

Overeducation, Earnings and Job Satisfaction in the Graduate Labour Market

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Abstract[#]

This paper provides the first available estimates of the impact of overeducation on wages and job satisfaction of AlmaLaurea pre-reform university graduates in 2005. The analysis focuses on jobs attained 5 years after graduation. Overeducation is low relative to similarly advanced economies, and persistent over the years after graduation, in as much as there is a strong impact of past experiences of overeducation on the probably to be currently overeducated. Analysis of the determinants of overeducation / overskilling suggests that *ceteris paribus* it tends to be more frequent among children of parents with lower educational levels and coming from professional and technical schools. The degrees that cause overeducation more frequently include: Arts, Languages, Physical Education and Also working while studying and having started the university later than the curricular years is associated to overeducation / overskilling more frequently. Specific on-the-job training schemes and advanced post-graduate studies provide a cushion against the risk of overeducation. We find a conditional wage penalty of about 10% of the median wage for adopt the “to get” (overeducation) and of about 6.7% for the “to do” (overskilling) definition of overeducation. We also assess the impact of overeducation on job satisfaction finding that it reduces job satisfaction by the same amount of wages, namely one out of ten points. We also study the determinants of “genuine” overeducation defined à la Chevalier (2003) as including those overeducated graduates who are also dissatisfied with their job. The determinants of genuine overeducation are similar those of apparent education, but ... The low share of overeducation / overskilling and the small penalty in terms of wages and job satisfaction that has demand and supply-side explanations.

The wage penalty associated to overeducation is much higher if we consider the sample selection bias arising from the high youth unemployment rate. Considering that the unemployed would be more likely to be overeducated, the share of overeducated and the wage penalty of overeducation would be much greater when controlling for this bias.

JEL classification: C25; C26; C33; I2; J13; J24.

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Introduction

The mismatch between the education level of workers and that required by the jobs available in the labour market represents one of the most debated dimensions of skill mismatch. In addition, with the increasing complexity of the composition of labour demand and supply, many observers believe that educational and skill mismatch are bound to increase in the near future. In particular, the increasing educational level of the youngest generations causes a growing concern that the mismatch will take the form of overeducation, especially in those countries, like Italy, where the production system is oriented towards traditional manufacturing sectors and therefore the demand for human capital is expected to remain low and stable. In other words, in countries with more traditional production structures, the demand is more at risk of losing the race with the supply of human capital.

In particular, it is interesting to note that while technological change and globalization have entailed a skill-biased change in labour demand in the Anglo-Saxon countries, instead, in other advanced economies in Western Europe the increase in educational levels has not been associated with a parallel increase in the share of skilled occupations, therefore generating skills mismatch (see Manacorda and Petrongolo, 2000, for a comparative analysis of skill mismatch across many OECD countries).

Overeducation can also determine skill mismatch, causing a penalty to individuals in terms of earnings and employment opportunities and a waste of resources to the society at large in terms of state investment into education that do not bear its yields (Groot 1996, Büchel et al., 2003, McGuinness, 2006). For individuals, overeducation is often conducive to lower returns to education in terms of current wages and career dynamics.

While early studies on overeducation have focused on the United States of America (Freeman, 1976), more recently, overeducation and skill-mismatch patterns have been recently observed in Italy (AlmaLaurea 2005; Di Pietro and Urwin 2006; Ordine and Rose, 2009; Ortiz 2010) and in other European countries (see, for instance, Büchel et al., 2003), causing widespread concern.

The literature relative to Italy

This paper provides the first available estimates of the impact of overeducation on wages and job satisfaction of AlmaLaurea¹ university graduates registered in the years before the implementation of the Bologna process, so-called pre-reform graduates. All individuals in the sample graduated in 2005 and are observed one, three and five years after graduation. Following the existing literature (see, among others, Dolton and Silles, 2008; Ferrante, McGuinness and Sloane, 2010), we study the determinants of the educational mismatch defined as the condition of having a higher level of education than that necessary “to get” a job (overeducation) or of having a higher level of skills “to do” a job (overskilling).

We find that overeducation is quite stable over the years after graduation and there is a strong impact of the past experience of overeducation on the probably to be currently overeducated.

The determinants of overeducation are quite similar in the two definitions. They include: ...

We also study the determinants of “genuine” overeducation / overskilling defined à la Chevalier (2003) as including those overeducated graduates who are also dissatisfied with their job. This group is expected to be different from the “apparently” overeducated / overskilled, namely those who are not dissatisfied with their job. The determinants are similar between the two groups, but ...

We find a conditional wage penalty of about 10% of the median wage when we adopt the “to get” definition and of about 6.7% when we adopt the “to do” definition of overeducation. We also assess the impact of overeducation on job satisfaction finding that it reduces job satisfaction by one out of ten points.

This is quite a low penalty in comparison to other countries that have reached a similar level of development. It has supply and demand-side explanations. In fact, these findings are consistent with a theory

¹ AlmaLaurea is a consortium including a large and growing number of Italian universities. The aim of the consortium is to provide a framework to facilitate interaction of graduates and firms by collecting information on curricula of graduates and making it available to firms wishing to fill in their job vacancies. It also collects valuable information on individual and educational characteristics of graduates at the time of graduation and on their employment status after one, three and five years from graduation. Information on characteristics at graduation and employment status, available in separate files and databases, can be, in fact, matched to form a unique data set useful for evaluation of the success of universities in producing human capital that the market is actually requesting.

where labour demand is less skill biased than elsewhere in Europe and the United States and, therefore, where the unemployment rate of university graduates is relatively higher than elsewhere and the wage distribution is particularly flat. Overall, it suggests that the country should move from a low to a high road to development to accommodate the increasing supply of human capital of the youngest generation.

To test this hypothesis, we move away from traditional OLS estimates, towards modelling strategies able to control for and assess the impact of the greater probability of unemployment of the graduates who have a higher degree of educational mismatch as compared to labour demand. In fact, it is likely that the wage penalty of overeducation is lower than actual when it is estimated only among the overeducated. In fact, the latter are the smoothest form of educational mismatch. Most overeducated are simply unemployed, since the most dramatic penalty of it is in terms of the reduced probability to find a job. We controlling for the sample selection bias arising from measuring overeducation only among the employed by the heckit estimates of the earnings equation, where the usual OLS estimates are corrected for the lower employment opportunities of the overeducated.

When controlling for sample selection bias, the wage penalty increases up to ...

The outline of this paper is as follows. Section one summarises the relevant literature by focusing especially on the Italian case. Section two discusses the main features of the data set adopted and the method of analysis. Section three presents the results, while section four places them within the existing literature attempting an interpretative explanation of the findings. A final section summarises the main findings.

1. The state of the art

1.1. Theoretical explanations of overeducation

1.2. The empirical literature

In a seminal contribution, Freeman (1976) noted the existence of overeducation in the USA. More recent contributions (see, among others, Büchel, de Grip and Mertens, 2003; Sloane) are raising concern regarding the existence of overeducation in Europe. The research on Europe has addressed the following issues:

- a) Size of overeducation in EU countries;
- b) Determinants within countries and by educational qualification;
- c) Penalty in terms of earnings and employment probabilities;
- d) Possible econometric difficulties of using OLS and different corrections for sample selection and endogeneity bias;
- e) Identification of control variables for policy intervention².

Issue a) is one of the most complex to deal with, also due to the scant empirical evidence that is available, especially due to the few datasets available that are able to return comparable information across EU countries. In addition, whatever the measure of overeducation adopted, measurement errors are very common.

Expectations based on theoretical reasoning and early evidence on the skill mismatch across OECD countries (Manacorda and Petrongolo, 2000) point to lower overeducation in the EU as compared to the USA. In fact, there is large evidence that technological change has been in the EU, and especially in Southern European countries, less skill biased than in the USA, but the supply of human capital is also on average much lower than in the USA. In fact, the supply of human capital has been much low and stable in most EU countries until recently.

Nonetheless, supply side considerations suggest that also in (Southern) European countries, overeducation might have become an issue in recent years, due to the dramatic increase in the supply of human capital in a context of sluggish economic growth and innovation rates. The human capital boom has been the consequence also of policy intervention. Continuous reforms of the educational system starting from 1999 have been aimed, among others, at reducing the direct and indirect cost of education, in order to favour the increase in educational attainment.

² For a recent survey of the literature, see McGuinness (2006).

At least in the short run, the 2008 financial crisis is believed to further reduce the demand for labour, including skilled labour, therefore further increasing unemployment and, possibly, also overeducation.

As to point b), overeducation is typically attributed to similar observed characteristics, such as holding a degree in Arts or social sciences, the fact of studying and working, the tendency to work before starting to attend a university programme.

Point c) is Even if the return to education is still positive for the overeducated and higher than that obtained by workers holding only a secondary high school diploma (Brynin and Longhi, 2009; Franzini Raitano 2009; Wasmer et al, 2005), nonetheless, they invariably get a wage penalty for being overeducated. The row wage penalty associated to overeducation, namely that estimated using a naive OLS, amounts to not more than 30% according to the country considered and the data set used. Using a panel of graduates from a UK university, Dolton and Silles (2008) find a wage penalty of between 16% and 23%. **OTHER MEASURES**

Moreover, generally speaking, the wage gap for the overskilled (“to do” definition) is lower than that for the overeducated (“to get definition) workers (see, among others, Sloane et al., 1999; Wasmer et al., 2005). This can be explained by the greater probability of overrating overskilling as compared to overeducation. In addition, the objective definition is more likely to signal an objective disadvantage at the job place of overeducation.

Dolton and Silles (2008) find a wage penalty of about 16% in the case of overskilling and of 23% in the case of overeducation. Ferrante, McGuinness and Sloane (2010) find an average wage penalty associated to overskilling of about 10%, but of about 30% in the case of overeducation in a sample of seven EU countries, using the REFLEX dataset. Also in the case of Italy,

The points c) and d) appear more and more related to each other, since many authors have raised the concern that simple OLS estimates tend to dramatically underestimate the wage penalty associated to overeducation. Three types of possible sources of bias have been highlighted in the literature: a) endogeneity; b) sample selection; c) measurement errors. While endogeneity and sample selection bias tend to generate upward corrections of the wage penalty, instead measurement errors tends to generate a downward correction.

Endogeneity arises if overeducation is assumed to be related to unobserved characteristics, such as a lower level of skills and motivation of the overeducated. Now, if the overeducated are less motivated than average, it is likely that the wage penalty is higher than that typically found. In fact, once controlling for unobserved motivation and skills, overeducation should generate a greater penalty.

Sample selection bias arises because of the fact that educational mismatch appears first of all in the form of a higher probability of unemployment and only among the employed overeducated also in terms of wage penalty. However, once controlling for the selection bias arising from the presence of unemployment, the wage penalty of those experiencing an educational mismatch might be much higher.

Measurement error might tend to reduce the wage penalty since often individuals believe, subjectively, more than they do objectively, to be overeducated when they are not. This might tend the wage penalty of the overeducated to be lower on average, since it is computed also on individuals that are not genuinely overeducated. It is important to detect the cases of measurement error to understand whether and how many individuals are not overweducaed.

In fact, as the measurement based on statistical overeducation shows, there are also many cases of under-education. If not adequately accounted for, they might tend to overestimate the wage penalty associated to overeducation, since the baseline group of the non overeducated might possibly include also the undereducated, whose wage is proven to be lower than average.

Once controlling for endogeneity and sample selection bias, the wage penalty doubles or, in some case, triples. The upward bias tends to outweigh the downward bias due to measurement error in panel data analysis (Dolton and Silles, 2008).

A different approach to controlling for endogeneity of overeducation has looked at the relation between overeducation and job satisfaction. Some authors have attempted to test the “job satisfaction penalty”, namely the lower level of satisfaction that being overeducated brings with it.

In addition, there is also a long-run effect of overeducation, in the sense that it tends to persist also some years after labour market entry (Ferrante, McGuinness and Sloane, 2009).

As to point e), the literature has taken **several approaches.**

1.3. The literature on Italy

The empirical literature on Italy has especially aimed at catching the specificity of the country, namely its low level of both demand and supply of human capital. From the demand side, as also Manacorda and Petrongolo (2000) note, the production structure is still based on labour intensive traditional manufacturing. From the supply side, Checchi (2003), Pastore (2009) and Franzini and Raitano (2009), among others, note the lowest level and quality of educational attainment of young people as compared to the EU average.

Also Italy has witnessed an increase in the supply of human capital, especially in the 2000s as a consequence of several reforms of the university system aimed at reducing the indirect cost of education, one of the highest in the world, due to the long time that is necessary to attain a degree (Pastore, 2009). The number of graduates has increased dramatically as a consequence in the last years, although the country still has one of the lowest educational levels in Europe.

The existing research about Italy highlights that the country has a high share of overeducated workers. In their study of REFLEX data, Ferrante, McGuinness and Sloane (2010, Table 3.6) find that the extent of educational mismatch is in Italy one of the highest among the EU countries included in their sample. With a share of 23% of overeducated workers at the time of their first job and of 13% five years after graduation, Italy is the third last performer, standing only after Spain and the UK, that have a share of overeducation of 17% and 14% five years after graduation. In other EU countries in the sample, overeducation is almost always below 10%.

Slightly different is the case of overskilling, which is much more common in the REFLEX sample and for which Italy tends to the average level then. This is due to the tendency of overskilling to be much more common than overeducation. In Italy, overskilling equals 21% at the first job and 11% five years after graduation. Italy is still under Spain and the UK only, but this time also other countries have similar levels, fluctuating from 8% in Portugal and Norway to 21% in France and 19% in Belgium.

In addition, due to the higher than average unemployment rate experienced in the country, it is likely that the educational mismatch tends to negatively affect also the probability to find a job. This might return a lower than actual rate of overeducation simply because of the higher probability of unemployment of the overeducated.

The wage penalty of overeducated or overskilled university graduates is lower in Italy than in other countries. Cuttillo and Di Pietro (2006) find a wage penalty for university graduates ranging between 3 and 2.4 and 5.7 in simple OLS estimates based on an ISTAT database. Ferrante, McGuinness and Sloane (2010) find a wage penalty of about 10% in a comparative dataset of EU countries. Interestingly, in the case of Italy, they find a higher wage penalty for the overskilled (-11%) than for the overeducated (-4%). The latter is not statistically significant. They also find a wage penalty of about 8% in the case of under-skilling.

According to some authors, this suggests that firms have strong incentives to hire a worker with a university degree rather than a secondary high school diploma even if the university graduate is bound to remain overeducated. This can be understood considering the highest unemployment rate existing traditionally in the country and the abundance of unemployed especially among the youngest segments of the population.

Although higher than that among young people holding a high school diploma, the unemployment rate of university graduates is in Italy higher than in other EU countries. As already noted in the previous section, this poses an apparent problem of sample selection bias.

In their interesting paper on Cuttillo and Di Pietro (2006) find that once controlling for endogeneity of overeducation, the wage penalty increases up to between 22 and 39%. Once controlling for both endogeneity and sample selection bias, the wage penalty of overeducation reaches always about 40%, independent of the sample adopted. **Cutillo and Di Pietro (2006) find that ...**

Considering the dramatic geographical differences existing in the country, a potentially relevant issue is whether there is any divide also in the way overeducation manifest itself across regions. In theory, one would expect overeducation to be more common in the South, where due to the lower development level, the demand for skills is lower, due to the lower development level. Nonetheless, Raitano and Franzini (2009) find that in the Southern regions overeducation is less frequent and bears a lower wage penalty. They explain this finding in terms of the relatively greater share in Southern regions of workers employed in the state sector, where overeducation is less frequent and bears a lower wage penalty.

2. Data and methodology

This paper provides the first available estimates of the impact of overeducation on wages and job satisfaction of AlmaLaurea university graduates. AlmaLaurea is a Consortium of a large and growing number of Italian universities. With 62 universities joining the Consortium in 2010, AlmaLaurea is by far the greatest consortium of universities in the country. The aim of the consortium is to provide a framework to facilitate interaction of graduates and firms by collecting information on curricula of graduates and making it available to firms. It also collects valuable information on individual and educational characteristics of graduates at the time of graduation and on their employment status after one, three and five years from graduation. Follow-up interviews are foreseen in the immediate future up to the 10th year after graduation. Information at the time of graduation is included in a data bank available for firms to consult to fill in their job vacancies.

By collecting very detailed information on several aspects of university education and the school-to-work transition of graduates up to the 5th year after graduation, for each of the universities joining the Consortium, AlmaLaurea is a valuable source of information to assess the quality of tertiary education in a comparative perspective across athenaeum, province, type of degree and so on. The quality of education can be assessed by looking not only at the course attendance and other parameters regarding the university track of graduates, but also at their labour market performance.

The sample of this study includes about 27,000 pre-reform university graduates who obtained their degree in 2005 at one of the 36 universities belonging to the AlmaLaurea Consortium at that time. Individuals in the sample are observed at the time of their graduation and, thereafter, in 2006 (1 year from graduation), in 2008 (3 years) and in 2010 (5 years)³.

Information on characteristics at graduation and employment status, available in separate files and databases, can be, in fact, matched to form a single data set useful for evaluation of the success of universities in producing human capital that the market is actually requesting. The questionnaire at the time of graduation includes questions regarding individual characteristics, family background and the way graduates have attended university. It means that this information is available only at the time of graduation and not later. For instance, we know whether the graduate was married at the time of graduation, but not five years later.

Graduates in Medicine and Law have been excluded from the sample because of the highest share of them who are still committed to the professional practice necessary to access the profession 5 years after graduation. The sample further reduces since we focus only on employed individuals who answer the questionnaire at the 5th year after graduation (13,500 circa in 2010). This confirms the highest degree of youth unemployment in the country and the extremely long school-to-work transition also among university graduates, the elite of Italian young people⁴.

In addition, when exploiting the longitudinal dimension of the data base to assess the effect of past on current overeducation, the analysis includes only the graduates who answer all three questionnaires administered after the degree and are employed in all three occasions. This reduces the sample to slightly more than 9,500 observations. Despite this, the AlmaLaurea remains one of the largest datasets of its kind not only in Italy.

The employment questionnaires administered after graduation include two questions that allow us applying different definitions of the educational mismatch. These are subjective measures in as much as they are based on an individual' self-assessment⁵.

³ For further methodological details regarding the databank and the definition of variables, see the AlmaLaurea webpage: <http://www.almalaurea.it/universita/profilo/profilo2007/premessa/info-variabili.shtml>.

⁴ The reader can imagine that the length of school-to-work transition is even longer for those who do not succeed in obtaining a degree. Quintini, Martin and Martin (2007, Table 2) reckon that the expected length of the school-to-work transition amounted to 62.4 months in 1995, 70.5 months in 2000 and 51.3 months in 2005, after the introduction of temporary work for a large number of young people. On the causes of the length of the school-to-work transition in the country, see, among others, Pastore (2009).

⁵ Other more objective measures of overeducation include a job analyst assessment of the educational requirements of jobs or is based on "statistical overeducation", meant as the case when the individual educational level is one or two standard deviations higher than the mean or mode of the distribution. The latter case allows computing in a similar manner also under-education.

Question A16 asks: “In your current job, do you use the competences acquired during your university studies?” Three answers are possible: 1, if the competencies are used to a great extent; 2, if they are little used; 3, if they are not used. We defined as overeducated all those who choose answer 3. This question closely mirrors what Dolton and Silles (2008) call the “to do” definition of the skill mismatch, also sometimes called “overskilling” (see, for instance, Ferrante, McGuinness and Sloane, 2010). In other words it aims to assess whether the skills acquired at the university are necessary to do the job.

Question A17 asks: “Is your university degree necessary to access your current job?” Four answers are possible: 1 if the degree is necessary by law; 2 if it is not required by law, but in fact needed; 3 if it is not required by law, but in fact useful; 4 if it is neither required by law nor useful. We defined as overeducated all those who choose answer 4. This question allows us defining what Dolton and Silles (2008) call the “to get” definition of the skill mismatch, also sometimes called “pure” overeducation (see, for instance, Ferrante, McGuinness and Sloane, 2010). In other words, it aims to assess whether the title acquired at the university is necessary to get the job.

In addition, we adopt the definition of “effectiveness” of the university title that AlmaLaurea itself has elaborated by merging information coming from the questions A16 and A17. As summarised in Table 1, there are five degrees of effectiveness the university title. They move from 1 when the university title is very effective (VE), when the title is required by law or necessary to get a job and also highly needed to do the job, up to 5 when it is not effective (NE), namely neither required nor useful to do a job. Notice that the coefficients in the estimates measure the impact of determinants on the “ineffectiveness” of the title. Considering the ordered nature of this variable, the estimates are based on ordered probit models.

[Table 1 about here]

These definitions of overeducation have raised a number of concerns. For instance, it is clear that overeducation / overskilling might be, say, equilibrium phenomena if the graduate does not want to change the job or continues to keep it. This is likely to depend on whether the graduate has or not less skills than their colleagues with the same title. In the latter case, overeducation can be seen as a signal of low skills. The problem is that much too often it is hard to observe the actual skill level of the overeducated. One may argue that cognitive skills are measured by grades at school and at the university. These proxies also mirror, at least in part, non-cognitive skills in as much as grades reflects an overall evaluation of individuals by professors. Nonetheless, there is a literature arguing that grades do not reflect always skills in Italy and elsewhere. They could be, for instance, the result of policy decisions, such as the need to encourage further registrations.

To overcome these problems, we follow Chevalier (2003) and try to grasp the actual skill level of the overeducated / overskilled by their level of job satisfaction. Chevalier proposed that one way to assess whether the overeducated / overskilled is “genuinely” so is to interact the information regarding the educational / skill mismatch with that on the level of job satisfaction. The “genuinely” overeducated / overskilled are likely to be dissatisfied with their job and, therefore answer from 7 through 10 to question A18: “Overall, how satisfied are you with your job on a scale from 1 to 10?” The rest are considered “apparently” overeducated / overskilled.

We compare in a multinomial logit framework the determinants of “genuine” and “apparent” overeducation to see whether they are statistically different as expected if the level of job satisfaction is negatively related to that of skills.

The independent variables are generally self-explaining. They include individual level variables, such as personal and family characteristics, study track and so on that are quite invariant over time and are based on information collected at the time of graduation. Of course, some characteristics might change in five years, such as the civil status, having children and so on. It means that the coefficients should be interpreted as referring to having that characteristics at the time of graduation. Independent variables also include information regarding the employment status as they have been collected at the time when the individual experiences overeducation. The baseline group includes single Italian men with no children, with no study abroad work or study experience, who graduated in Engineering from a university located in the North-West in the curricular time with magna cum laude, whose parents have both a degree, who attended the Lyceum of sciences, with no post-graduate education or training, but did some occasional work while at school, holding a full time, permanent job in the private sector, found thanks to his personal initiative. For descriptive statistics see Table 3.

[Table 3 about here]

The estimates control for the local unemployment rate defined as 1994-’99 average at the provincial level (NUTS3). For individuals working abroad, we use the OECD – Europe average over the same years.

For individuals who do not declare their place of residence, we use the average provincial unemployment rate.

Obviously, the next step of the analysis is assessing the size of the wage penalty that is associated to overeducation / overskilling. Earnings are defined as the natural logarithm of net monthly wages. The question asks the interviewee to declare to which of 13 classes of earnings (s)he belongs to. For ease of analysis, the natural logarithm is applied to the average value of the relative class. Considering that this is still an ordered, rather than a continuous dependent variable, estimates of earning equations are provided both using the ordered PROBIT and the OLS estimators. No information on working hours is collected at five years from graduation, which prevents us from studying the determinants of hourly wages.

If overeducation / overskilling are not associated with lower skills they should also cause a dramatic reduction in the level of job satisfaction. In other words, overeducation / overskilling are likely to cause also a job satisfaction penalty. We estimate this by using the ordered probit model, considering that, as already mentioned, job satisfaction is defined on a scale from one to ten.

The determinants of wages and job satisfaction are assumed to be the same as those of overeducation / overskilling.

3. Results

Information regarding AlmaLaurea graduates confirms a picture where the share of the overeducated and of the overskilled is roughly similar to that found in other EU countries. As Table 2 shows, in our sample, one year after graduation, the overskilled and the overeducated amount to 16.5 and 13.2 per cent respectively, to reduce at a roughly constant pace down to 11.4 and 8.0 per cent respectively at the end of the considered period. It means a reduction down only to 69.1 and 60.6% of the original value. In other words, the phenomenon is quite persistent also with time passing, confirming the nature of genuine overeducation and not so much of a transitory phenomenon. In addition, the overskilled overcome the overeducated by a certain amount, confirming that the former might include a greater upward measurement error and will probably generate a lower wage penalty.

How does this information compare with that coming from previous studies? The shares are roughly similar to the ones Ferrante, McGuinness and Sloane (2010) find in the REFLEX data. Nonetheless, some differences arise in terms of the lower shares of AlmaLaurea data one year after graduation and higher share 5 years after graduation. In addition, in the REFLEX data, overskilling is lower, not higher than overeducation. These differences are hard to explain in full and are likely to depend on the slightly different formulation of the question used to measure overeducation and overskilling.

[Table 2 about here]

Overeducation and overskilling are not invariant to the type of degree achieved. As Figure 1 shows, overeducation in the “to get” definition fluctuates from virtually zero in the case of Architecture, Chemistry and Pharmacy, Engineering, Sciences to about 15 per cent in the case of Physical education, Arts, Languages, Political Sciences. The factor of difference is likely to be the ability of the qualification achieved to provide access to a liberal profession, which the former qualifications give, but the latter do not. Some types of degree, such as Economics and Statistics, Law, Education, Sciences provide some preparation to pass public competitions in the state sector, where the university degree is not only necessary to get a job, but also later to gain higher earnings and a quicker working career.

[Figure 1 about here]

Overskilling follows more or less the same pattern, with higher shares on average for each type of degree. Some types of degree experience a relatively greater increase. It is the case of Agriculture, Geology and Biology, and Sciences. This is probably because these last types of degree tend to provide some form of cushion against overeducation, by providing easier access to a job, but not against overskilling in the sense that they give access to sectors that require skills that are different from those acquired attending those types of courses⁶.

[Figure 2 about here]

Table 4 reports PROBIT estimates of the probability to be overeducated (column 1) or overskilled (column 2). Column 3 of the table also provides the estimated coefficients of an ordered PROBIT estimate of

⁶ Gender differences are not striking.

the probability to reduce the level of effectiveness of the university qualification on a scale from 1 (very effective) to 5 (not effective), as based on the definition provided in Table 1. The last row of column 3 provides the estimated cut off points of the ordered PROBIT model. Overall, the estimates are quite satisfactory for these types of cross-section data, with values of the pseudo- R^2 ranging from 0.14 to 0.20.

Overall, the findings suggest that the factors that are associated to overeducation are consistent with the well-known image of a very immobile social structure. The same groups that are at disadvantage in achieving higher education are at disadvantage also in their access to the labour market and tend to experience very often also overeducation and / or overskilling. The common factors of success can be found in the components of the socio-educational background. In turn, the latter is transferred to young people through the choice of the type of high school.

As Caroleo and Pastore (2011) argue, in a study based on the same AlmaLaurea data bank used in this study, there is a dualism in the youth school-to-work transition. On the one hand, some successful young people, often coming from a good socio-educational background, are more likely to choose a lyceum at high school and, after that, to attend a university programme. In fact, the lyceum is very generalist and does not provide qualifications readily usable on the labour market and, hence, those who complete the lyceum, but do not go to the university, find it extremely hard to find a job, due to the insufficient preparation to work that the lyceum provides. On the other hand, other more numerous young people choose a professional or technical school and then go to the university without adequate educational background. The latter group experiences dramatic difficulties in completing their university education.

Considering the small differences in the determinants of the two types of educational mismatch considered in this paper, namely overeducation and overskilling, the following discussion focuses on the determinants of the former. Such individual characteristics as gender, civil status and having children seem to have little impact on the probability to be overeducated. A possible explanation for civil status and having children is that, as already noted in the previous section, the questions on which this information is based were asked at the time of graduation and therefore might not apply anymore five years later.

The probability of experiencing an educational mismatch is higher among the graduates who experience a longer duration of unemployment, perhaps as a consequence of a reduction in their reservation wage. In other words, the longer is the time a graduate is waiting to find a job, the lower his/her reservation wage becomes and the greater the probability of accepting a job offer, even if it is conducive to overeducation, is. This finding is partly different from that of other countries, such as Belgium (see, for instance, Nicaise, 2001), where longer unemployment spells are associated with more careful job search and lower probability of overeducation. The reason is likely to lie in the high youth unemployment rate typical of the country, which discourages young people from being too much choosy.

Several aspects of an individual educational background correlate with the educational mismatch. The higher is the final grade at high secondary school, the lower is the probability to be overeducated. Graduating in technical or professional high schools or in pedagogic, where typically young people with a lowest socio-economic background tend to gather, is associated with a greater chance of being overeducated later in their working life.

Once we have controlled for the high school background, it should come as no surprise that the educational background of the parents does not affect the probability to be overeducated / overskilled, since, as previous studies (Cappellari, 2004; Caroleo and Pastore, 2011) have shown, the family background correlates with the performance at high school and the choice of the type of diploma. Although being totally free⁷, the choice of the high school tends to reflect the social class to which the young person belongs to. In particular, people from a low social class tend to choose technical or professional schools and tend to experience later on problems in their educational career.

Obviously, the university background is very important and, interestingly, it is much more so when looking at overskilling rather than at overeducation: in fact, in the latter case, the tertiary qualification is the only important condition to get a job, independent of the graduate's competencies, which are instead decisive to understand overskilling. As a consequence, a bad university performance is less likely to affect overeducation than overskilling.

The time spent to get a degree, the final grade and the type of degree achieved are all proxies of the quality of education and tend, therefore, to correlate more positively with the probability of being

⁷ The reference is to the German early tracking. In Germany, the choice of the educational track is made when young people are 10 years old. This makes the German system classist.

overskilled, rather than being overeducated. Having got a degree with five years of delay with respect to the curricular time is the exception⁸. It does affect also overeducation, since most probably implies a much lower level of competencies than average.

Finally the chance of overeducation is strongly associated with any other degree but Engineering and Mathematics and Physics. Particularly strong is the impact of holding a degree in Arts, Languages, Physical education and Education on the chance of being overeducated and / or overskilled.

Also the effectiveness of *laurea*⁹ in the labour market is strictly dependent on university background (see Column 3). The shorter the time needed to get a degree and the higher is the grade, the greater is the effectiveness of the degree.

The localisation of the athenaeum matters, assuming that most students tend to seek jobs in the place where they get their degree, also because, as noted above, it takes a long time to get a degree young people tend to remain where they have studied. Of course, people getting a degree in the North, no matter whether in the West or East, have a lower chance of being overeducated or overskilled. Also the Centre has a lower share of overskilling than the South thanks to the larger share of public sector jobs.

Studying abroad does not seem to reduce (or to increase) overeducation. Also studying while working does not affect in a statistically significant way the probability to be overeducated or overskilled, but when the graduate is continuing the job that (s)he had already before starting the university programme. The overeducated/overskilled are more frequent among those who started the university after finding employment, since they started most probably their job as high school graduates only and five years are not sufficient to improve their position in the static Italian labour market.

Interestingly, having completed some post-graduate training or advanced master course represents a cushion against the risk of overeducation, confirming the importance of institutions able to increase the job specific competences of graduates, which the educational system and the labour market are unable to satisfy. As Pastore (2011) note, the youth unemployment problem essentially depend on the youth experience gap that the Italian educational system seems unable to satisfy, due to the tendency to provide only theoretical notions, but no training.

The overeducated are more frequent among the graduates who found their job through a network of family and friends and through the request of recommendation by the employer. Interestingly, this search methods increases also the “effectiveness” of the university degree in the labour market. Overall, this finding suggests that finding a job earlier is likely to bring with it as an increased probability of overeducation a trade-off.

Finding a job as a continuation of a *stage* or other on-the-job training programme reduces the chance of finding a job, but also of experiencing overeducation and to a lesser extent overskilling. This suggests that more difficult search methods bring with them also better results in terms of the quality of the job worker match.

Moving is generally associated with a lower chance of overeducation if mobility is due to a rational choice. However, in the case of Italy this does not seem to be the case. The only effect of mobility on the probability of overeducation regards those who decide to move to the South and the Islands, where the labour market is less developed, the production structure is oriented towards traditional manufacturing and also the quality of employment is lower.

Furthermore, there is a strong correlation between the probability of overeducation and overskilling among the graduates who are involved in starter contracts / training and work contract / apprenticeship, temporary contracts, without contract. This might be taken as evidence that those who are in some way weaker in the labour market and therefore need to find a job through some temporary arrangement have to accept jobs in condition of overeducation / overskilling.

The county level unemployment rate seems to be negatively related to the probability of overeducation, but not to overskilling, although the university degree is less effective in areas with a higher unemployment rate. This finding seems in line with that of Franzini and Raitano (2009) who find that overeducation is lower in high unemployment rate and relate this the greater share of public sector jobs there.

[Table 4 about here]

⁸ It is well known that only a minority of university students attain their degree in the curricular years. Abating the problem of *fuoricorsismo*, namely the tendency of university students to overcome the curricular years was one of the main declared aims of the recent university reforms. Nonetheless, this objective has been failed.

⁹ This is the Italian name for a university degree.

What is the wage penalty associated to overeducation / overskilling if any? Table 5 provides unconditional estimates of the impact on wages and job satisfaction. Different from what previous studies find relative to Italy (see, Ferrante, McGuinness and Sloane, 2010), the unconditional penalty is relatively high and, in addition, is especially high in the case of overskilling rather than of overeducation. Overskilling brings with it a wage penalty of about 100%, while overeducation only of 33%. This finding should be explained also considering the fact that the sample does not include the graduates in Law and Medicine.

Also the penalty in terms of job satisfaction is higher in the case of overskilling than in that of overeducation.

[Table 5 about here]

However, the unconditional measure of the wage penalty might catch such factors as the lower level of observable and unobserved characteristics of the individuals in the sample. In other words, such a high unconditional penalty might be due to the tendency of the overeducated to have lower levels and quality of human capital. In other words, the penalty would be due to a lower level of human capital and a lower level of motivation of the overeducated rather than to overeducation per se.

It means that to get the true measure of the wage penalty associated to overeducation one should first control for such observable and/or unobserved characteristics. The first conditional measure of the wage penalty as obtained in simple OLS estimates including as control variables all the variables included in the AlmaLaurea data base is reported in Table 6. Interestingly, once controlling for the level and quality of human capital, the wage gap of the overskilled becomes statistically insignificant, while that of the overeducated goes up by about 10% of the wage of the baseline group.

How to explain this result? A possible explanation is that in the case of overskilling the characteristics of level and quality of human capital are actually lower than average. This is not surprising, since overskilling is a variable based on self-assessment of the overskilled of their actual skill level to do the job that they actually have. The fact that the wage penalty is now statistically insignificant means that young people have actually made the right assessment of their skill level.

In the case of overeducation, the conditional wage penalty is slightly higher than the unconditional one. This might suggest that the skill level of the overeducated is slightly higher than that required to get a job.

As to the other determinants of earnings they are quite similar to those typically found in the case of young graduates. Interestingly, the gender wage gap is not statistically significant in the case of young graduates. This has been already noted in previous studies, who argue that in fact the fact itself that female wages are not higher than males is already a case of discrimination, considering the higher level and quality of human capital of young women in the country and elsewhere. In addition, young women tend to have the same wages as men, simply because they have not experience maternity yet. The wage penalty increases dramatically in the late thirty, when women tend to give birth.

[Table 6 about here]

However, as already noted, OLS estimates do not control for possible unobserved differences between the overeducated and the rest of the employed. We observe overeducation only among the employed, not the unemployed. Two possibilities are in order when comparing the overeducated and the unemployed. For the case of Belgium, Nicaise (2001) argue that overeducation is a consequence of an immobile social structure: overeducation is more common among the employed, since the most motivated graduates tend not to accept the first job offer they receive, in order not to spoil their earnings and career prospects by accepting the wrong job. According to this scholar, overeducation is more common among the employed, while the unemployed are so because they have a higher reservation wage and a higher human capital level. Once controlling for the unobserved characteristics of the unemployed and the overeducated, it happens that wage penalty associated to overeducation is reduced once controlling for sample selection bias. The existence of sample selection bias would be associated then to lower, not higher wages. The coefficient λ would be negative.

An alternative explanation is that if the unemployment rate is high, school-to-work transitions longer and there is no unemployment benefit for the new entrants, those who accept job offers are just the most fortunate or skilled to get a job offer and nobody would refuse a job offer, even if associated to overeducation. In this case, the educational mismatch might be even more frequent among the unemployed than among the employed, when it takes the form of overeducation.

Table 7 reports the results of earnings equations estimated with the Heckman correction. A maximum likelihood simultaneous estimate is preferred to the two step procedure. We apply the rule that variables in the main and selection equation should be the same, except for some instrumental variables, namely variables that affect the probability to participate to the labour market, but not wages. The instrumental

variables used are those typically used to predict labour force participation in these cases, namely: civil status, having children and the local unemployment rate.

The instrumental variables have the expected sign. Being married reduces the reservation wage and therefore increases the probability to participate in the labour market. The opposite applies to having children. The local unemployment rate reduces the probability to participate in the labour market. The instruments are statistically significant, except for the local unemployment rate.

The α is positive and statistically significant, while the log σ is negative and statistically significant. This would suggest a positive correction to the bias in the impact of overeducation.

We find, in fact, that the wage penalty associated to overeducation has slightly increased with respect to the unconditional value, whereas it is slightly lower than the conditional one.

In the case of overskilling, the wage penalty also goes back almost up to the unconditional level, suggesting that the unobserved characteristics of the overskilled are better than those of the unemployed who experience unemployment. In other words, unemployment is featured by a higher, not lower educational mismatch.

Interestingly, also the gender pay gap emerges in estimates corrected for sample selection bias: from not statistically significant in simple OLS estimates, it becomes now statistically significant and sizeable. This suggests that unemployed women are much less skilled and motivated than the employed women.

[Table 7 about here]

We adopt a classification à la Chevalier (2003) to disentangle “genuine” from “apparently” overeducated and find that the characteristics of the genuine overeducated are ... similar different?

The persistence in the status of overeducation is strong, as measured by estimates of the probability to be overeducated in the current job, five years after graduation, in terms of the condition of overeducation one and three years after graduation.

4. Discussion

The findings of this paper can be summarised as follows:

- a) If compared to that of other advanced economies, the share of the overeducated (“to get definition”) and the overskilled (“to do definition”) are relatively low among the graduates who find employment in the period immediately following their graduation;
- b) The percentage of university graduates who are unemployed is higher than in other advanced economies;
- c) There is a high degree of correlation between overeducated and overskilled;
- d) The wage penalty associated to overeducation / overskilling is relatively low, both the unconditional and the conditional ones;
- e) The penalty in terms of job satisfaction associated to overeducation / overskilling is comparable to the wage penalty in relative terms

How do we rationalise this stylised facts in terms of the economic theory. The first candidate to explain this findings is the lower relative demand for high skill work in Italy. As Manacorda and Petrongolo (2000) note in their comparative analysis of skill mismatch in OECD countries, while in the Anglo-Saxon countries technological change and globalization have entailed a skill-biased change in labour demand, in other countries the increase in educational levels has not been associated with a parallel increase in the share of skilled occupations, therefore generating skills mismatch. In their study, Italy belongs to group two of countries.

Besides, there is a large literature noting that the production structure of Italy is still oriented towards labour intensive traditional manufacturing sectors, such as textile and footwear, car industry. The share of GDP and total employment that these sectors represent is far greater than that of countries at a similar level of development.

In addition to that, the labour economics literature has shared the conclusion that although greater than those of comparable workers holding only a high school diploma, the chances of university graduates in the Italian labour markets are not astonishingly good. The returns to university education are low in comparative perspective, the return in terms of job finding is also low and the ratio of unemployed with a university degree to the unemployed with a high school diploma is only slightly less than one. In fact, when one considers the youngest segment of the population, those aged under 32, this ratio is even greater than one.

Concluding remarks

This paper has found that the share of overeducated and overskilled are not particularly high in Italy among university graduates. In fact, they amount respectively to 17 and 18 per cent.

The factors that are associated to overeducation are consistent with the well-known image of an immobile social structure, whereas not only the success at the school and at the university, but also in the labour market dramatically depends on the socio-educational background of young people. In fact, the probability of being overeducated and overskilled is higher among those with a higher duration of unemployment, a lower final grade at high secondary school, a shorter time employed to get the university degree, a lower final grade and residing in or moving to the South of the country, having parents with a lower educational level, graduating in technical or professional school, where typically young people with a lower socio-economic background gather. In addition, the overeducated are more frequent among those who started the university after finding employment, since they started most probably their job as high school graduates only and five years are not sufficient to improve their position in the static Italian labour market. Interestingly, having completed some post-graduate training or advanced master course represents a cushion against the risk of overeducation, confirming the importance of institutions able to increase the job specific competences of graduates, which the educational system and the labour market are unable to satisfy.

The overeducated are more frequent among the graduates who found their job through a network of family and friends and through the request of recommendation by the employer. Interestingly, this search method increases also the “effectiveness” of the university degree in the labour market. Finding a job as a continuation of a *stage* or other on-the-job training programme reduces the chance of overskilling more than that overeducation.

Furthermore, there is a strong correlation between the probability of overeducation and overskilling among the graduates who are involved in starter contracts / training and work contract / apprenticeship, temporary contracts, without contract. This might be taken as evidence that those who are in some way weaker in the labour market and therefore need to find a job through some temporary arrangement have to accept jobs in condition of overeducation / overskilling.

Finally the chance of overeducation is strongly associated with any other degree but Engineering and Mathematics and Physics. Particularly strong is the impact of holding a degree in Arts, Languages, Physical education and Education on the chance of being overeducated.

As to the impact of overeducation on wages and job satisfaction, this paper finds that the penalty is similar. The conditional measure is about ten percent, which is quite low in comparison to that found in similar studies relative to other advanced economies with a similar economic structure.

We adopt a classification à la Chevalir (2003) to disentangle “genuine” from “apparently” overeducated and find that the characteristics of the genuine overeducated are ... similar different?

The persistence in the status of overeducation is strong, as measured by estimates of the probability to be overeducated in the current job, five years after graduation, in terms of the condition of overeducation one and three years after graduation.

These findings are consistent with a theory where less skill mismatch in the Italian labour market is due to lower demand for high relative to low skill jobs and a higher probability of the graduates to be unemployed rather than being overeducated / overskilled in any kind of employment. In addition, as a consequence of lower skill bias of labour demand, there is also the greater flattening of the wage structure, which provides to high skill individuals and jobs a lower return relative to other advanced countries. This makes the wage and job satisfaction penalty associated to overeducation smaller than elsewhere.

The reason why this might be the case, namely why the penalty in terms of wages and job satisfaction of overeducation / overskilling, is to be found in the fact that only the most able individuals belonging to the group of the low skill find a job. This might cause a lower penalty than in other countries. Future research will attempt to assess the extent of sample selection of the least skilled of the potentially overeducated in unemployment rather than in overeducation / overskilling and the impact of this sample selection on wages and job satisfaction.

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Appendix of Tables and Figures

Table 1. Definition of effectiveness of the university degree

Use of university competences	Usefulness of the degree				
	Required by law	Necessary	Useful	Neither required nor useful	Does not answer
High	VE	VE	E	NC	NC
Low	E	QE	QE	LE	NC
None	NC	NC	LE	NE	NC
Does not answer	NC	NC	NC	NC	NC

Note: VE means very effective; E = effective; QE = quite effective; LE = little effective; NE = not effective; NC = not classifiable.

Source: AlmaLaurea.

Table 2. Overeducation after 1, 3, 5 years of pre-reform graduates. Large definition

Definition	1 year	3 year	5 year
Overskilling (“to do” definition)	16.47	12.49	11.44
Overeducation (“to get” definition)	13.16	9.37	7.99
Employed			
Number of observations	13500	17223	17387

Source: own elaboration on AlmaLaurea data.

Table 3. Descriptive statistics

Variable	Nobs	Mean	St. dev.	Min	Max
Overeducation 1 year after the degree (to get)	13500	0.1316	0.3380	0	1
Overeducation 1 year after the degree (to do)	13500	0.1647	0.3709	0	1
Overeducation 3 year after the degree (to get)	17223	0.0937	0.2914	0	1
Overeducation 3 year after the degree (to do)	17223	0.1249	0.3307	0	1
Overeducation 5 year after the degree (to get)	17387	0.0799	0.2711	0	1
Overeducation 5 year after the degree (to do)	17387	0.1144	0.3183	0	1
Effectiveness of the degree in the labour market	16960	2.1273	1.1801	1	5
Earnings, 5 years after the degree	16591	7.0618	0.4997	5.2983	8.0864
Earnings, 1 year after the degree	12892	6.8026	0.5341	5.2983	8.0864
Earnings, 3 years after the degree	16462	6.9588	0.4903	5.2983	8.0864
Overall job satisfaction	17382	7.5698	1.6933	1	10
Overeducation 5 years (to get), based on Chevalier (2003)	17387	0.1206	0.4330	0	2
Overeducation 5 years (to do), based on Chevalier (2003)	17387	0.1787	0.5248	0	2
Woman	28976	0.6163	0.4863	0	1
Married	25196	0.1066	0.3086	0	1
Lives together	25196	0.0182	0.1337	0	1
Separated, divorced, widow	25196	0.0056	0.0746	0	1
Children	25196	0.0586	0.2348	0	1
Foreigners	28976	0.0357	0.1856	0	1
Months from the degree before finding a job	17355	10.8186	13.3111	0	65
Final grade at High Secondary school (out of 100)	28032	81.4413	12.3064	60	100
Erasmus experience	28976	0.0658	0.2479	0	1
Other Study experiences abroad	28976	0.0394	0.1947	0	1
Missing	28976	0.1933	0.3949	0	1
I extra-curricular year late	28976	0.2068	0.4050	0	1
II extra-curricular year late	28976	0.1908	0.3929	0	1
III extra-curricular year late	28976	0.1483	0.3554	0	1
IV extra-curricular year late	28976	0.1025	0.3033	0	1
V extra-curricular year late	28976	0.2755	0.4468	0	1
66-90 out of 110	28976	0.0732	0.2605	0	1
91-100 out of 110	28976	0.2678	0.4428	0	1
101-105 out of 110	28976	0.2135	0.4098	0	1
106-110 out of 110	28976	0.2292	0.4203	0	1
Athenaeum in the North East	28976	0.2674	0.4426	0	1
Athenaeum in the Centre	28976	0.3303	0.4703	0	1
Athenaeum in the South and Islands	28976	0.2833	0.4506	0	1
(S)he works in another region (Nuts2) of the same area of residence (NUTS1)	17387	0.0548	0.2275	0	1
Moved to the North	17387	0.0937	0.2915	0	1
Moved to the Centre	17387	0.0565	0.2309	0	1
Moved to the South or to the Islands	17387	0.0054	0.0733	0	1
Moved abroad	17387	0.0311	0.1735	0	1
No title	23191	0.0049	0.0696	0	1
Primary school	23191	0.0802	0.2716	0	1
Low secondary education	23191	0.2195	0.4139	0	1
High secondary education	23191	0.4168	0.4930	0	1
One parent got a university degree	23191	0.1694	0.3751	0	1
Classical high school	28976	0.2228	0.4161	0	1
Specialisation in teacher training	28976	0.0689	0.2533	0	1
Language high school	28976	0.0547	0.2273	0	1
Art school	28976	0.0167	0.1280	0	1
Technical school	28976	0.2120	0.4088	0	1
Professional school	28976	0.0232	0.1506	0	1
Other high school diploma	28976	0.0141	0.1181	0	1
Training, apprenticeship aimed at gaining access to a liberal profession	21605	0.2859	0.4518	0	1
Doctoral studies	21605	0.0430	0.2030	0	1
Specialisation school	21605	0.1225	0.3278	0	1
Ist level master degree	21605	0.0801	0.2714	0	1
IInd level Master degree	21605	0.0828	0.2756	0	1
Other type of Master degree	21605	0.1019	0.3025	0	1
Stage / Work grant / Training on-the-job	21605	0.1963	0.3972	0	1
Public off-the-job training scheme	21605	0.1234	0.3290	0	1
Study scholarship	21605	0.0357	0.1855	0	1
Voluntary civil service	21605	0.0413	0.1990	0	1
Work and study	23742	0.0707	0.2564	0	1
No work experience	23742	0.2253	0.4178	0	1
Work experience is missing	23742	0.0104	0.1013	0	1
Agriculture	17387	0.0068	0.0824	0	1

Metal and engineering industry	17387	0.0382	0.1918	0	1
Construction	17387	0.0391	0.1939	0	1
Chemical industry and energy	17387	0.0373	0.1894	0	1
Other manufacturing industry	17387	0.0408	0.1979	0	1
Trade and repair	17387	0.0992	0.2989	0	1
Credit and insurance	17387	0.0699	0.2550	0	1
Transportation, advertising and telecommunications	17387	0.0603	0.2381	0	1
Several consulting services	17387	0.1837	0.3873	0	1
Informatics	17387	0.0246	0.1550	0	1
Other services for firms	17387	0.0485	0.2148	0	1
Public administration and army	17387	0.0590	0.2355	0	1
Health	17387	0.0628	0.2426	0	1
Other services	17387	0.0814	0.2735	0	1
Current job is the same as that before university	17387	0.1208	0.3259	0	1
Current job is different from that before university	17387	0.2424	0.4285	0	1
Part-time work	17387	0.1872	0.3901	0	1
Public sector job	17387	0.2057	0.4042	0	1
Network of family and friends	28976	0.0856	0.2797	0	1
Continuation of stage / other traineeship	28976	0.0614	0.2401	0	1
Answering an advertisement	28976	0.0547	0.2274	0	1
Public competition	28976	0.0593	0.2362	0	1
Application to teach at school	28976	0.0295	0.1691	0	1
Direct call by the employer	28976	0.0361	0.1865	0	1
Temporary employment agency	28976	0.0264	0.1604	0	1
Request of recommendation by the employer	28976	0.0190	0.1365	0	1
Other job search channel	28976	0.0160	0.1257	0	1
Job search channel is missing	28976	0.0024	0.0487	0	1
Network of family and friends	28976	0.0008	0.0282	0	1
Self-employed	17387	0.2222	0.4158	0	1
Starter contract / Training and work contract / Apprenticeship	17387	0.0183	0.1342	0	1
Temporary contract	17387	0.1502	0.3572	0	1
Freelance / Consulting	17387	0.1070	0.3091	0	1
Other atypical work	17387	0.0150	0.1214	0	1
Without contract	17387	0.0200	0.1401	0	1
Contract is missing	17387	0.0011	0.0330	0	1
Agriculture	28976	0.0195	0.1384	0	1
Architecture	28976	0.0457	0.2087	0	1
Chemistry and pharmacy	28976	0.0365	0.1875	0	1
Economics and statistics	28976	0.1211	0.3263	0	1
Physical education	28976	0.0043	0.0655	0	1
Geology and biology	28976	0.0378	0.1906	0	1
Law	28976	0.1328	0.3394	0	1
Education	28976	0.0698	0.2548	0	1
Arts	28976	0.1267	0.3326	0	1
Languages	28976	0.0655	0.2474	0	1
Political and social sciences	28976	0.1225	0.3278	0	1
Psychology	28976	0.0496	0.2171	0	1
Mathematics and Physics	28976	0.0197	0.1391	0	1
County level unemployment rate (NUTS3)	17387	6.84	3.47	2.6323	18.1093

Source: own elaboration on AlmaLaurea data.

Table 4. Determinants of overeducation 5 years after graduation. Pure pre-reform graduate in 2005

Independent variable	Dependent variable		
	Overeducation (to get)	Overskilling (to do)	Ineffectiveness of the title
	(1)	(2)	(3)
Individual Characteristics			
Gender. Default: Men			
Woman	-0.0308	0.0653	-0.0044
Civil Status. Default: Single			
Married	0.0322	-0.013	-0.0383
Lives together	0.0654	0.0251	0.0219
Separated, divorced, widow	-0.346	-0.3747	-0.1145
Children	-0.071	-0.0571	-0.023
Non Italian	-0.1533	-0.1706	-0.0639
High secondary School			
Months from the degree before finding a job	0.0076***	0.0052***	0.0027**
Final grade at High Secondary school (out of 100)	-0.0036*	-0.0048**	-0.0034***
Type of Secondary high school diploma. Default: Lyceum in sciences			
Classical high school	0.006	0.0717	-0.0216
Specialisation in teacher training	0.2171**	0.2800***	0.1625***
Language high school	0.07	0.0198	0.0199
Art school	0.2694	0.2026	0.1545
Technical school	0.1909***	0.0957*	0.0964***
Professional school	0.2482*	0.3788***	0.1954**
Other high school diploma	0.3573*	0.3599**	0.2208*
Family background			
Parents' level of education. Default: Both parents got a university degree			
No title	0.0325	-0.0082	-0.322
Primary school	0.1018	0.0437	-0.1082*
Low secondary education	0.0916	0.0107	-0.1318***
High secondary education	0.1391	0.0536	-0.0859*
One parent got a university degree	0.1355	0.0775	-0.0794*
University performance			
Final grade at the university. Default: Magna cum laude			
66-90 out of 110	0.1651	0.3653***	0.2706***
91-100 out of 110	0.1779**	0.2685***	0.1999***
101-105 out of 110	0.1018	0.2962***	0.1466***
106-110 out of 110	0.0901	0.2206***	0.1077***
Time to get a degree. Default: Curricular years			
I extra-curricular year late	0.0958	0.1646	0.1847***
II extra-curricular year late	0.1546	0.1646	0.2098***
III extra-curricular year late	0.1461	0.2756**	0.2759***
IV extra-curricular year late	0.1334	0.2263*	0.2564***
V extra-curricular year late	0.2129*	0.2773**	0.3255***
Field of study. Default: Engineering			
Agriculture	0.4890**	0.5845***	0.2675**
Architecture	0.0655	0.2047	0.2161***
Chemistry and pharmacy	-0.4469*	-0.4982***	-0.7332***
Economics and statistics	0.3495***	-0.0764	0.2148***
Physical education	0.9401***	1.0209***	0.7991***
Geology and biology	0.8622***	0.7890***	0.5520***
Law	0.4480***	0.3943***	0.2400***
Education	0.7304***	0.3730***	0.2998***
Arts	1.0483***	0.9820***	0.9230***
Languages	0.8095***	0.6611***	0.5984***
Political and social sciences	0.7963***	0.6007***	0.7327***
Psychology	0.8839***	0.7273***	0.7453***
Mathematics and Physics	0.2232	0.4172**	0.1332
Localisation of the Athenaeum. Default: North West			
North East	-0.0294	-0.0139	0.0075
Centre	0.1306*	0.1310*	0.0742*
South and Islands	0.2035*	0.2529***	0.1172***
Study abroad. Default: No study experience abroad			
Erasmus experience	-0.0333	-0.0834	-0.0078
Other Study experiences abroad	0.0728	0.0013	-0.0158
Missing	0.0857	-0.0848	0.1515
Work and study. Default: Study and work			
Work and study	-0.0675	0.0801	-0.0338
No work experience	-0.1323*	-0.0282	-0.0484
Work experience is missing	0.0009	-0.0437	-0.1313
Relation with pre-university job. Default: (S)he started a job after the degree			

Current job is the same as that before university	0.4858***	0.3218***	0.3998***
Current job is different from that before university	0.0164	0.0416	0.0227
Post-graduate studies			
Post-graduate studies or professional experiences			
Training, apprenticeship aimed at gaining access to a liberal profession	-0.2312***	-0.2387***	-0.2806***
Doctoral studies	-0.2194	-0.031	-0.2097**
Specialisation school	-0.0595	-0.1439*	-0.3004***
Ist level master degree	-0.0494	0.0726	-0.0671
IInd level Master degree	-0.2046**	-0.1047	-0.0888*
Other type of Master degree	-0.0524	-0.0022	-0.0641
Stage / Work grant / Training on-the-job	-0.0836	0.0277	0.034
Public off-the-job training scheme	-0.0096	0.01	0.0506
Study scholarship	-0.1993	-0.2366*	-0.1336*
Voluntary civil service	0.0621	0.0749	0.0985
Job characteristics			
Job-search method. Default: Personal initiative			
Network of family and friends	0.2729***	0.2260***	0.2299***
Continuation of stage / other traineeship	-0.3495***	-0.1656*	-0.1662***
Answering an advertisement	0.1133	0.1282*	0.1287***
Public competition	0.1504	-0.0704	0.1058
Application to teach at school	-0.2821	-0.2175	-0.2778***
Direct call by the employer	0.0959	0.1677*	0.0285
Temporary employment agency	0.1763	0.1477	0.2621***
Request of recommendation by the employer	0.3714***	0.2446*	0.2461***
Other job search channel	0.5230*	0.4831*	0.2406
Job search channel is missing	0.8557*	0.9234*	0.4442
Stayer versus movers. Default: Works where (s)he resides			
(S)he works in another region (Nuts2) of the same area of residence (NUTS1)	-0.0799	0.1303	-0.0126
Moved to the North	-0.1426	0.0291	-0.0426
Moved to the Centre	-0.0994	-0.0267	0.0631
Moved to the South or to the Islands	0.5907**	0.1812	0.2925*
Moved abroad	1.8721*	0.5378	-0.0792
Hours worked. Default: Full-time work			
Part-time work	0.3128***	0.2189***	0.2034***
Firm's ownership. Default: Private company			
Public sector job	-0.1225	0.1077	-0.0742
Self-employment and family business	0.1051	0.2069**	0.0611
Type of working contract. Default: Permanent work			
Self-employed	-0.1378	-0.3127***	-0.3419***
Starter contract / Training and work contract / Apprenticeship	0.4461***	0.2250*	0.1910**
Temporary contract	0.2484***	0.1323**	0.0459
Freelance / Consulting	0.0909	-0.0643	-0.1249**
Other atypical work	0.2184	0.1471	0.1615
Without contract	0.3312**	-0.0217	-0.0132
Contract is missing	-0.0178	0.7066	0.3956
County level unemployment rate (NUTS3)	-0.0176*	-0.0062	-0.0008**
Constant	-3.0744***	-2.6775***	
Cut point 1			0.7119***
Cut point 2			1.4319***
Cut point 3			2.5139***
Cut point 4			3.0198***
N	13621	13621	13297
Pseudo R ²	0.20	0.16	0.14

Note: Legend: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. Coefficients have been omitted for some groups of regressors: Sectors of activity (15);

Source: own elaboration on AlmaLaurea data.

Table 5. Unconditional penalty of overeducation and overskilling on earnings and job satisfaction. Pure pre-reform graduate in 2005

Dependent variable:	Overeducation	Overskilling	Overeducation	Overskilling
	(to get)	(to do)	(to get)	(to do)
	Natural logarithm of net monthly wages		Job satisfaction	
	(1)	(2)	(3)	(4)
OLS	-0.3264***	-0.9608***	-1.3486***	-2.8404***
Ordered PROBIT	-0.4682***	-1.6324***	-0.7349***	-1.3432***

Note: Legend: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Source: own elaboration on AlmaLaurea data.

Table 6. Conditional OLS wage penalty of overeducation and overskilling on earnings. Pure pre-reform graduate in 2005

	Dependent Variable: Log of net monthly wage	
Overeducation (to get)	-0.4253**	
Overskilling (to do)		-0.1083
Gender. Default: Men		
Donna	-0.0516	-0.0488
Civil Status. Default: Single		
Married	0.1646	0.0546
Lives together	0.545	0.6926*
Separated, divorced, widow	-0.0905	-0.0584
Children	0.4312*	0.4570*
Months from the degree before finding a job	-0.0190***	-0.0183***
Final grade at High Secondary school (out of 100)	0.004	0.0044
Type of Secondary high school diploma. Default: Lyceum in sciences		
Classical high school	0.1374	0.0974
Specialisation in teacher training	0.3636*	0.4425*
Language high school	-0.0046	0.0354
Art school	0.1432	0.0426
Technical school	-0.0555	-0.1024
Professional school	0.0713	0.0677
Other high school diploma	0.258	0.2874
Final grade at the university. Default: Magna cum laude		
66-90 out of 110	-0.4626**	-0.4460*
91-100 out of 110	0.1224	0.154
101-105 out of 110	-0.0008	0.0124
106-110 out of 110	-0.11	-0.0862
Field of study. Default: Engineering		
Agriculture	0.0584	-0.004
Economics and Statistics	0.1938	0.2007
Law	0.0803	0.0958
Education	-0.3022	-0.1835
Arts	-0.094	-0.1079
Languages	-0.109	-0.1538
Political and Social Sciences	-0.1765	-0.1179
Mathematics and Physics	0.5442**	0.3746*
Time to get a degree. Default: Curricular years		
I extra-curricular year late	-0.4799*	-0.5252*
II extra-curricular year late	-0.2329	-0.2516
III extra-curricular year late	-0.2315	-0.2655
IV extra-curricular year late	-0.2801	-0.2965
V extra-curricular year late	-0.1235	-0.1565
Study abroad. Default: No study experience abroad		
Erasmus experience	0.0161	0.0354
Other Study experiences abroad	-0.1662	-0.0119
Work and study	-0.1313	-0.0744
No work experience	-0.1123	-0.1531*
Relation with pre-university job. Default: (S)he started a job after the degree		
Current job is the same as that before university	0.0525	-0.0819
Current job is different from that before university	0.1018	-0.0068
Post-graduate studies or professional experiences		
Training, apprenticeship aimed at gaining access to a liberal profession	0.5660**	0.5535*
Doctoral studies	0.4488	0.5483
Specialisation school	0.0391	0.0435
Ist level master degree	0.1197	0.1575
IInd level Master degree	-0.2696	-0.2424
Other type of Master degree	-0.1659	-0.0243
Stage / Work grant / Training on-the-job	-0.0083	0.034

Public off-the-job training scheme	0.121	0.2242*
Study scholarship	-0.4548**	-0.3366*
Voluntary civil service	-0.5057**	-0.2795
Job-search method. Default: Personal initiative		
Self-employed	-0.471	-0.4565
Network of family and friends	-0.0502	-0.0109
Continuation of stage / other traineeship	0.4024*	0.3290*
Answering an advertisement	-0.3185**	-0.2580*
Public competition	-0.235	-0.1377
Application to teach at school	0.0138	0.0754
Direct call by the employer	-0.2063	-0.2109
Temporary employment agency	0.2915*	0.1697
Request of recommendation by the employer	-0.0935	-0.2727
Other job search channel	-0.1484	-0.2451
Stayer versus movers. Default: Works where (s)he resides		
(S)he works in another region (Nuts2) of the same area of residence (NUTS1)	0.2819**	0.182
Moved to the Centre	-1.2963***	-1.4838***
Moved abroad	0.4219	0.2288
Part-time work	-0.8825***	-0.8335***
Public sector job	-0.1527	-0.1798
Sector of industry. Default: Education and research		
Agriculture	0.4409	0.469
Mechanical industry	0.3133	0.2681
Construction	-0.3031	-0.2226
Chemical and Oil industry	0.5558*	0.4735
Other manufacturing	0.0916	0.2192
Trade	0.0453	0.0487
Credit and insurance	0.2045	0.2635
Mail, Transportation and telecommunications	0.305	0.4264
Legal and Fiscal Services	-0.5071	-0.5304
Informatics	0.0241	0.1848
Other services	-0.1823	0.1411
Public Administration and Army	0.7226**	0.6872*
Health	0.8187**	0.9272**
Other services	-0.215	-0.2504
Type of working contract. Default: Permanent work		
Self-employed	0.4628*	0.5312*
Starter contract / Training and work contract / Apprenticeship	0.0678	-0.0914
Temporary contract	0.1857	0.1465
Freelance / Consulting	0.251	0.1768
Other atypical work	0.8809***	0.6429***
Without contract	-0.2195	-0.7243*
County level unemployment rate (NUTS3)	0.0202	0.0571
Constant	7.0221***	6.8322***
N	11385	11385
LI	2.90E+04	2.80E+04
Aic	-5.80E+04	-5.60E+04

Note: OLS estimates. Legend: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Source: own elaboration on AlmaLaurea data.

Table 7. Earnings equations with correction for sample selection. Pure pre-reform graduate in 2005

Earnings equations. Heckman correction		
Dependent variable	Log of net monthly wage	
Overeducation (to get)	-0.3513***	
Overeducation (to do)		-0.7357***
Woman	-0.8815***	-0.7976***
66-90 out of 110	-0.6495***	-0.6191***
91-100 out of 110	0.0511***	0.1884***
Agriculture	0.0211	-0.0096
Economics and Statistics	-1.4102***	-1.3072***
Education	-0.3226***	-0.2669***
Arts	-0.7288***	-0.4539***
Languages	-0.3904***	-0.4302***
Political and social sciences	-0.0944***	0.0401**
Mathematics and Physics	-0.2	-0.166
IV extra-curricular year late	-0.8457***	-0.6778***
V extra-curricular year late	-0.1622***	-0.0920***
Training, apprenticeship aimed at gaining access to a liberal profession	-0.1995***	-0.2433***
Stage / Work grant / Training on-the-job	-0.9494***	-0.7358***
Constant	8.2009***	7.9823***
Selection equation		
Woman	4.1238***	3.8294***
66-90 out of 110	0.174	0.2093
91-100 out of 110	8.0756***	7.7758***
Agriculture	-4.7748***	-4.6214***
Economics and Statistics	-4.1127***	-3.9919***
Education	-6.5625***	-6.0043***
Arts	-5.0092***	-4.9830***
Languages	-7.9005***	-7.3861***
Political and social sciences	-8.3520***	-7.6120***
Mathematics and Physics	-2.5102***	-2.6441***
IV extra-curricular year late	0.2579	0.3722
V extra-curricular year late	-2.2605***	-1.7813***
Training, apprenticeship aimed at gaining access to a liberal profession	-8.6088***	-8.0429***
Stage / Work grant / Training on-the-job	-4.5620***	-4.2088***
Married, lives together * woman	6.0161***	5.9789***
Children	-10.5108***	-10.3030***
County level unemployment rate (NUTS3)	-0.1921	-0.1609
Constant	7.4228***	6.7600***
arthrho	0.9819***	1.1311***
lnsigma	-0.9857***	-1.0087***
Statistics		
N	20171	20171
ll	-7.90E+03	-7.40E+03
aic	1.60E+04	1.50E+04

Appendix of Figures

Figure 1. Overeducation (“to get” definition) by type of degree

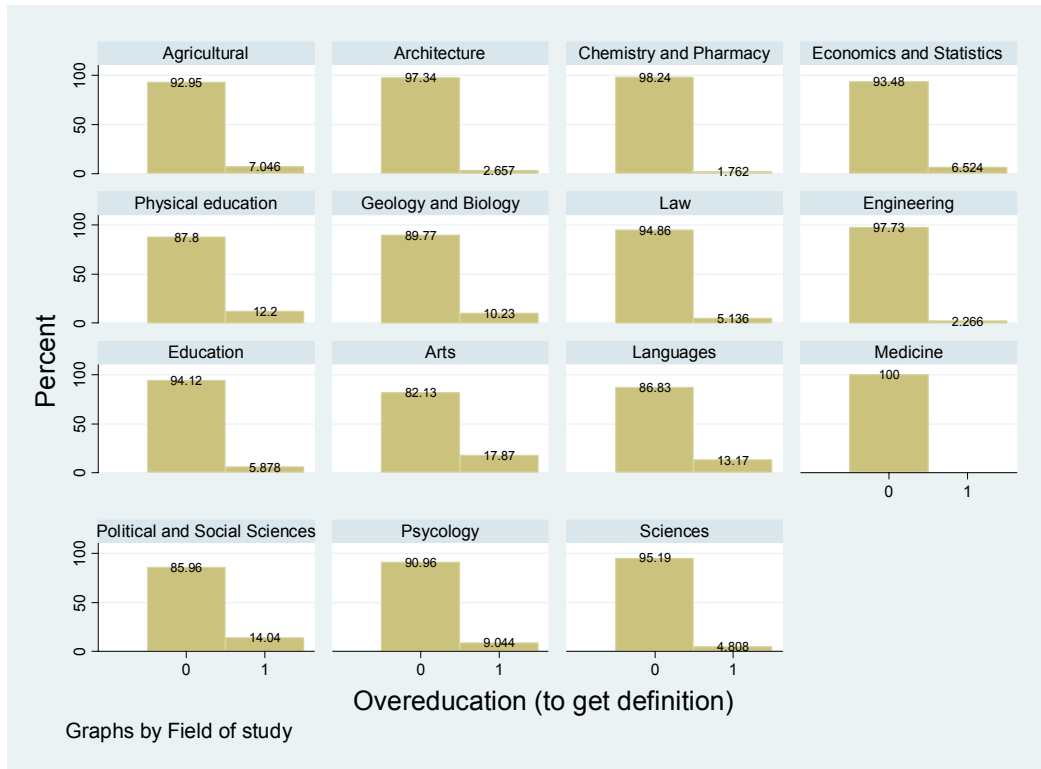


Figure 2. Overskilling (“to do” definition) by type of degree

