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# Graduates' employment and employability after the "Bologna Process" reform. Evidence from the Italian experience and methodological issues

by

**Andrea Cammelli, Gilberto Antonelli, Furio Camillo,  
Angelo di Francia, Silvia Ghiselli, Matteo Sgarzi**

*University of Bologna  
AlmaLaurea*

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AlmaLaurea Inter-University Consortium | viale Masini 36 | 40126 Bologna (Italy)  
Website: [www.almalaurea.it](http://www.almalaurea.it) | E-mail: [pubblicazioni@almalaurea.it](mailto:pubblicazioni@almalaurea.it)

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# AlmaLaurea Inter-University Consortium

## *Graduates' employment and employability after the "Bologna Process" reform. Evidence from the Italian experience and methodological issues\**

by

Andrea Cammelli<sup>♥</sup>, Gilberto Antonelli<sup>\*</sup>, Furio Camillo<sup>♦</sup>,  
Angelo di Francia<sup>♠</sup>, Silvia Ghiselli<sup>♠</sup>, Matteo Sgarzi<sup>♠</sup>

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♥ Bologna University, Founder and Director of AlmaLaurea Inter-University Consortium.

\* Bologna University, Coordinator of the Scientific Committee, AlmaLaurea Inter-University Consortium.

♦ Bologna University, AlmaLaurea Inter-University Consortium.

♠ AlmaLaurea Inter-University Consortium.

Reference author E-mail address: andrea.cammelli@unibo.it

## Abstract

In a phase of depression and systemic crisis investments are essential assets in organizing the recovery, and the more so when innovation is relevant. This is why universities, companies, households and graduates implement strategies for overcoming the present crisis, leading to structural changes and competition both at the local and international level.

In this framework, tracer studies on graduates transition to the labour markets provides fundamental insights and information not only to the organizations responsible for their training, but also to the economic system as a whole. Moreover, any such study is all the more useful when it can draw upon reliable and up-to-date information.

This paper emphasizes three main points. First we present the results achieved by the AL model in tracing the transition path of graduates from the time they enrolled at the university until a few years after earning the degree. The survey is carried out every year by the AL and makes it possible to analyze the most recent labour market trends through the scrutiny of the career opportunities available for the graduates after 1, 3 and 5 years on from graduation. More specifically, we will present the results of the 2008 survey. This survey involved also all first and second level graduates from the 2007 vintage.

Second, we examine the revision in our survey method, adopted in order to face the need to monitor a much higher number of post-reform graduates (more than 140 thousand overall) and the call of the Ministry and the universities to keep the information as much detailed as possible in assessing the employment outcomes for each single degree course, without losing feasibility in terms of costs and data collection time. In fact, we resorted to a mixed method: the computer assisted web interviewing (CAWI) and the computer assisted telephone interviewing (CATI). This is why it became necessary to measure and assess the effect of this approach on the answers given by interviewed graduates.

In third place, we outline the results of some preliminary experiments carried on in order to allow for specific and recurrent comparisons between the results achieved with the AL model and other similar models dealing with the employment conditions of Italian graduates.

*Keywords:* Graduates' employment; Graduates' employability; Bologna Process; University reform; University governance; Assessment of the higher education system; CAWI and CATI survey techniques; Propensity score matching; Data quality control; Counterfactual analysis; Labour supply, Human capital.

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## 1. Introduction

AlmaLaurea (AL) in Italy is one of the main actors having the delicate task to provide institutional and governing bodies with the most reliable and up-to-date information on the evolution of graduates' features, in the context of the reform and also in this very unpredictable times of economic downturn. In the next paragraphs we will, therefore, summarize the AL initiative giving notice of its objectives and main features. Paragraph 2 will outline some of the most recent trends recorded on graduates job conditions and employability through the XI survey issued in 2009. The AL commitment induce us to meet and work out the challenges raised by new methodological issues and technical challenges on which to deploy even greater analytical efforts in testing new strategies and solutions. In paragraphs 3 and 4 we'll focus on some of these issues raised in this changing context and the solutions adopted for manage them.

### 1.1. AlmaLaurea presentation

AlmaLaurea initiative has made a name for itself in the course of its first 15 years of activity, through a gradual subsidiarity process, as a highly qualified actor of the Italian university system. Definitely, at least in the Italian scenario, AlmaLaurea has been a real institutional innovation and can be particularly relevant to briefly outline its main stages of evolution.

In 1988 the University of Bologna celebrated its 9th centennial. On that occasion several research initiatives were undertaken and, among them, a small group of scholars started to investigate the features and destinies of foreign students who attended the University. This first pioneering research focusing on foreign students suddenly gave the feeling that a more comprehensive research on the internal performances and professional outcomes had never been undertaken before, but would have been extremely beneficial. A small cultural revolution took place with a long term effect: the formal decision to establish the national registry of graduates.

In 1993, the Statistical Observatory of the Bologna University started the AlmaLaurea Project with a view to create a meeting point for graduates, universities and companies. In particular, for the Italian universities it was deemed strategic to keep a close relationship with their graduates by providing them with the services and information required to make their entry on the job market much easier and at the same time keeping continuous track of their education and working careers.

The experience of Bologna University started in 1994 and was soon made available to the other Italian universities. Even if it was necessary to overcome some universities' legitimate wish to implement similar systems on their own, it was clear since the beginning how much a common shared system could lead to a wider horizon: the international and globalised context of education where the Italian academic system should present itself as a whole, avoiding self-destructive behaviours like blowing each university's own trumpet.

The nation-wide extension of the project – who gained also the support of the Ministry of University – led to a considerable increase in the number of curricula included in the database and to the availability of this information on the Internet starting from January 1997.

In October 2000 AlmaLaurea became an Inter-University Consortium which now includes 53 universities which have joined in on a voluntary basis and partially bear the expenses of the Consortium. The database includes today more than 1.250.000 curricula which are accessible online through the [www.almalaurea.net](http://www.almalaurea.net).

AL's uniqueness lies in being able to create an integrated system capable of guaranteeing documentation which is *complete* (universities are accepted into the Consortium on condition that they make available information on their entire student body), *periodic* (the surveys are taken at regular intervals), *well-timed* (year after year, a 'snapshot' of the universities' internal and external performances may be obtained) and *updatable* (the data-bank is kept 'alive' to the extent that the cv are updated by the graduates themselves and therefore kept up with the graduates' professional

pursuits). All of these characteristics<sup>1</sup> are made possible by the extended use of information technologies, both for managing the graduate data-bank and for disseminating its services via the Internet.

AL data became crucial for the governance of the university system, through the provision of effectiveness, efficiency and transparency indicators required by the Ministry of Education<sup>2</sup>, the satisfaction of the national agencies monitoring needs in assessing the Bologna Process reform accomplishments<sup>3</sup> and the cooperation with local academic committees and evaluation units.

#### *1.1.1. Data collection and certification*

Graduates get in contact with AL when they are about to finish their study course. Final-year students apply directly on the AL website gaining the username and password required to access the functions available. Students fill in a questionnaire with the information required to complete a personal record aimed at generating a curriculum vitae (cv) and making possible statistical analysis<sup>4</sup>. At this stage, however, they can choose to publish or not their cv in the AL web site. After the graduation, universities send to AL the graduates administrative records<sup>5</sup>.

AL staff have the task to detect any inconsistency or incompleteness between the administrative data provided by each university and the information formerly provided directly by graduates, giving origin to the curricula certification<sup>6</sup>.

Afterwards, the cv is kept updated by the graduate himself using editing web interface. The cv may be integrated by additional information concerning the training and working experiences gained<sup>7</sup>. Companies have direct access to published cvs through a wide set of services: a cv selection system, based on over 100 search parameters; job/internship vacancies publication; saving previous searches, in order to quickly retrieve them in the near future; storing the most interesting candidates' profiles in a personal reserved area; online management of the applications received in answer to published vacancies; subscription for the database search in order to obtain a fixed quota of cvs downloadable from the system. Companies may consult cvs through a self-service facility, with payment due when the names and addresses of the graduates are obtained<sup>8</sup>.

#### *1.1.2. Monitoring the higher education system*

Two are the main reports based on AL statistics. The first is the *Graduate profile survey*, issued yearly and only four months after the end of the reference solar year: the information is fully available for free to everyone on the web. Main aims of this survey are to monitor graduates performance and characteristics, to report quantity and quality of the human capital produced by the universities, looking at their effectiveness and internal efficiency, to supply every university, faculty

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<sup>1</sup> These characteristics are in line with the European standards on statistical quality, recently re-formulated in the Regulation 223/2009 of the European Parliament and The Council.

<sup>2</sup> Ministry Decree 544, 31 October 2007 and Ministry's General Director Decree 61, 10th June 2008.

<sup>3</sup> Ministry Decree 270, 22 October 2004.

<sup>4</sup> Only to give a hint on: social background and parents degrees, details on university study (attendance rates, studies abroad, Erasmus mobility, fellowships, internships), employment during their studies, assessment of university experience (study behaviour, teachers evaluation, fellow students, course workload), university facilities (libraries, IT workstations, lecture halls), language and IT skills, study and work prospect, student services, city facilities and infrastructures (transportation, cultural activities, leisure).

<sup>5</sup> Nature of school-leaving diploma and marks obtained, age at matriculation and graduation, marks of exams and final degree, actual duration of undergraduate studies, high school degree.

<sup>6</sup> Only part of the collected information is cv matter; the majority of indicators are dealt with exclusively in an aggregated manner and for research purposes. Information is disseminated under strict protection of the graduates' privacy.

<sup>7</sup> Only the administrative data provided by the university and validated by the staff cannot be edited.

<sup>8</sup> AL has a non-profit statute. Private companies co-finance the provision of AL services. Associated universities also co-finance the initiative, paying a share that, as matter of fact, has decreased over time, due to the efficient management of the Consortium.

and degree course with reliable data on their graduates. The response rate for neo-graduates questionnaire is above 90%.

The second annual report is the *Survey of graduates employment condition*. Thanks to graduates' personal information kept in the data base, graduates are tracked and interviewed on their employment conditions 1, 3 and 5 years after graduation<sup>9</sup>. The focus of this survey is to assess the capability of the labour markets to take advantage of the human capital created by universities and, conversely, the capability of the universities to meet the society's and economy's requirements. Data relating to occupational outcomes are subsequently supplemented with the broad pool of data collected by AL from the questionnaires administered to students immediately before the completion of their degrees.

It is worth to underline how this integrated system is capable to shedding light on features of great interest, which are not immediately available otherwise without additional ad hoc surveys. Just to mention some of them, we can refer to the impact of the ERASMUS mobility on graduates characteristics and job condition by sorting out from the database information on mobile and non-mobile students<sup>10</sup>; the impact on graduates performances of factors like residence in the same territorial area in which they attended university or job condition during their studies.

## **1.2. Bologna Process in Italy and economic crisis**

The Bologna Declaration (1999) had a strong impact on the willingness to reform the Italian university system in order to support an overall convergence at the European level<sup>11</sup>.

The academic context and, as a direct consequence, the labour markets are still living a transition process where old system graduates are coexisting with the newest degrees designed after the reform. The new first cycle bachelor's degrees are in Italy a great innovation with reference to the traditional structure of higher education. Recruiters today have to face a multiplicity of young graduates profiles and, more than ever, it is not easy for them to be aware of the differences in acquired competences and skills.

As we'll see thereafter (paragraph 2.3.1) the observed outcomes of the reform - focusing only on the share of students that fully developed their study experience under the new system - are largely positive. Nevertheless, all along the transition period the reform faced premature and harsh evaluations, based on the assessment of the overall graduate population affected by the poor performances of those students who moved from the old system to the new one. Even more difficult is to deal with the issue of the evolution in the educational quality. Some aspects lead us to think that it has decreased (for instance, reduction in course years, elimination of a mandatory written thesis, the time needed for the completion of the study cycle). Nevertheless – even if quality measurement remains a very difficult task and it should be performed in the framework of a fully balanced comparative approach with reference to the previous university system - we have to take

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<sup>9</sup> Every graduate is interviewed on her/his occupational status: attendance/not attendance of a second level post-degree course (only for first level graduates), reason for further enrolment/not enrolment in second level post-degree course (only for first level graduates), graduate training activities, occupational condition at the time of interview, occupational condition at the time of graduation, match between current job and job held at the time of graduation, improvement in employment situation as a consequence of having the degree, number of months elapsed between obtaining the degree and seeking/finding the first job, job-seeking channel used to find the job held at the time of interview, type of job (employee/self-employed), professional position, legal and contractual characteristics, full-time or part-time employment, sector and field of economic activity, firm size, region and province where the job is located, extent to which university-acquired knowledge/skills are used, degree requirements for performing the job, satisfaction felt for various characteristics of the job, net monthly income, reasons for inactivity in the labour markets, frequency of the actions implemented to find a job.

<sup>10</sup> Cammelli A., Ghiselli S. and Mignoli G.P. (2008).

<sup>11</sup> In Italy the main steps of a complex, and sometimes cumbersome, reform process have been the following : reform law (DM 509/99), implemented starting by the academic year 2000-01 and establishing a generalised 3+2 system; further adjustment regulations (DM 270/04), that have been implemented in academic year 2008-09 (apart from the Faculty of Law, for which it already started in 2006-07), aimed at reducing the number of new courses and the resources involved, apart from readjusting the 3+2 system.



into consideration that the overall number of graduates is almost doubled in the considered period. (Cammelli, 2009).

The most recent surveys carried out by AL on the Italian graduates occupational conditions warn us about the difficulty of carrying on university assessments in this strongly diversified context<sup>12</sup>. The institutional revolution of the last decade does not allow us to provide a single and concise figure when we try to answer the crucial question: how many graduates actually find jobs appropriate to their qualifications? Every evaluation has to take into account the overtime impact of all the different course levels and variations put in place by the reform.

The analysis is further complicated by the blow out of the crisis and the difficulties in predicting the duration of a downturn that is affecting large swathes of the population regardless of their cultural level, age, sex, social background or geographic place of residence. It would be unforgivable if long-term measures were not taken in those areas that hold the seeds of recovery. The crucial prerequisite for Italy, in particular, is to achieve a higher and more widespread *educational threshold*. Today, the need to be active players in a knowledge-based society means that higher education must become much more widespread that it has been thus far. However, achieving this international goal is hardly likely unless the necessary resources are allocated.<sup>13</sup>

Unfortunately the Italian inadequate commitment on this sector goes back in the years, as shown by the very small number of university graduates among the older section of the Italian population. In Italy, graduates account for only 9% of the 55-64 year old population bracket, less than half the percentage in the Oecd countries taken as a whole. In France, graduates account for 16%, in Germany and the United Kingdom 23-24%, and in the US 38%. This poor result still persists among younger age groups. According to Oecd data, in 2006 17% of young Italians aged 25 – 34 had university degrees. This was a little more than half the average for the Oecd countries taken together (33%). Germany reached 22%, UK 37%, Spain and the USA 39%, France 41% and Japan 54%. Yet are these younger people who will have the difficult task of leading the country out of the crisis, ensuring prospects for domestic growth and meeting the challenges of international competition.<sup>14</sup>

### **1.3. Aim and structure of the paper**

The aim of our paper is threefold. First we will present the results achieved by the AL model in tracing the transition path of graduates from the time they enrolled at the university until a few years after earning the degree. The survey is carried out every year by the AL and makes it possible to analyze the most recent labour markets trends through the scrutiny of the available career opportunities.

Second, we will examine the impact of the survey method revision on data quality. In fact, we resorted to a mixed method, based both on CAWI and CATI, and it became necessary to measure and eventually evaluate the effect of this approach on the answers given by graduates.

In third place, we will outline the results of some preliminary experiments carried on in order to allow for specific and recurrent comparisons between the results achieved with the AL model and other similar models dealing with the employment conditions of Italian graduates.

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<sup>12</sup> Differentiation and complexity are not new concepts for the Italian background whereas graduates diversity is great among different universities and faculties depending on the geographical location: labour market vitality changes as much as it is linked with local social pre-conditions like graduates family backgrounds and personal networks. For this reason it is important to implement a capillary assessment reaching smaller subgroups of graduates like the AL model is capable to do (Cammelli and Gasperoni, 2008).

<sup>13</sup> It is an undisputable fact that Italy falls short in its efforts to raise educational levels: a fact that can be clearly seen considering data on public expenditure for university education: Italy allocates a mere 0.78% of its GDP to higher education, compared with 1.02% for the United Kingdom, 1.16% for Germany, 1.21% for France, and 1.32% for the United States; without considering the Scandinavian countries which are by far the highest spenders in this area with more than 2% of their GDP allocated to higher education. (Commission of the European Communities, 2008).

<sup>14</sup> See, for instance, Oecd (2008).

## **2. The XI AlmaLaurea survey on graduates' employment condition**

In the 2008 survey almost 300,000 graduates from 47 Italian universities<sup>15</sup>. are involved. The survey covered all post Bologna reform graduates in the 2007 calendar year, of first and second level and single-cycle specialist graduates. The survey also included pre-reform graduates from the summer sessions in the years 2007, 2005 and 2003, who were interviewed at one, three and five years respectively from graduation. The aim of the survey was to assess the graduate employment condition and the training experiences during the first five years following graduation.

### **2.1. Survey characteristics**

The much higher number of post-reform graduates (more than 140 thousand overall), together with the requests of the Ministry and universities to keep the information as much detailed as possible in order to assess the employment outcomes for each single degree course, determined a far-reaching revision of the survey's instruments so as to make the research even affordable in terms of costs and data collection time. This was obtained especially by introducing after a positive test carried out on first level graduates in 2006 survey, a dual data collection system, CAWI and CATI (see further, paragraph 3.1.)<sup>16</sup>.

The traditional survey of pre-reform graduates was performed with the consolidated CATI method. In order to guarantee a representative estimate of the entire population of Italian graduates (filling the gap due to the non-participation of some of the universities), the findings reported in the AL survey have been subjected to a special statistics procedure known as "re-weighting". (see: Cisia-Ceresta, 2001).

### **2.2. Trends in graduates' employability**

What can be said on the trend of graduates employability? In order to answer this question we have to focus the analysis only on pre-reform graduates. Although they belong to an academic system which is being phased out, they are the ones who enable us to carry out a medium-term analysis, since a huge amount of data on them collected over the years is available.

The evolution of the employment condition has been analysed from 2001 to 2008, applying the same graduates structure of the year 2000, in terms of regular attendance, employment situation at graduation and course undertaken. To sum up, the employment rate at one year on from graduation is reduced, compared to the previous survey, by 0.5 percentage points. During the last seven years the rate of employment of graduates decreased by 6 percentage points (Figure 1.).

The reduction in the employment rate, however, has not implied a smaller number of newly-graduated students entering the labour markets, since it took place a substantial increase in the number of students who graduated and left the academic system. Excluding the graduates who already worked at the time of graduation, the number of graduates who entered the labour markets has risen by over 35%: it ranged from 55,000 in 2001 to 74,000 in 2007.

The current setting confirms that, if the level of education rises, also employability and income will then rise. On the one side, firms are increasingly looking for graduates; on the other, graduates are better equipped to face changes in the labour markets. Throughout the overall working life (25-64 years) a degree is rewarding. Indeed, degree holders present an employment rate which is over 10 percentage points above the one observed among upper secondary school certificate holders (78 vs 67%).<sup>17</sup> Moreover, to be graduate is also rewarding in terms of higher earnings: in the age range 25-

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<sup>15</sup> Out of the total 53 AL universities. For being involved in the survey universities must be member from at least one year.

<sup>16</sup> At the conclusion of the survey, the response rate among first-level graduates was 88%, similar to the figure for first level graduates (89%). Slightly fewer (85%) single-cycle specialist graduates responded. High response rates are possible thanks to the intensive use of updated information kept in the database that make easier to trace people and propose them the interview.

<sup>17</sup> See Istat (2009).

64 years, graduates' mean income rise above 65% relative to that of upper secondary school certificate holders.<sup>18</sup>

Five years on from graduation the majority of graduates enter the labour markets. Although a slight decrease is experienced, the employment rate of the graduates in 2003 amounts to 84,6% (but 7,4 % of graduates continue their studies) (Figure 2.). 70% of employed graduates experience a stable job (Figure 3.). The degree turns to have a high level of effectiveness: the degree achieved is considered by 91% of employed graduates at least "fairly effective" for the job held. A negative side can be found in real earnings: although average net monthly earnings turn out to exceed 1300 Euros, they decreased by 6% over the last four years (Figure 4.).

### 2.3. Post-reform graduates' employment condition

What is the performance in labour markets for post-reform first and first level graduates? In this case the analysis just gives us a snapshot of the year 2007 and not an overview of the trends, because these graduates have been accessing the labour markets in the last few years. However, AL is probably the first European research centre which had the opportunity to publish data on graduates' employment condition at one year from graduation for first level graduates generated by the Bologna Process reform.

As formerly observed, any assessment of the labour markets willingness to absorb reform and pre-reform graduates must take into account the complex range of training offerings available. Nor should it be forgotten that the comparison is made between populations that differ in their objectives, training, time-to-graduation, and age at graduation.

In addition, to be truly accurate an analysis should be protected from all possible elements of distortion, in particular from the different incidence of continuation in a job held before graduation. This is not an incidental concern since some 35% of first and second level graduates in 2007 were employed at the time of graduation as against only 14.5% among the former, single-cycle graduates. Nor should it be forgotten that the percentage of graduates continuing their studies after a first degree differs, and so a direct comparison of the employment situation would especially penalise first level graduates, most of whom choose to continue their studies and go on to the first level, masters degree, thereby postponing their entry onto the labour market.

For the above reasons, rigorous in-depth analyses aimed at monitoring the labour market's reaction should only take into consideration the populations that start working after completing their degrees, further scaling down the analyses to include only those who want to enter the labour markets.

The analysis of the employability of post-reform graduates, shows positive signals, above all if data are compared with all the required caution to the data relating to the pre-reform graduates of the last few years. This analysis demonstrates that the labour markets seems to accept rather well the "offspring of the university reform" without any particular discrimination between first-and first level degrees (Figure 5.). While the *employment rate* of pre-reform graduates is 51% at one year from graduation, it reaches 69% for post-reform first level graduates and 53% for second level graduates. The lower rate for second level graduates reflects the fact that these are the first graduates produced by the new system, and therefore the best. Moreover, as we'll see later, in many cases they chose to continue with their postgraduate education.

The analysis of the *employment type* confirms the substantially positive results achieved by the post-reform graduates, especially in comparison to pre-reform ones. This is especially true for earnings and the effectiveness of the academic qualification.

*Monthly net nominal earnings* at one year (Figure 6.) are just above 1,100 Euros<sup>19</sup> with understandable differences between the various groups of disciplines. These are significantly higher than the salaries of pre-reform graduates (1,010 Euros).

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<sup>18</sup> This figure refers to the year 2004 for females and males together (Oecd, 2008, Table A9.1a). A specific analysis on graduates incomes, based on AL data, can be found in Antonelli and Campiglio (2009).

The *effectiveness of a university degree* (Figure 7.) has been appreciated right from the first year after graduation. A degree proved at *least fairly effective* for more than 87% of post-reform graduates (9 percentage points more than among pre-reform graduates), and achieves maximum efficacy (98%) among single-cycle specialists. This latter finding is understandable given the very special nature of these study courses.

*Job stability* showed no particular variation compared to the past and was essentially the same for the study courses (around 40%), with the only exception of second level graduates, 28% of whom were found to enjoy job stability (Figure 8.). The special situation of these first level graduates was due to the high variability within the various study-course disciplines. Job stability was lowest in the letters groups at 11%, followed by psychology (13%), geo-biology (16%) and the political sciences, which accounted for one third of all the second level graduates. The highest job stability has been observed among health profession (72%) and engineering (38%) graduates.

### 2.3.1 Focus on second level graduates

*Second level graduates* are the first coming out exclusively from the new university system . “Pure” graduates<sup>20</sup> have been 83% of the total number and they were the very first to finish their studies and, accordingly, show the most brilliant results. In fact 80% attended more than 75% of the classes. They graduated at 26 years of age with an average mark of 109 out of 110. 70% concluded their studies within the limits of required duration. During their studies, 56% had work experience; 12% studied abroad within the framework of a European programme and 75.5% have a good English proficiency.

The comparative performance of 2001 pre-reform graduates is very poor.<sup>21</sup> (Figure 9.). They ended their degrees at 28 with an average final mark of 102.5 out of 110, and only 9.5% of them completed their studies within the limits of required duration. 18% had work experience, 8% had been abroad on a Community study programme and only 55.5% had a good English proficiency. Graduates who completed their studies with no more than one year of delay (4 legal years + 1) were only 27% in 2001, against 97% of the 2007 second level post-reform *pure* graduates. In terms of excellence, the second level post-reform graduates have responded positively. The real question is whether the labour markets will respond accordingly. A substantial number of graduates with a second level degree choose to continue their studies, enrolling especially in doctorate programmes, training courses or apprenticeships. If these second level graduates were to find themselves squeezed between two negative factors – on the one side, labour markets unable to absorb them on account of the bad economic downturn , and, on the other, a university system with insufficient research funding – we risk wasting and destroying the best human capital coming out of our universities thus far, obliging them at best to leave the country in the hope of achieving their expectations.

### 2.3.2 Focus on single-cycle graduates

*Single cycle graduates* are a very particular category. Their employment rate is lower than the average, due to the large percentage of those who choose to continue their education in activities (often paid) mandatory for accessing the liberal professions. If those who are engaged in a paid training activity are included in the analysis, the employment rate for single cycle graduates soars to 79% (about 4 percentage points higher than the first level graduates).

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<sup>19</sup> Namely, 1,117€ for second level degrees, 1,128€ for first level degrees and 1,140€ for single-cycle degrees.

<sup>20</sup> The so-called “pure” graduates are those who were in a post-reform course since their first enrolment at the university. This category is antithetical to the “hybrid” graduates, which moved from an old system course to a new post-reform one (AlmaLaurea, 2009b).

<sup>21</sup> When 45% of the courses lasted 4 years, rather than the 5 years (3+2) for all post-reform courses.

### **3. Propensity score matching for evaluating differences between CAWI and CATI responses**

This paragraph sets out to test if the responses given by interviewees submitted to different survey techniques – and, specifically, to CAWI and CATI - can differ and, in case of biases, if the same can be ascribed to the type of technique being used.

It is indeed likely that the survey methodology used can somehow affect, in a non-random manner, the responses given by graduates. For example, the presence/absence of the interviewer is a major determinant of the quality of the data collected, since she/he can provide explanations or further information during the interview. On the other hand, though, in some cases the interviewer's contribution may turn out to be minor or even counter-productive, since she/he might influence the responses given by interviewees with her/his attitude.

#### **3.1. Description of the CAWI procedure adopted**

As previously mentioned, in the 2008 survey graduates have been contacted by e-mail and invited to fill in a questionnaire posted on the AL web-site. The survey also envisaged two reminders which were sent about one week apart. The CAWI technique, which was completed within a period of about three weeks, reported unusually high response rates for this type of investigations. Response rates, as calculated in relation to the number of e-mails sent out, amounted to 41% among first level graduates and to 43% among first level graduates.<sup>22</sup>

During the second phase of the survey, those who, for various reasons, had not filled in the on-line questionnaire have been contacted again by phone in order to achieve satisfactory coverage and response rates for the purposes of the survey. Final response rates, as previously outlined, exceeded 88% for the overall population of graduates involved in the survey, without significant differences between first and first level graduates.

The same survey technique has been employed in the two phases of the investigation, except for some occasional adjustments adopted in order to optimise the procedure for the type of contact with the interviewee (over the Internet or by phone)<sup>23</sup>. The questionnaire was relatively “lean”, comprising, as a whole, little more than 30 questions, even if each graduate was able to answer a maximum of 25-27 questions: the exact number depending on the type of degree course completed (first- or first level) and on the employment situation reported by the respondent, since employed graduates were supposed to answer a higher number of questions. The survey questionnaire proved to be effective for gathering the main information relating to the training and employment experiences gained by graduates after graduation.

#### **3.2. Methodological issues**

As already anticipated, it is reasonable to expect that - *all relevant conditions being the same* - different approaches can give rise to different responses precisely because of the specific survey methodology being used<sup>24</sup>.

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<sup>22</sup> The percentages were 35% and 37% respectively, when calculated in relation to the overall surveyed population.

<sup>23</sup> In particular, these adjustments consisted in changing some key words; for instance the expression “see some examples of training activities below” used in the CAWI version was changed into “I will list some examples of training activities in the following” in the CATI version. In other cases, a few minor changes were made to the mechanisms employed to check consistency among responses, with the specific aim of simplifying these phases in the CAWI version.

<sup>24</sup> Questions such as those relating to the type of employment contract, for example, may give rise to different interpretations depending on the type of technique being used. When responding to a CAWI survey, the graduate can physically scroll down and visualise on the screen all possible responses to the question and carefully evaluate what contractual form corresponds to his/her own work activity. By contrast, a telephone survey, though unable to guarantee a visual and simultaneous presentation of all response options, has one major advantage. As a matter of fact, in a telephone interview the interviewer can at any time provide the respondent with explanations to help him select the most correct contractual category.

But, as already stressed, *all relevant conditions* must be the same. This is crucially important: if it takes place a form of “self-selection” in the sample of respondents to the CAWI survey in comparison to the CATI survey (e.g. if some groups of graduates are more willing than others to respond to the first stimulus as compared to the second), it will be essential to correct this bias. After that it is possible to evaluate precisely whether or not there are systematic differences related to the specific survey technique<sup>25</sup> - i.e. if there are discrepancies between the responses given in the web questionnaire and those given during the telephone interview that can be solely attributed to the type of technique used.

Therefore, in order to adjust for self-selection in the participation to one type of survey versus the other, respondents were classified in homogeneous groups, in relation to their “propensity” to take part in the CAWI versus the CATI survey, following to the propensity score matching approach (Rosembaum and Rubin, 1983; Lee, 2006). A logistic regression model made it possible to assign to each graduate a probability score (a variable ranging between 0 and 1) of participating in the CAWI survey, taking into account the available pre-treatment variables<sup>26</sup>: the higher the value associated to a graduate, the higher the likelihood, given the characteristics considered in the model, of participating in the web survey as compared to the telephone survey. Homogeneous groups of graduates were formed, therefore, on the basis of the logistic regression model. It is therefore obvious that graduates who are assigned similar probability scores are equally similar also in terms of their propensity to respond to one type of survey versus the other. In other words, if two respondents classified within one of these groups of graduates were submitted to different survey techniques, this can be attributed to sheer chance and not to their personal or educational experience characteristics, because these aspects had already been considered in the logistic regression model. Consequently, any difference in the responses given by graduates would be attributable exclusively to the type of survey instrument being used and not to their personal characteristics.

The method for evaluating the treatment-related (CAWI or CATI) differences in responses was formally developed following an approach based on impact evaluation in observational studies. Its aim consists in evaluating whether the type of treatment  $T$  respondents were subjected to (CAWI and CATI) had a significant impact on a target variable  $Y$  (the responses to the various questions contained in the administered questionnaire).

More specifically, treatment  $T$  has a causal effect on the target variable  $Y$  for the  $i$ -th unit if the result obtained in case of treatment ( $T_1$ ) differs from the one obtained in the absence of a treatment (or in case of a different treatment,  $T_0$ ), or if the following relationship is satisfied:

$$\Delta_i \equiv Y_i(T_1) - Y_i(T_0) \neq 0.$$

In reality this relationship cannot be observed since each unit  $i$  is subjected either to treatment  $T_1$  or to treatment  $T_0$ . However, by making the right assumptions, it is possible to identify and measure a causal effect for the average individual of the population under examination.

$$E\{\Delta\} \equiv E\{Y(T_1)\} - E\{Y(T_0)\} \neq 0.$$

To do so it is necessary, however, to select two independent and random samples, one being the sample subjected to treatment  $T_1$  and the other being the control sample  $T_0$  and to observe the target variable  $Y$ . It is true, though, that this is more difficult in the case under examination since, as

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<sup>25</sup> As previous mentioned a similar analysis has been already carried out in the framework of the 2006 survey (Camillo F. and Girotti C., 2008).

<sup>26</sup> The variables considered are related to socio-demographic data (gender, geographical area of residence, social class and parents' educational title and qualification), the academic career (discipline group, geographical area of the university, whether the graduate was pure or hybrid, degree mark and age at graduation, completion of degree within the prescribed timeframe, attendance of classes), skills and experiences gained during the years at university (language and IT skills, work and study periods abroad) as well as future expectations (intention to pursue further studies, willingness to move for occupational reasons, whether they would re-enrol at the same university). We have considered all the variables that can affect the probability of participating in the CAWI survey: most of them came out as significant and thus are considered in the model.

already explained, the treatment itself is related to a phenomenon of self-selection of the population which, by definition, clashes with the assumption of there being a random assignment.

This problem can then be handled by adopting the already mentioned *propensity score* approach, proposed by Rosembaum and Rubin (1984), which is defined as the conditional probability, calculated for each unit, of receiving a treatment given a set of known covariates.

Within the obtained sub-groups of population,<sup>27</sup> it was possible to evaluate discrepancies in the responses given by graduates and related to the different type of treatment simply by calculating the difference, for each target variable, between the observed and the expected distribution in case of distribution independence (i.e. independence between type of interview and target variable).

In our case, the resulting effects on the estimates of the response rates to the specific categories were found to be lower than 2 percentage points in terms of deviation, a very promising result since it confirms that the two survey techniques are not generating high differences in terms of responses. There were only two exceptions to this finding which enabled us to identify some anomalies in the way the relevant questions had been formulated in the CAWI version of the questionnaire.

The first case refers to the question concerning the type of job performed: only the response category “other fixed-term contract” showed a deviation equal to or higher than 2 percentage points. This is thought to be due to the use of the word “other” which may confound the respondent, in particular when filling in the CAWI questionnaire: indeed, the word “other” may lead him/her to consider this category to be a residual one, while in reality it is meant to refer to the actual fixed-term employment contract.

The second very interesting case refers to the question relating to the job search. Although the question is in itself very simple and unequivocal, the absence, in the CAWI version, of some consistency checks led to a certain discrepancy between responses given by graduates who had opted for the web questionnaire and responses given by those who had been interviewed by phone. For the sake of simplicity, this particular section of the questionnaire is fully reported in the following.

D1. *Are you actively searching for a job? For the purposes of this survey, job search is meant to be active which implies that at least one concrete initiative has been undertaken such as, for example, sending a curriculum vitae.*

- [01] yes
- [02] no

[ask only if D1=01]

D2. *When did you undertake the last initiative in your job search efforts? Please remember that search is assumed to be active meaning that you must have undertaken at least one concrete search action.*

- [01] during the last 15 days
- ...
- [04] over 6 months ago
- [05] no concrete actions have been undertaken yet. [Note for the interviewer: This is not a valid answer because job search is meant to be active. Please go back and correct your responses] (*this modality was included only in the CATI questionnaire*).

As it can be observed, only the CATI version envisaged category 5 in question D2. This response option could not be selected by the interviewer: its only purpose being to highlight an inconsistency between the responses given by the graduate. Indeed, how could a graduate be actively looking for a job if she/he has not undertaken any initiative to find one? In the CAWI version of the questionnaire, this consistency check was in fact not envisaged; in keeping with the guidelines suggested by the scientific literature as well as by operational practice, our goal was to make sure that filling in the questionnaire was as simple as possible and that it was formulated in a straightforward way.

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<sup>27</sup> It is fundamental to verify in each subgroup the balancing property with regard to the categorical variables taken into consideration. Some clusters have been excluded because this property was not verified.

However, as already anticipated, the omission of this consistency check caused substantial differences in the responses given to question D1 in the two survey techniques (Table 1.). In any case, this discrepancy did not cause remarkable problems during the data processing phase, since the information contained in question D1 was used only for those graduates who had stated not to be employed (10.9% of the first level graduates and 41.3% of the first level graduates among those who participated in the CAWI survey).

*Table 1. – Observed distribution and estimate of the differences found between responses to the question regarding job search in the CAWI survey as compared to the CATI survey, as calculated through the propensity score separately for the two types of graduates*

	First level graduates		First level graduates		Observed distribution (column rates)	Estimate of the differences (percentage points)	
	Observed distribution (column rates)	Estimate of the differences (percentage points)		CAWI		CATI	
		CAWI	CATI				
Looking for job	36.2	10.705	-9.883	45.5	9.890	-8.020	
Not looking for job	63.8	-10.705	9.883	54.5	-9.891	8.021	

Source: AlmaLaurea, year 2008.

Nevertheless, for the sake of accuracy in the analysis, we decided to apply a system of weights to correct and estimate the bias thus generated. According to the approach developed by Lee (2006), the adjusted weight for unit  $j$  in class  $c$  of the web sample becomes.<sup>28</sup>

$$d_j^{W,PSA} = f_c d_j^W = \frac{\hat{N}_c^R / \hat{N}^R}{\hat{N}_c^W / \hat{N}^W} d_j^W$$

Where:  $d_j^W$  = base weight, necessary in order to get representative estimates of the Italian population;  $\hat{N}_c^R$  = number of units in class  $c$  in the reference survey (in this case, the CATI survey);  $\hat{N}^R$  = total number of units in the reference survey (in this case, the CATI survey);  $\hat{N}_c^W$  = number of units in class  $c$  in the web survey;  $\hat{N}^W$  = total number of units in the web survey.

It should be noted that each graduate of each group  $c$  was assigned the same weight  $f_c$ .

<sup>28</sup> This refers to each group within which the balancing property was verified.



Table 2. – Employment status by graduate type: comparison between weighted values and weighted and adjusted values using the weight system proposed by Lee

Graduate type	Employment status	
	Weighted values	Weighted and adjusted values
<b>First level graduates</b>		
In work	29.2	31.5
In work and enrolled on the first level degree course	16.1	16.0
Enrolled on the first level degree course (and not in work)	44.6	42.0
Not looking for work	2.8	2.9
Looking for work	7.3	7.6
<b>First level graduates</b>		
In work	61.7	62.1
Not looking for work	17.7	17.4
Looking for work	20.6	20.5

Source: AlmaLaurea, year 2008.

Table 2. reports the results obtained for graduates' employment status by using the base weight  $d_j^w$  (first column), which is necessary in order to get representative estimates of the Italian population, and the adjusted weight  $d_j^{w.PSA}$  (second column). As can be noticed, differences are decidedly small, in the order of just a couple of percentage points. This confirms that, despite the problems in retrieving the information regarding the search for a job, the actual bias is, in fact, not very relevant, according to the usual sampling error rate results in large sample surveys.

#### 4. Further data quality control and designed experiments

Data quality control has the purpose of achieving and preserving the reliability and effectiveness<sup>29</sup> of the data under analysis and implies a continuous process of confirmation of these crucial features for the overall data-base. Therefore, maintaining data quality requires going through the data-base periodically and scrubbing it.

Data are of high quality "if they are fit for their intended uses in operations, decision making and planning" (Juran and Blanton Godfrey, 1999, p. 2.2).

Among the available statistical methods, designed experiments are particularly relevant in that they allows us to test specific features of interest. However, different strategies can be devised in the attempt to optimize the use of the available information and a crucial issue is to specify in a precise way the main goal of the analysis.

In this paragraph we are concerned with a specific goal. Our aim is to investigate if the answers of the Italian graduates interviewed each year by AL in the framework of the survey of their employment condition are biased because of a sort of long-lasting affiliation to the university of origin and the AL Inter-university Consortium which join them. This sort of affiliation stems from the fact that graduates can benefit from placement services offered after graduation by their colleges and the AL Consortium.<sup>30</sup> As a consequence of this affiliation, one could argue<sup>31</sup> that their answers

<sup>29</sup> More precisely, the basic dimensions of data quality are found in their: performance; reliability; durability; serviceability; aesthetics; features; perceived quality; conformance to standards (Montgomery, 2005).

<sup>30</sup> As a matter of fact, these services are offered to all the graduates registered in the AL data-base.

<sup>31</sup> And, in fact, this criticism has been actually raised in various occasions, in a direct or indirect way.

to the questions relating to “subjective” outcome appraisal, based on personal opinions<sup>32</sup>, can be biased<sup>33</sup>, in that graduates can be led to “propping up” their image for self-promoting in the labour markets. While this is not the case with the “objective” information raised on their occupational condition<sup>34</sup> or based on administrative records.

Furthermore, the same argument can be put forward also in order to account for the very high response rate common to all AL surveys. However, it can be reasonably argued that an high response rate might have negative connotations only to the extent that the prior bias is observed.

The implications of this bias would be dual and relevant. On the one side, the significance of certain results obtained by the AL survey could be denied, on the other, it could be questioned the very capability of a subsidiarity-based initiative, like the AL Consortium, to significantly report on “subjective” variables.

In order to confront with this relevant issue and to test if the bias is present, we tried three research strategies based on different designed experiments. They are shortly described in the subsequent paragraphs.

#### **4.1. Comparing different data sources**

The first research strategy focus on finding consistent or inconsistent results in comparable surveys in order to test the relevance of the bias. In particular, two are the most pertinent sources for our purposes: the Istat and the Reflex surveys, both studying the employment condition of graduates in the Italian context.

The most recent Istat (2006) survey for which complete results are available has been carried out in 2004 on a sample of graduates in 2001.<sup>35</sup> In this case the questions raised in the questionnaire and the definitions are very similar to the AL ones.

The Reflex (2007) survey has been carried out on a sample of graduates in 2000 interviewed at 5 years from graduation. In this case, even if the basic themes are similar, the specific questions and definitions adopted are often different, making even more complex the comparison.

However, in both cases we are led to think that the survey methodologies are too different to allow for a significant comparison and test of our hypothesis: the main ones referring to the differences in the populations under examination (i.e. the graduation year), in the sampling strategies, in the definitions adopted, and in the questions wording.

For instance, in the case of the Reflex survey the comparison can be carried out only on the graduates with a degree in engineering. The reason stays in the fact that the Reflex survey, differently from the AL one, also considers as employed those graduates involved in paid training activity; and there is no chance to cut off this part of the interviewed population. Engineers are the only disciplinary group where the smaller rate of post-degree training is recorded and, by consequence, the best for a fitting comparative analysis. On top of that, Reflex surveys the job satisfaction using a scale with 5 reply modalities, while AL now uses a scale with 10 reply modalities. Until 2002 also AL used a 5 modalities scale, but in that period, first of all, the interview was taking place 3 years after the degree, while the Reflex interview took place 5 years after the degree; secondly, the specification and spelling of the 5 reply modalities in the two surveys is strongly different.<sup>36</sup>

In conclusion, every attempt to compare the AL results with those of the two other surveys seems runs into very awkward obstacles.

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<sup>32</sup> Like, for instance, in the case of the questions referring to the job satisfaction and the degree of satisfaction in exploiting competences.

<sup>33</sup> We could speak in this respect of a “club effect”.

<sup>34</sup> Like, for instance, in the case of the questions referring to their employment status, contract typology, economic sector.

<sup>35</sup> This is a one stage sample, stratified by gender, college location and degree course. A CATI procedure has been employed.

<sup>36</sup> For example, the fifth modality reads “very satisfied” in the Reflex survey, “very much satisfied” in the AL survey.

## 4.2. Looking at independent studies

The second research strategy looks at the results of an independent study by Bagues and Sylos Labini (2008), trying to find out further evidence on the consequences of the affiliation to the AL Consortium. The authors analyze the effect of the intermediation activity carried on by AL on graduates' labour market outcomes. The different timing of universities' enrolment in AL allows them to apply the *difference-in-differences* method to a repeated cross section data set. They employ Istat data: a statistical source totally independent from AL surveys and, therefore, not affected by potential distortions due to a “club effect”. In particular, they refer to two subsequent Istat surveys<sup>37</sup> carried on in 1998 and 2001. The graduates has been interviewed after 3 years from graduation. Under the normal assumption<sup>38</sup>, the affiliation to AL turns out to reduce the individual unemployment probability and to improve matching quality. The authors also find that on-line intermediaries foster graduates' geographic mobility. Moreover, they show that between 1998 and 2001 the satisfaction of the AL graduates increases significantly more in comparison with graduates not belonging to colleges which are partners of the AL Consortium.<sup>39</sup> This differential can be reasonably attributed to the positive effect of the manpower intermediation activity carried on by the inter-university consortium.

In conclusion, the results of an independent test suggest that the affiliation to AL significantly improves graduates' achievements in “objective” outcomes (rate of employment, earnings, and mobility). Moreover, the affiliation improves also graduates' achievements in “subjective” outcomes (satisfaction). The response rate turns out to be beneficially influenced by the advantages offered by the affiliation to AL. However, this evidence shows that the advantages felt are, at least partly, objective and, therefore, coherent with a transparent and rational behaviour on the side of graduates when they answer the questionnaire.

## 4.3. Resorting to counter factual analysis

The third research strategy focus the attention on an apparently trivial distinction between two categories of graduates which are both present in the list of AL graduates and periodically interviewed.<sup>40</sup> The majority of them, when they are first contacted, choose to publish their personal cv on the AL website. On the other side, a minority of graduates prefer not to make public their cv. This means that part of the graduates are granted a full “membership” in the AL Consortium, while part of them are not fully members. We can argue that, if a “club effect” is relevant, this cannot affect the second category. Therefore, the bias can be considered absent from the answers of the latter category, which becomes a good control group for our analysis.

Our experiment refers to the 2008 AL survey: in particular, it refers to the graduates in 2003 at 5 years from graduation. In this case 87% of the graduates had decided to publish their cv, while 13% did not.

We applied an OLS regression model in which the dependent variable corresponds to the overall satisfaction for the job performed<sup>41</sup>, while the regressors consist of a vector of control variables (see Table 3.) and the “membership” category to which each graduate belong to.

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<sup>37</sup> Namely to Istat (2000) and Istat (2003).

<sup>38</sup> Concerning parallel outcomes.

<sup>39</sup> The satisfaction refers to two variables: earnings and knowledge attained at the university. For an investigation of the first variable see Antonelli and Campiglio (2009).

<sup>40</sup> For a more detailed analysis see Camillo and Ghiselli (2009).

<sup>41</sup> As previously stressed, this variable is measured on a scale using 10 reply modalities.

Table 3. – Regression equation of the overall satisfaction on a vector of control variables<sup>(a)</sup> and the “membership”<sup>(b)</sup>

Variable	Type III square sum	Degrees of freedom	Square mean	F	p-value null hp
Model	9102.778 <sup>(c)</sup>	39	233.405	126.221	.000
Intercept	12970.970	1	12970.970	7014.461	.000
Disciplinary group	271.911	14	19.422	10.503	.000
Gender	33.094	1	33.094	17.897	.000
Geographic job location	38.881	3	12.960	7.009	.000
Contract type	50.891	1	50.891	27.521	.000
<b>Membership</b>	<b>.852</b>	<b>1</b>	<b>.852</b>	<b>.461</b>	<b>.497</b>
Effectiveness of the degree	963.412	2	481.706	260.498	.000
Employment condition when graduating	1.109	2	.554	.300	.741
Position in the profession	106.350	2	53.175	28.756	.000
Public/private sector,	141.669	1	141.669	76.612	.000
Firm size	25.600	2	12.800	6.922	.001
Full-time/part-time job	28.834	1	28.834	15.593	.000
Economic sector	8.907	2	4.454	2.408	.090
Worked hours	117.715	1	117.715	63.658	.000
Earnings	648.121	1	648.121	350.492	.000
FAC1_1 (satisfaction)	2892.561	1	2892.561	1564.244	.000
FAC2_1 (satisfaction)	157.838	1	157.838	85.356	.000
FAC3_1 (satisfaction)	146.678	1	146.678	79.321	.000
FAC4_1 (satisfaction)	182.486	1	182.486	98.685	.000
FAC5_1 (satisfaction)	5.400	1	5.400	2.920	.087
Random error	22635.757	12241	1.849		
Total variance	31738.535	12280			

Notes: (a) These are, respectively, disciplinary group, gender, geographic job location, contract type – tenure/not tenure, employment condition when graduating, position in the profession, public/private sector, firm size, full-time/part-time job, economic sector, worked hours, earnings, other satisfaction components. “Standardized” opinions, net of the size effect, have been transformed in factor-scores in order to eliminate the correlation, as proposed in Camillo (1999). (b) The “membership” variable is a dichotomic one, depending on individual decision to publish/not publish the cv. (c) R-square = .287; corrected R-square = .285.

Source: Estimates based on AL data.

The main results of the OLS regression estimate are shown in Table 3. As it is evident, the variable referring to the “membership” of the graduate (published/not published cv) turns out to be not significant. More than that, it exhibits one of the parameters with less significance.

Not even satisfied with this result, in order to assess in a more accurate way the potential bias, we have performed a second experiment in the framework of the multivariate propensity score approach (Camillo and D’Attoma, 2009).

In this approach, the decision to publish/not publish the cv give rise to a treatment variable T. The X variables prior to the treatment are useful in order to form different groups of graduates, homogeneous with regard to their personal characteristics, in relation to the decision to publish/not publish their cv. Furthermore, the job satisfaction is one of the target variables Y we can asses. As already seen in paragraph 3.2. for a different application , it is possible to pull together groups of graduates homogeneous with respect to their choice to publish their cv. Inside each groups the

analysis on satisfaction for the job held, again performed with an OLS regression model, is more accurate.

However, the classic propensity score procedure is not feasible in our case, due to the fact that the balancing property is not verified (Rosenbaum and Rubin, 1983, 1984).

Therefore, we have tried a multivariate propensity score analysis using the only 3 X variables available for all graduates and possibly influencing the decision to publish/not publish the cv (disciplinary group, gender, geographic job location), fixing for each graduate the factor scores of a multiple correspondence analysis identified in such a way. Then we have performed a cluster analysis on the first 4 factorial axes, identifying 15 clusters.

As mentioned before, each cluster can be considered as a graduates' group with similar characteristics, which can be used to test if the balancing property is verified with respect to the 3 categorical variables taken into consideration. Cluster 1, 7 and 10 have been excluded because this property is not verified.

Then, within each of the remaining clusters we have tested if the satisfaction variable is significantly different, taking into consideration all the variables used in the general regression model estimated previously.<sup>42</sup>

*Table. 4. – p-values for the “membership” variable*

	R-square	p-value for the “membership” variable
cluster2	0.426	0.568
cluster3	0.654	0.521
cluster4	0.517	0.823
cluster5	0.366	0.243
cluster6	0.316	0.401
cluster8	0.330	0.371
cluster9	0.303	0.757
cluster11	0.202	0.770
cluster12	0.418	0.070
cluster13	0.258	0.155
cluster14	0.342	0.617

For the sake of simplicity, in Table 4. only the p-values for the “membership” variable are presented. In none of these clusters the dichotomic variable “membership” turns out to be significant, displaying p-values all well above 15% with respect to the null hypothesis (except cluster 12, where the p-value is 7%).

In conclusion, the final result seems to exclude the occurrence of an affiliation bias in the estimates making use of the AL data-base.

## **5. Concluding comments**

The AL model, that is the methodology used by AL in creating a fully integrated information system, aiming at diffusing reliable statistical data on graduates' employment condition and profile, has been outlined. Its novelty and effectiveness rest on the interaction of two cumulative drivers: the joint use of administrative data and surveys, on the one side, the offer of placement services, on the other.

<sup>42</sup> Namely, all the characteristics of the performed job.

The synthetic presentation of the main results achieved using this methodology, shows how unique and comprehensive in the AL data-base in describing the impact of the Bologna Process reform on the Italian higher education system.

Afterward, the study of two relevant methodological issues faced by AL surveys has been outlined. Our aim is improving as much as possible the reliability of AL data-base thorough the implementation of quality control techniques.

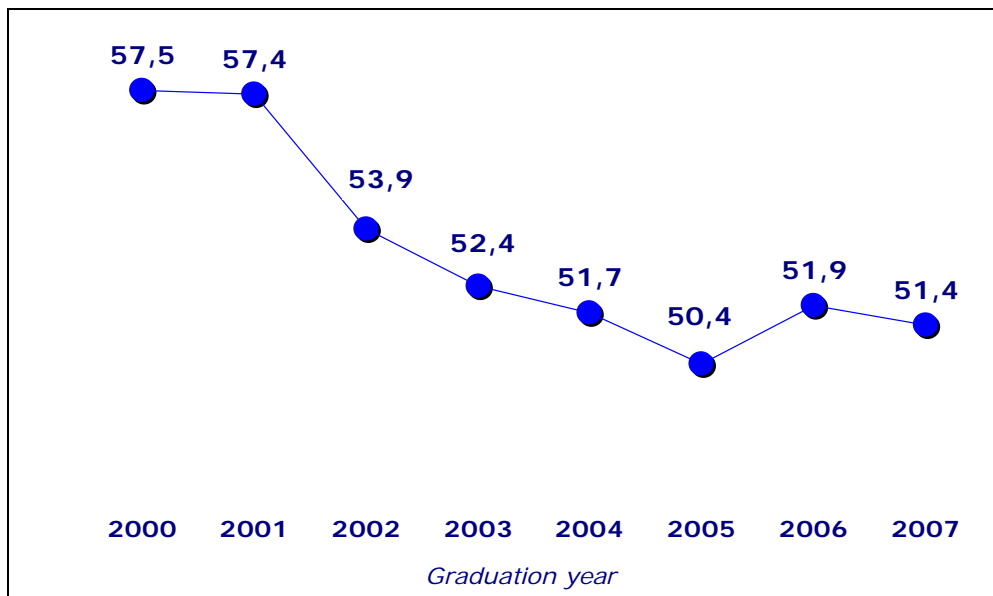
In the first case, we test the effect on survey results of a mixed method (CAWI and CATI) use. Despite the problems in retrieving the information regarding the search for a job, the actual bias is, in fact, not very relevant, according to the usual sampling error rate results in large sample surveys.

In the second case, we investigate the significance of a potential bias arising from a “club effect”.

Preliminary results seems to exclude the occurrence of an affiliation bias in the estimates making use of the AL data-base.

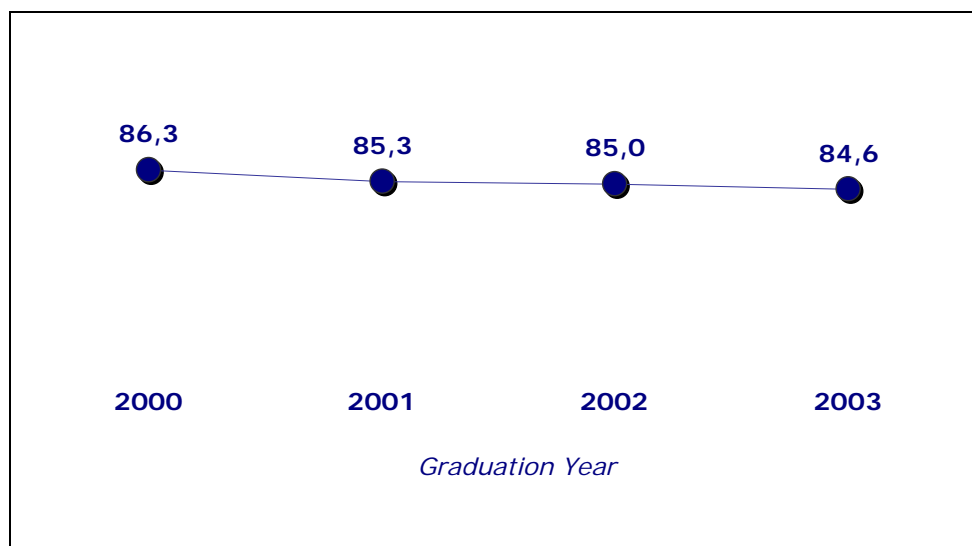
## Appendix – The XI AlmaLaurea survey on graduates' employment condition

Figure 1. - Employment rate trends at one year from graduation (pre-reform graduates)



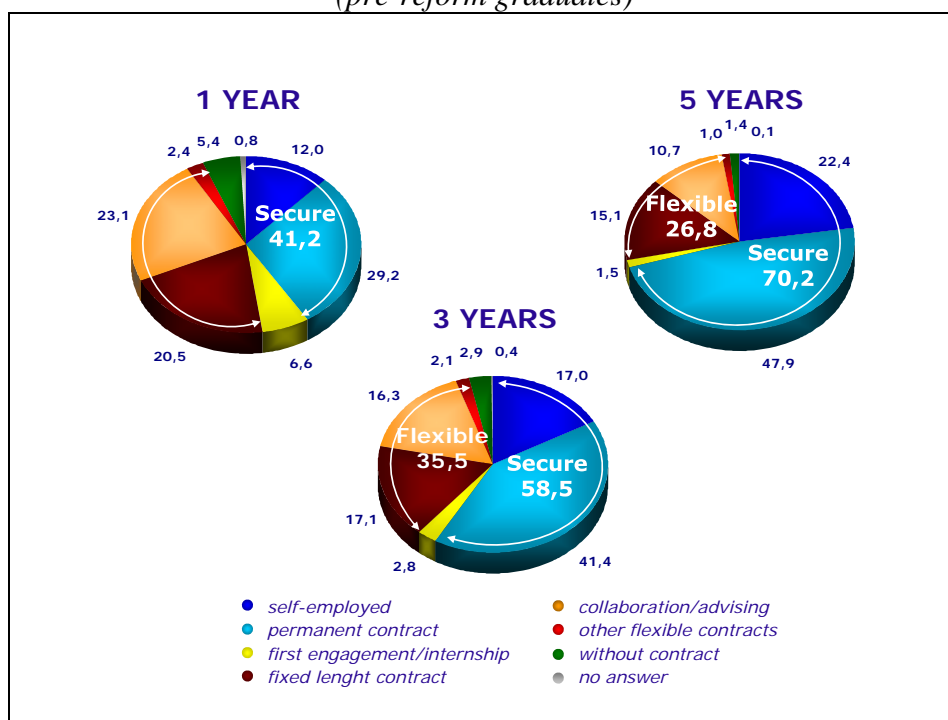
Notes: simulation obtained applying the same graduates structure of the year 2000. in terms of regular attendance, employment situation at graduation and course undertaken. Source: AlmaLaurea.

Figure 2. - Employment rate trends at five year from graduation (pre-reform graduates)



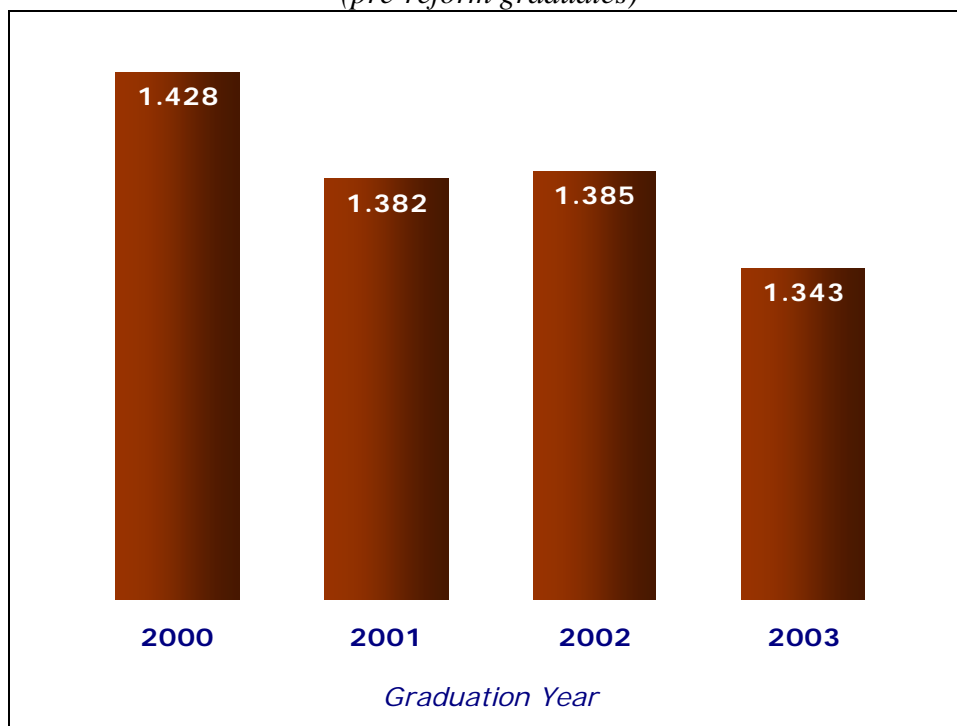
Note: percentage values. Source: AlmaLaurea.

Figure 3. - Job stability: longitudinal comparison for the graduates in the year 2003 (pre-reform graduates)



Note: percentage values. Source: AlmaLaurea.

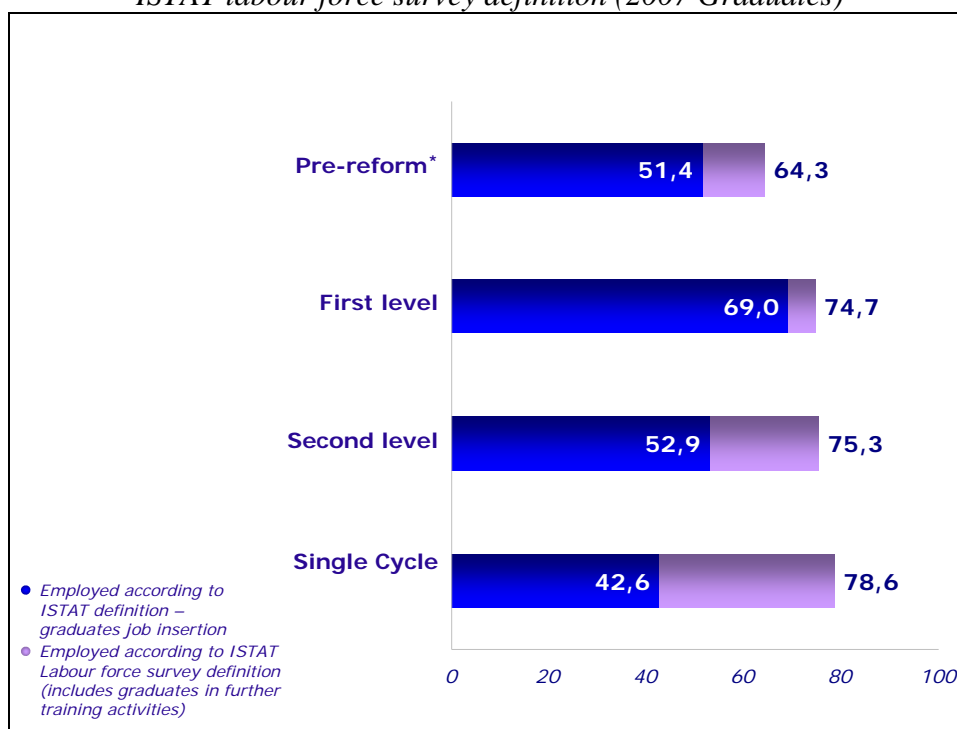
Figure 4. - Net monthly real earnings: comparison at five years from graduation (pre-reform graduates)



Note: reassessed values in Euros (ISTAT index of consumer prices for work and employee households). Source: AlmaLaurea.

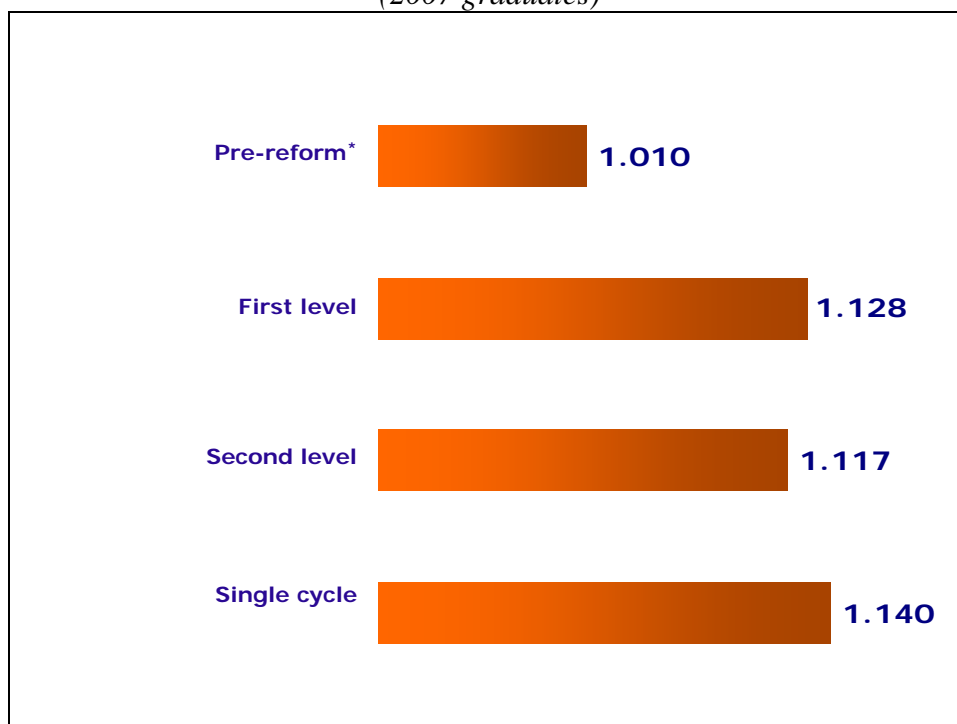


Figure 5. - Employment rate at one year from graduation by degree type: comparison with ISTAT labour force survey definition (2007 Graduates)



Notes: percentage values. Figures include only graduates not employed when graduating and, in the case of first level degree holders, only those not enrolled in a second level course. \* Simulation obtained applying to the pre-reform graduates the same graduates structure of the year 2000, in terms of regular attendance, employment situation at graduation and course undertaken. Source: AlmaLaurea.

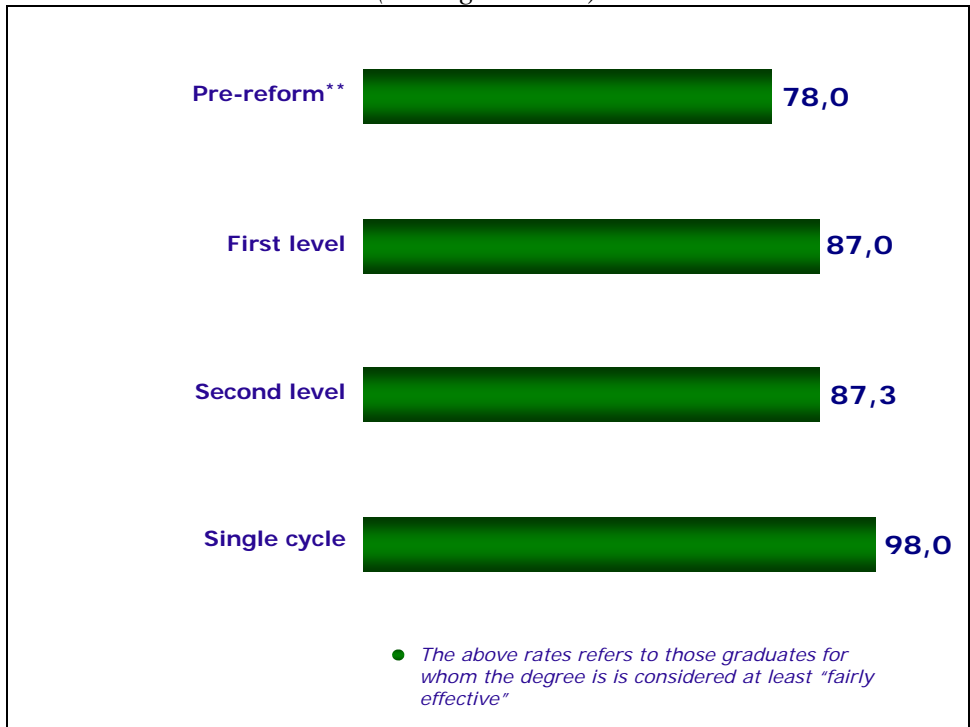
Figure 6. - Net monthly nominal earnings at one year from graduation by degree type (2007 graduates)



Notes: average values are expressed in Euros. Figures include only graduates not employed when graduating and, in the case of first level degree holders, only those not enrolled in a second level course.

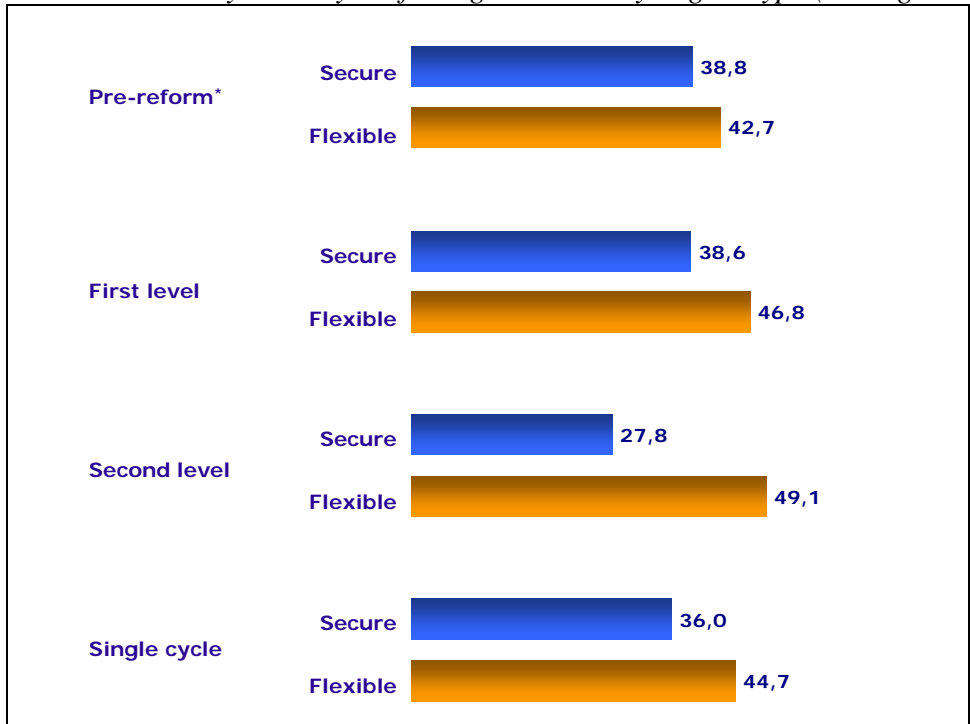
\* Simulation obtained applying to the pre-reform graduates the same graduates structure of the year 2000, in terms of regular attendance, employment situation at graduation and course undertaken. Source: AlmaLaurea.

Figure 7. - Effectiveness\* of the degree after one year of graduation by degree type (2007 graduates)



Notes: percentage values. Figures include only graduates not employed when graduating and, in the case of first level degree holders, only those not enrolled in a second level course. \*It combines the requirement of the degree for the work activity and the use of the skills acquired in university studies. \*\* Simulation obtained applying to the pre-reform graduates the same graduates structure of the year 2000, in terms of regular attendance, employment situation at graduation and course undertaken. Source: AlmaLaurea.

Figure 8. - Job stability at one year from graduation by degree type (2007 graduates)



Notes: percentage values. Figures include only graduates not employed when graduating and, in the case of first level degree holders, only those not enrolled in a masters course. \* Simulation obtained applying to the pre-reform graduates the same graduates structure of the year 2000, in terms of regular attendance, employment situation at graduation and course undertaken. Source: AlmaLaurea.

Figure 9. - Pre- and post-reform graduates: a comparison of the main features

	Pre-reform graduates of the year 2001		Second level post-reform <i>pure*</i> graduates of the year 2007 (83%)
	No more than 1 year of delay (27%)	Total	
Age at graduation (average in years)	26,0	28,0	25,9
Graduation mark (average/max 110)	105,9	102,5	109,1
Attended classes on a regular basis (% , more than 75% of classes)	70,7**	54,3**	80,4
Degree completion within the prescribed time (%)	65,4	9,5	69,6
English knowledge: "at least good" command (%)	63,9**	55,5**	75,5
Participation to internships before graduation (%)	25,2	17,9	55,9
Study abroad (%)	11,0	8,4	12,3

Notes: \*Pure post-reform graduates who completed their course of studies entirely and exclusively under the new system. \*\* Pre-reform graduates of the year 2004. Source: AlmaLaurea.

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