminate by exiting toward employment with a right or a wrong educational match. Notice that the assumption concerning independence between the two risks strongly relies on the presence of uninterrupted spells of unemployment characterizing our sample.

In general, in a CRM with m types of failure there are $m + 1$ states $\{0,1,2,...,m\}$, where 0 represents the initial state and $\{1,2,...,m\}$ are possible destination states. We may assume that there exist latent variables $(t_1, t_2, ..., t_m)$ which correspond to the spell duration for each possible failure. Destination-specific covariates are denoted by x_j (with $j = 1,2,...,m$). Since we observe only the shortest duration and the others are censored, the joint survivor function S may be expressed as:

$$S_\tau = \Pr[\tau > t] = \Pr[t_1 > t, ..., t_j > t] \tag{2}$$
$$\tau = \min_j(t_j)...t_j > 0$$

where τ denotes the spell duration. Let $g_j(t)dt$ denote the probability of failure to risk j in the interval $(t, t + dt)$ then the total hazard rate $\lambda_\tau(.)$ applicable to all causes is:

$$\lambda_\tau(t) = \sum_{j=1}^{m} g_j(t) \tag{3}$$

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If risks are independent, then the hazard rate for a specific cause j is $\lambda_j(t) = g_j(t)$. This means that the probability of failure from cause j in $(t, t + dt)$ conditional on survival to t is the same whether j is one of the risks or it is the only risk. Given independent risks, the hazard rate for failure of j-th type is defined by:

$$\lambda_j(t_j|x_j) = \lim_{dt_j \to 0} \frac{\Pr[t_j \leq T \leq t_j + dt | T > t_j, x_j]}{dt_j} \tag{4}$$

where T indicates duration in the origin state.
We estimate a proportional hazard model of the form:

$$\lambda_j(t|x) = \lambda_{0j}(t) \exp(x(t)\beta_j) \tag{5}$$

where both the baseline hazard λ_{0j} and β_j are specific to type j hazard.

4. Empirical Results

We implement a Competing Risks Analysis where we distinguish two separate destination states: right match job and wrong match job. Our estimated models are reported in Table 4. For comparison, in Table 5 we also report the estimates referred to transition toward employment without separating the destination states. For each transition we estimate the Cox model specification and, in order to check the robustness of our results, we also present estimates deriving from Weibull models where we introduce a control for unobserved heterogeneity (Inverse-Gaussian) as suggested in the literature.[4] Coefficients appearing in the different specifications are very similar to each other although, as expected, those arising from parametric models are slightly bigger than the others when we control for unobserved heterogeneity. This is due to possible misspecification problems that lead to upward biased point estimates when using the Weibull hazard function specification. We focus our comments on the Cox model and we present additional specifications to highlight the robustness of our results. In particular, the inclusion of unobserved heterogeneity does not seem to affect the signs of the explanatory variables, pointing out for a minor relevance of its existence.

The estimated coefficients of the unemployment hazard equations which refer to exit toward employment, without distinguishing by exit type (Table 4), are comparable to those presented in other empirical studies on the topic.[5] Moreover, notice that although we have some information on unemployment benefits, we observe that just a minority of unemployed in our sample receive some form of insurance (in Table 2, just 7% of unemployed workers). Indeed, in the period under study unemployment benefits cover only a small fraction of the workforce, mainly workers in open-ended contracts who lose their jobs. Moreover, there is weak evidence on the role of this variable in the Italian labor market (Brugiavini, 2009). This may explain its limited extent among unemployed in our sample and its reduced significance in our preliminary estimated regressions, so we decide to discard it. In the econometric models presented in Table 5, where we distinguish between exit types, we notice that individuals located in less developed areas of the country are significantly penalized in exiting the unemployment pool independently on the job-match type. As expected, the process of

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[4] We select the Weibull specification according to the Akaike Information Criterion. We focus our comments on the Cox specification since we are aware of the possible misspecification problems arising when using the Weibull hazard function specification (Cameron and Trivedi, 2005).

[5] Among others see Biggeri et al. (2001) and Barbieri and Schrerer (2008).

Table 4: Exit out of unemployment. Semiparametric and parametric models.

	Cox Model	Weibull Model	Weibull with IG Frailty
Age	-0.026*** (0.008)	-0.029*** (0.003)	-0.077*** (0.004)
Female	-0.102** (0.046)	-0.109** (0.046)	-0.341*** (0.083)
Married	0.020 (0.058)	0.009 (0.058)	0.294*** (0.105)
Son	0.082 (0.067)	0.101 (0.068)	-0.357*** (0.109)
South	-0.554*** (0.055)	-0.604*** (0.055)	-1.180*** (0.099)
Graduate	0.354*** (0.075)	0.403*** (0.076)	0.643*** (0.144)
Graduate*South	0.044 (0.105)	-0.015 (0.105)	0.049 (0.195)
University grade	0.013 (0.089)	0.020 (0.090)	0.114 (0.170)
High school grade	0.190*** (0.047)	0.201*** (0.047)	0.272*** (0.089)
Secondary school grade	0.084 (0.050)	-0.078 (0.051)	-0.042 (0.090)
Father education	0.290*** (0.081)	0.307*** (0.081)	0.532*** (0.155)
Degree in Humanities	-0.287*** (0.097)	-0.341*** (0.098)	-0.604*** (0.185)
Degree in Science	-0.044 (0.134)	-0.017 (0.135)	-0.052 (0.258)
Degree in Medicine	0.419** (0.179)	0.464*** (0.180)	0.733*** (0.351)
Degree in Engineering	-0.059 (0.152)	-0.031*** (0.152)	-0.104 (0.296)
const.		-2.275*** (0.124)	
P		0.952*** (0.015)	1.701*** (0.044)
Obs. 4791			
Failures	2320	2320	2320

Notes: i) The failure is toward employment without distinguish job match type; ii) Standard Error in parenthesis; iii)*** 1% significant, ** 5% significant, * 10% significant; iv) *p* is the coefficient for duration dependence; v) "Weibull Model" is the Weibull with No Heterogeneity while "Weibull with IG Frailty" indicates the Inverse Gaussian specification to control for unobserved heterogeneity; vi) Economics and Law is the reference category for majors; vii) Graduate*South is the interaction between the two variables; viii) University grade and Majors are interacted with the variable Graduate; ix) Variables' full description in Table 1.

**Table 5: Exit out of unemployment by job-match type. Semiparametric and parametric competing risks models.**

	Cox Model		Weibull Model		Weibull with IG frailty	
	Well-match	Wrong-match	Well-match	Wrong-match	Well-match	Wrong-match
Age	-0.030***	-0.023***	-0.035***	-0.026***	-0.078***	-0.077***
	(0.008)	(0.003)	(0.004)	(0.003)	(0.010)	(0.005)
Female	-0.130*	-0.08	-0.135*	-0.097	-0.314**	-0.334***
	(0.069)	(0.061)	(0.070)	(0.061)	(0.141)	(0.111)
Married	-0.124	0.114	-0.135	0.106	-0.191	0.522
	(0.092)	(0.076)	(0.092)	(0.075)	(0.188)	(0.137)
Son	0.029	0.108	0.052	0.123	-0.071	-0.418***
	(0.101)	(0.092)	(0.101)	(0.091)	(0.214)	(0.144)
South	-0.575***	-0.546***	-0.631***	-0.591***	-1.293***	-1.204***
	(0.055)	(0.068)	(0.092)	(0.068)	(0.182)	(0.125)
Graduate	0.742***	-0.053	0.799***	-0.012	1.570***	-0.150
	(0.099)	(0.120)	(0.101)	(0.122)	(0.202)	(0.225)
Graduate*South	0.171	-0.518***	0.195	-0.486**	0.437	-0.738**
	(0.139)	(0.192)	(0.140)	(0.192)	(0.277)	(0.343)
University grade	0.063	-0.199	0.064	-0.188	0.150	-0.253
	(0.108)	(0.162)	(0.109)	(0.163)	(0.217)	(0.299)
High school grade	0.504***	-0.080	0.518***	-0.071	1.002***	-0.216*
	(0.069)	(0.067)	(0.070)	(0.066)	(0.140)	(0.124)
Secondary school grade	0.310***	-0.034	0.308***	-0.046	0.527***	-0.278**
	(0.087)	(0.062)	(0.087)	(0.063)	(0.176)	(0.112)
Father education	0.278***	0.294**	0.303***	0.297**	0.592**	0.484**
	(0.107)	(0.125)	(0.107)	(0.068)	(0.214)	(0.237)
Degree in Humanities	-0.412***	0.023	-0.474***	-0.068	-0.944	-0.141
	(0.126)	(0.155)	(0.126)	(0.157)	(0.252)	(0.292)
Degree in Science	-0.060	-0.133	-0.074	-0.091	0.140	-0.166
	(0.166)	(0.231)	(0.167)	(0.232)	(0.333)	(0.435)
Degree in Medicine	0.710***	-1.906*	0.751***	-1.853*	1.469***	-3.106**
	(0.187)	(1.006)	(0.188)	(1.007)	(0.375)	(1.404)
Degree in Engineering	0.117	-0.679*	0.157	-0.661*	0.311	-1.175*
	(0.172)	(0.349)	(0.172)	(0.350)	(0.344)	(0.613)
const.			-3.334***	-2.697***		
			(0.197)	(0.161)		
P			0.960**	0.949**	1.894**	1.702***
			(0.024)	(0.020)	(0.048)	(0.054)
Obs. 4791						
Failures	1012	1308	1012	1308	1012	1308

Note: i) Well-match indicates failures towards right matches, Wrong-matches indicates failures toward bad match; ii) St. Er. in parenthesis; iii)***1% significant, **5% significant,*10% significant; iv) *p* is the coefficient for duration dependence; v) "Weibull Model" is the Weibull with No Heterogeneity while "Weibull with IG Frailty" indicates the Inverse Gaussian specification to control for unobserved heterogeneity; vi) Economics and Law is the reference category for majors; vii) Graduate*South is the interaction between the two variables; viii) University grade and Majors are interacted with the variable Graduate; ix) Variables' full description in Table 1.

job finding is more difficult and long lasting in the South of Italy. Turning to individual characteristics, in our model individual ability is proxied, in line with the existing literature, by pre-college and pre-high-school leaving grades.[6] Interestingly, high and secondary school leaving grades are significant in speeding up transitions towards well matched occupations but they have no role in speeding up unemployment outflows towards wrong matched positions. In this case the

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[6] Among others, see Cappellari and Lucifora (2010), McGuinness (2003), and Ordine and Rose (2009).

parametric specifications detect a significant negative effect of the secondary school leaving grades, implying that more able individuals tend to slow down their transition into bad quality occupations. In line with some previous results, the university leaving grade is not significant in determining labor market transitions. We know that university grades may be biased by the so called "grade inflation" phenomenon, and in Italy many universities tend to inflate their final marks.[7] Family background may impact the individuals' choices in many ways. On the one hand, families may provide the necessary help at early stages of children' growth in setting their individual ability. Cultural background is extremely relevant in this process even because better educated parents may value their children's education more than the others (Checchi, 2003). On the other hand, parents may increase individual employment opportunities through informal networks (Sylos Labini, 2008). Our results point out that father education is an important variable in determining the speed of employment transitions. Even for mismatched workers, employment opportunities are significantly influenced by family background and this may be in support of the "family network" hypothesis. It is reasonable to think that coming from a family that may act as a "network provider" increases employment opportunities. Our empirical analysis also controls for gender, showing that being female always imposes a penalty in terms of job opportunities and unemployment spells' length. As expected, fields of education influence unemployment to job transitions in case of right matches. Notice that, variables related to majors are interacted with a 0-1 dummy variable equal to 1 only if the individual has a university degree. As a consequence, these variables highlight differences in the speed of exit out of unemployed across graduates.
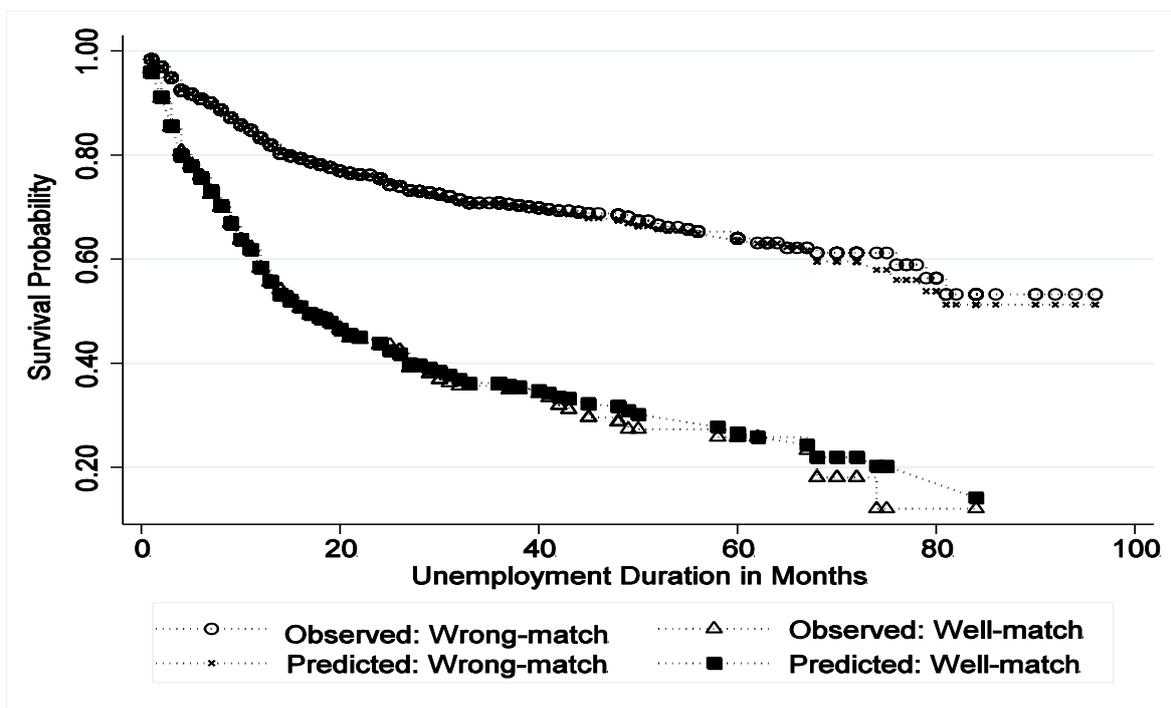
Figure 6 - Survival probability observed and predicted (Cox specification) by education, Failure: Right match. Note: the vertical axis reports the probability that there is no failure event beyond time t.

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[7] On this argument see Ordine and Rose (2009).
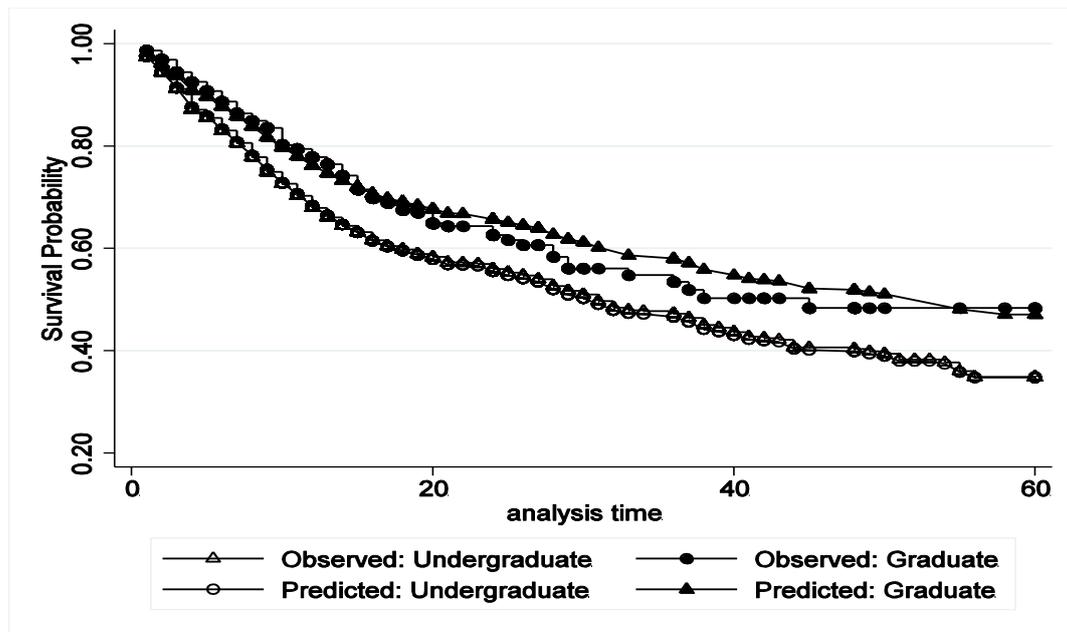
Figure 7 - Survival probability observed and predicted (Cox specification) by education, Failure: Wrong match. Note: the vertical axis reports the probability that there is no failure event beyond time t.

As expected, having a degree in Medicine speeds up the exiting process towards a good match occupation compared with the excluded Economics and Law field. At the opposite, having a degree in humanities reduces the rate of exit towards well match occupations. Interestingly, no major significantly (at 5% level) affects the speed of exit towards bad match occupations. Finally, as reported in Table 5, the parameter p arising from parametric specifications appears to be always statistically different from the unit value, implying significant duration dependence.

Our duration analysis points out some important results. Firstly, by means of Kaplan-Meier hazard functions we show that mismatched individuals wait for a job position consistently more that their well matched peers. Then, we show that the speed of transitions towards right match jobs is significantly influenced by individual's characteristics and attributes. Conversely, the same factors do not seem to affect transitions towards wrong match occupations. In particular, individual ability as well as education do not influence the pattern of exiting towards bad jobs.

5. Concluding Remarks
In this study we investigate a neglected issue concerning educational mismatch i.e., we investigate the possible interrelationships linking individual unemployment spells to the occurrence of overeducation. By turning to this different perspective, we point out the relevance of investigating the peculiar unemployment histories of workers ending up in positions that do not require their skills. We realize that the interpretation of educational mismatch in the form of overeducation is controversial. Overeducation may be the consequence of low individual ability for that level of education or may just be a matter of choice related to compensating advantages. Educational mismatch could also result from a voluntary short term strategy to enter the labor market. At the opposite, it may be the aftermath of long periods of unemployment giving rise to an exacerbation of waiting unemployment phenomena. It is apparent that the policy implications arising from these possible interpretations are quite different. If educational mismatch is an involuntary and persistent phenomenon in the individuals' working life implying productivity constraints, it should become an issue of particular policy concern especially for economies characterized by public-funded schooling and higher education systems. We consider the case of Italy and we show that the Kaplan-Meier failure functions reveal that overeducation appears to be an occurrence taking place

after long periods of unemployment. In order to evaluate the possible factors at work in shaping the hazard probabilities and the duration dependence that we see in the data, we implement a Competing Risk Analysis reporting strong heterogeneity in terms of variables affecting the speed of exit out of unemployment depending on the quality of job matches. Our study suggests that overeducation may indeed be accompanied by additional penalizations due to a long lasting unemployment experience. According to the unemployment scarring literature, this further drawback may be the consequence of a deterioration of the skills acquired through education. We think that the identification of the right measures able to cope with educational mismatch is strictly related to the investigation of the characteristics of individuals queuing in the labor market. If graduates' ability is a main determinant of access to right jobs and faster transitions to good occupations, the presence of educational mismatch may reflect some inefficiency either in the process of self-selection into education or in the establishment of university and schooling quality. At the same time, the extent of competition among firms and the features of the productive system may also be relevant in determining the spread of mismatch and the cutoff level of ability at which potentially high productive workers wait in the labor market dissipating their Human capital ending up in jobs where they work below their potential. Further research is needed in this direction in order to evaluate the right policy measures to implement to curb overeducation and to improve the overall performance of the economy in term of output, productivity, and efficiency of public expenditure.

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