Do On-Line Labor Market Intermediaries Matter?
The impact of *AlmaLaurea* on the University-to-Work Transition [1]

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ABSTRACT

University-to-work transition is affected by different kinds of information imperfections and asymmetries. The present paper studies the consequences of on-line institutional arrangements aimed at reducing information imperfections in this segment of the labor market. More specifically, this work is concerned with the impact of a specific labor intermediary, the interuniversity consortium called *AlmaLaurea*, on the graduates labor market outcomes. In order to measure the effect of *AlmaLaurea* a pooled cross section data set is exploited employing the "difference-in-differences" method. It is shown that *AlmaLaurea* has a clear effect on both individual unemployment probability and different measures of job satisfaction.

JEL Classification: J64, J68, G14.

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1. Introduction

Labor market functioning is deeply affected by different kinds of information imperfections and asymmetries. *A fortiori*, if one focuses on the education-to-work transition, one wants to recognize that this segment of the labor market is particulary exposed to such imperfections, given that job seekers lack typically work experience and this negatively affects both the accurateness of their outlooks concerning employment opportunities and jobs characteristics and employers' screening options.

International evidence shows that unemployment rates are lower for university graduates than for the rest of labor force and that, in most countries, highly educated people experience a smoother entry into working life. However, university graduates transition process may be harmed by the high specialization they have typically acquired: over-education (i.e. individuals whose level of education is higher than the one required in their occupation) and mismatching are likely outcomes in countries that lack proper coordination mechanisms between individual educational choices and productive structures dynamics.

Italian university-to-work transition is particularly affected by the above problems and, as showed in Table 1, international comparisons depict it as one of the most problematic cases among industrialized countries.[2] A few studies have focused on the over-education phenomenon (e.g. Di Pietro and Urwin (2003)). The present paper addresses the importance of information job seekers and employers have about each other and the consequences of institutional arrangements aimed at reducing information imperfections. More specifically, this work is concerned with the impact of a specific labor market intermediary, the interuniversity consortium called *AlmaLaurea*, on the Italian graduates labor market outcomes. To put it in a nutshell, *AlmaLaurea* collects and organizes on-line information concerning college

[2]See also the data in Mannheim Centre for European Social Research (2002).

Table 1: **Employment Rates of University Graduates by Age Classes - 2004**

	Age Class		
Country	*25-29*	*30-34*	*35-39*
Denmark	79.7	87.7	91.2
Finland	84.4	86.7	87.9
France	80.1	85.0	87.5
Greece	72.2	85.5	87.9
Italy	**58.0**	**81.9**	**89.4**
Spain	76.3	85.9	86.7
Sweden	76.6	88.2	88.3
UK	90.5	98.1	90.1

Source: Eurostat.

graduates curricula and provides it to firms in electronic format, subject to the payment of a fee. With respect to other on-line labor market intermediaries, *AlmaLaurea*, as we shall discuss more thoroughly below, combines very peculiar characteristics: first, it also collects information concerning graduates who do not use its services; second, it accomplishes very high enrolment rates among graduates. Both features, we suggest, are likely to mitigate possible market failures. The main contribution of the present paper is to show that *AlmaLaurea* has a clear effect on both unemployment probabilities and job satisfaction.

Our results are important for two basic reasons. First, much attention has been recently devoted to the importance of electronic labor market intermediaries (Krueger 2000; Autor 2001).[3] We show that under certain conditions they do have a positive impact on market functioning. In particular, we suggest that electronic labor markets are effective if

[3]In a recent report the US Congressional Budget Office has pointed out that "internet job searching may also have played a role in reducing the natural rate (of unemployment)" (CBO 2002).

they display institutional arrangements that prevent adverse selection. Second, our study is interesting for policy makers: to begin with, clear evidence for *AlmaLaurea* effectiveness is useful for program evaluation, also because the consortium is partly financed by the Italian Ministry of Education. Moreover, if *AlmaLaurea* proves to be an effective institutional arrangement, other European countries might learn from its example improving their public policies aimed at facilitating university-to-work transition.

In order to measure the effect of *AlmaLaurea* a pooled cross section data set is exploited. The data set is built merging two distinct (but almost identical) surveys run by ISTAT (the Italian Statistical Office) on two representative samples of Italian university graduates of 1995 and 1998 respectively, interviewed three years after graduation. Given that *AlmaLaurea* intermediation activities started only in a subset of Italian universities in between such span of time, we can measure its impact using a differences-in-difference approach. With this goal in mind we split the sample in two distinct groups of graduates: the ones that completed their degree in a university that joined *AlmaLaurea* between 1995 and 1998 (the treatment group) and the ones that graduated from a university which have not been in *AlmaLaurea* during such period (the control group). The subtleties of envisaging academic institutions participation to *AlmaLaurea* as a quasi-natural experiment shall be discussed more thoughtfully below. Here it suffices to say that, according to personal conversation with the consortium director, *AlmaLaurea* membership has been quite accidental, based mostly on informal relationships among faculties.

The paper is organized as follows. Section 2 describes in dept the *AlmaLaurea* consortium and briefly discusses its economic implications. Section 3 outlines the identification assumptions needed for our empirical strategy to be valid. Section 4 is concerned with the description of the data set exploited in our investigation. Section 5 presents the most important results and, finally, Section 6 concludes.

2. *AlmaLaurea* and the Economics of Electronic Labor Markets

Labor market intermediaries, both private and public, often play an important role in mitigating information imperfections undermining college-to-work transition. Several distinct institutional arrangements may either spontaneously emerge or be purposefully designed in order to ameliorate information flows. They range from market-like ones (e.g. private job hunting organizations) to centralized public placement offices.

Universities are often active actors in labor market intermediation. For instance, most academic institutions set up and manage placement offices or, more rarely, their faculties establish informal ties with firms.[4] However, when universities receive (public) financial endowments on relatively egalitarian bases (e.g. graduates labor market performance do not affect either their financial endowments or their enrollment rate), they might lack the right incentives for caring about their students' placement. In Italy until 1994, when *AlmaLaurea* was founded by the University of Bologna, public universities were barely doing any formal intermediation activity. As showed in Table 2, if one compares the shares of college graduates who have used the help of their institutions' placement office across a selected sample of European countries, Italy ranks well below other European countries with the notable exception of Germany.[5]

Initially run by the Statistical Observatory of the University of Bologna, *AlmaLaurea* is today managed by a consortium of Italian universities with the support of the Ministry of Education. Its institutional objectives are twofold. First, *AlmaLaurea* aims at providing for its member academic institutions reliable information concerning their graduates. Second, it

[4]See Rebick (2000) for an insightful account of the Japanese case.

[5]Percentages displayed are calculated using the data set built by a Project funded by the European Community under the Targeted Socio-Economic Research (TSER) named "Careers after Higher Education: a European Research Study". See `http://www.uni-kassel.de/wz1/tseregs.htm` for details.

Table 2: **Share of University Graduates Using Universities Placement Offices as job search method**

Country	University Placement Office Utilization Rate
Italy	10.3
Spain	39.3
France	18.1
United Kingdom	37.6
Germany	6.6

Notes: The relevant question (asked to graduates who obtain their degree between autumn 1994 and summer 1995 and declared in 1998 that they have sought a job at least once) was "How did you tried to find the first job after graduation?". Multiple options follow, among which "I enlisted the help of a careers/placement office of my institution of higher education".
Source: Our elaboration from the data set produced by a Project funded by the European Community under the Targeted Socio-Economic Research (TSER) "Careers after Higher Education: a European Research Study".
Details on the project and downloadable material can be found at `http://www.uni-kassel.de/wz1/tseregs.htm`.

tries to facilitate graduates access to the labor market through the creation of an innovative service that makes electronically available to firms a rich data set concerning graduates characteristics conditional upon the payment of an annual fee, that ranges from 440 to 2,600 euros, according to the amount of data downloadable.

Universities who wish to participate to the consortium need to afford a one-time association fee (ranging between 2,582 and 5,165 euros according to the number of graduates of each university) and an annual subscription fee determined each year by the Board of Directors (also proportional to the number of graduates from each institution) for the collection and the insertion of new data in the *AlmaLaurea* database.

The database combines information from three distinct sources. First, academic institutions provide official data concerning grades, course durations, and degrees received by their alumni. Second, undergrads are asked to provide a few pieces of information including military service obligations, periods of study abroad, work experience, and a self-evaluation

concerning foreign languages and computer skills. Finally, graduates have the option to update directly their curricula vitae up to three years after graduation.[6] The last piece of information is provided by the graduate directly on-line filling out an electronic questionnaire. In accordance with Italian privacy law, only a subset of the information in the database is available for consultation by employers.[7]

Today 40 academic institutions, both private and public, are member to the *AlmaLaurea* consortium. Nevertheless, in 1998 only the 13 universities had joined the consortium and had started their labor intermediation activity in between 1995 and 1998: Universities of Bologna, Catania, Chieti, Ferrara, Firenze, Messina, Modena, Molise, Parma, Trento, Trieste, Udine, and the the Venice University Institute of Architecture. Graduates from those institutions represent around 23% of all Italian graduates in the two years considered.

AlmaLaurea recruitment service is an insightful example concerning how on-line communication technologies (coupled with more traditional forms of intermediation) may ameliorate the way in which employer-employee matches are made. In first approximation, *AlmaLaurea* should decrease search costs for both employers and employees. Standard search theory predicts that, everything equal, lower search costs imply better matches and, therefore, higher productivity (Pissarides 2000). However, the effects of more favorable search technologies on unemployment are ambiguous, since they might induce both job seekers and employers to be choosier and increase their reservation wages and screening standards. Moreover, a likely consequence of lower costs in distinct job search channels is that job seekers *ceteris paribus* will apply for more jobs. Especially when employers perceive such *excess application* as a problem, adverse selection is likely to undermine the effectiveness of cheap search methods (Autor 2001).

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[6]Recently such span of time has been extended to five years.

[7]More information can be found on-line at http://www.almalaurea.it/eng/index.shtml

One of the few empirical investigations concerning the above issues corroborates the skepticism concerning the effectiveness of electronic labor markets: Kuhn and Skuterud (2004), using the recent CPS Computer and Internet Supplement, find that Internet searchers, when observed characteristics are controlled for, do not experience shorter unemployment spells *vis-à-vis* other unemployed job seekers. However, given the characteristics of their data, the authors of the above study are not able to give any evidence concerning the quality of the matching. They speculate that their findings might stem from negative selection into Internet search on unobservables. In particular, likewise Autor (2001), they also observe that low cost search methods are unlikely to screen out individuals with only a very low interest in finding a new job.

AlmaLaurea is completely free for students (except for the cost of updating personal information) and therefore it is potentially exposed to the adverse selection problem underlined above: employers might expect that individuals that update their resumes on line are somehow negatively selected. Nevertheless, first, part of the information contained in the data collected by *AlmaLaurea* concern the entire graduates population, given that it is provided directly by academic institutions. Therefore, we conjecture, adverse selection may be controlled for by employers confronting relevant differences (e.g. university grades, internship attendance,...) between job seekers and the entire graduate population.[8] Second, academic institutions that joined *AlmaLaurea* are able to enroll the overriding majority of their graduates.[9] High participation rates have been very effective in building a good reputation and make adverse selection very unlikely. To sum up, we expect that the organizational features of *AlmaLaurea* prevent it from the usual shortcomings suffered by on-line labor market.

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[8] *AlmaLaurea* web site allows to do it on-line. Incidentally, more accurate information concerning graduates educational performance might also indirectly affect individuals' incentives in their educational efforts.

[9] For instance, more than 92% of 1998 graduates updated their curriculum vitae at least once.

Table 3: **Notation and Definitions**

Notation	*Interpretation*
(t, i, u)	Date $t \in \{1998, 2001\}$, individual $i \in \{1, ..., I\}$, university $u \in \{1, ..., U\}$.
x_i	Observed characteristics of individual i.
s_u^{t-3}	Observed indicators of university u quality at time $t-3$.
ξ_i	Unobserved characteristics of individual i.
χ_u^{t-3}	Unobserved quality and characteristics of university u at time $t-3$.
A_u^{t-3}	Indicator for university being in *AlmaLaurea* (university u, at time $t-3$)

3. The Empirical Strategy

Our estimation approach is based on the "difference-in-differences" method, applied to a pooled cross-section data set. The goal is to evaluate the impact of the *AlmaLaurea* affiliation of Italian universities in the period 1995-1998 on employability, earnings, and levels of satisfaction of their graduates. This section formalizes and explicitly discusses the assumptions that make our empirical approach valid.

At time t labor market outcome $E_{i,u}^t$ for individual i, graduated in university u at time $t-3$ is observed. There exists a number of factors affecting graduates' labor market outcomes. We make a sharp distinction between individual characteristics, both observable x_i and unobservable ξ_i, and university ones, both observable s_u^{t-3} and unobservable χ_u^{t-3}.[10]

Our treatment is A_u^{t-3}, i.e. university u being in *AlmaLaurea* at time $t-3$.[11] Summing

[10]Note that employing a pooled cross-section, individuals characteristics do not have a time index. Moreover, university characteristics are indexed at $t-3$, given that individuals graduated three years before the surveys used in our analysis are run.

[11]The consortium started to work as a labor market intermediary only after 1996, therefore as will be clear below A_u^{t-3} assumes value one only in 2001 for a subset of universities.

up and using the notation defined in Table 3:

$$E_{i,u}^{t} = f\left(x_i, s_u^{t-3}, \xi_i, \chi_u^{t-3}, A_u^{t-3}\right). \tag{1}$$

Of course, our empirical strategy requires a number of assumptions concerning the unobsorvables. First, we decompose the impact of universities unobserved quality into a fixed component c_u and a time-varying component q^t, and we assume that the latter is additive and constant across universities:

Assumption 1: $\chi_u^{t-3} = c_u + q^t$.

Most importantly, we need also to consider the relationship between the unobservables and *AlmaLaurea* affiliation. We allow for the possibility that some colleges have higher unobserved quality and, relatedly, that some of them tend to receive better students. However, we assume that the incremental impact of *AlmaLaurea* on individual employment outcomes is the same across universities:

Assumption 2: f is additively separable in χ_u^{t-3} and A_u^{t-3}.

If Assumption 2 does not hold, our approach only identifies the average impact of universities which joined *AlmaLaurea* and these selected universities might have different return than the average level of returns.

As far as graduates unobservables are concerned, we allow *AlmaLaurea* to be correlated with the average individual characteristics in a given college, but we need to assume that within university changes in graduates unobservables over time are uncorrelated with *AlmaLaurea*:

Assumption 3: Across time, ξ_i is independent of A_u^{t-3}, conditional on s_u^{t-3} and x_i.

The fact that individual enrolment decisions have been taken before universities ones of

joining *AlmaLaurea* makes the above assumption not too restrictive.[12]

Under assumptions 1-3 the average effect of affiliation to *AlmaLaurea* on labor market outcomes is identified. Imposing a linear functional form for f, our baseline empirical specification becomes:

$$E_{i,u}^{t} = c_u + q^t + \alpha A_u^{t-3} + \beta x_i + \gamma s_u^{t-3} + \xi_i + \chi_u^{t-3}. \tag{2}$$

The above specification will be used in Section 5 in order to measure the impact of *AlmaLaurea* on graduates labor market outcomes.

4. The Data

To implement the econometric approach described in Section 3, we collect from distinct sources data concerning Italian university graduates and the academic institutions where they studied.

In particular, our main data set come from two distinct (but almost identical) surveys named *Indagine Inserimento Professionale Laureati* (Survey on University-to-Work Transition) run in 1998 and 2001 on individuals graduated in 1995 and 1998, respectively.[13]

The target samples consist of 25,716 individuals in 1998 and 36,373 individuals in 2001. They represent respectively the 25% and 28.1% of the total population of university graduates in Italian universities. The response rates have been of 64.7% and 53,3% for a total of 17,326 and 20,844 respondents.[14] In both years the sample is stratified according to sex,

[12]However, note that the assumption is violated if ξ_i and A_u^{t-3} are both related to factors which are not controlled for.

[13]The publicly available micro-data do not include information on the university the interviewed individual graduated from. Therefore, we carried out the analysis at the ADELE ISTAT laboratory in Rome.

[14]Differences may stem from different interviewing technologies used in the surveys: in 1998 ISTAT mailed

Table 4: **Sample Design and Means of Key Variables**

	All	*AlmaLaurea*	non*AlmaLaurea*
1998 Survey:			
Number of Graduates	17,106	4,599	12,507
Weighted Shares		23.64	76.36
2001 Survey:			
Number of Graduates	20,576	4,619	15,957
Weighted Shares		22.04	77.96
	All	*AlmaLaurea*	non*AlmaLaurea*
Means of selected sample characteristics in 1998:			
Female	52.9 (.004)	52.1 (.009)	53.2 (.005)
Age	30.4 (.035)	30.5 (.070)	30.4 (.041)
High School Grade	48.4 (.062)	48.0 (.127)	48.5 (.071)
University Grade	103.4 (.060)	103.4 (.123)	103.4 (.069)
Means of selected sample characteristics in 2001:			
Female	55.4 (.004)	56.2 (.008)	55.2 (.004)
Age	30.4 (.026)	30.4 (.054)	30.4 (.030)
High School Grade	48.9 (.054)	48.7 (.115)	49.0 (.061)
University Grade	103.1 (.053)	103.0 (.118)	103.1 (.060)
	All	*AlmaLaurea*	non*AlmaLaurea*
Universities in 1995			
Number of (not delayed) students per faculty	19.5 (1.14)	17.9 (1.77)	19.9 (1.37)
Delayed Students	.28 (.01)	.27 (.02)	.29 (.01)
Universities in 1998			
Number of (not delayed) students per faculty	18.4 (1.09)	15.6 (1.78)	19.2 (1.29)
Delayed Students	.34 (.01)	.38 (.02)	.33 (.01)

Notes: Standard errors in parenthesis. Shares, means and standard errors are computed with stratification weights. Only individuals that

university and degree obtained and in the analysis below all estimations are performed using stratification weights.

The surveys collect information concerning individuals' (i) school and university curricula, (ii) labor market experience, and (iii) demographic and social backgrounds. The most important dependent variables in this study concern occupational outcomes (i.e. unemployment and labor force participation) and matching productivity (i.e. wage and distinct measures of satisfaction) both considered three years after graduation. We group our individual level dependent variables in two subsets. The first includes all those individual characteristics that are predetermined with respect to college choices and outcomes, i.e. sex, age, high school grade, parent's education, siblings, province of residence before college enrolment, and provincial GDP. The second contains indicators related with college curricula, i.e. grade, and dummies for distinction (summa cum laude), degree, and university attended.

In order to control for observable variation in college quality, we also use data concerning college characteristics provided by ISTAT in a yearly bulletin named *Lo Stato dell'Universitá* (University Indicators) for the academic years 1991-98. In particular, we collect information at the level of single college on the number of students, professors, and delayed students.[15] Finally, for public colleges we also have access to the amounts of public funding received yearly from the National budget provided by the Ministry of Education.[16]

We start focusing on those individuals that have answered at least to the question

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paper-based questionnaires, while in 2001 questions were asked following the C.A.T.I. (Computer Assisted Telephone Interview) technique.

[15]In Italy most students graduate beyond the official limit. Even if in principle this can be due to the difficulty of the degree, most likely this depend also on the quality of the didactic.

[16]In the Italian tertiary education system those funds are dubbed *Fondi di Finanziamento Ordinario* (Ordinary Financial Funds) and represent the major financial resource of public colleges.

Table 5: **Employment, Unemployment and Wages by Year and *AlmaLaurea***

Employment			
	1998	*2001*	**Diff.**
AlmaLaurea	73.13	75.19	2.06
non AlmaLaurea	73.78	74.41	0.63
Diff.			**1.46**
St. Err.			*(1.20)*
Unemployment			
	1998	*2001*	**Diff.**
AlmaLaurea	22.16	10.28	-11.88
non AlmaLaurea	21.31	12.15	-9.16
Diff.			**-2.72**
St. Err.			*(1.07)* **
Wage			
	1998	*2001*	**Diff.**
AlmaLaurea	930	1122	192
non AlmaLaurea	981	1152	171
Diff.			**21**
St. Err.			*(14.7)*

Notes: Unemployment rates have been computed using stratification weights over 33,538 individuals in the labor force. Average gross monthly wages are expressed in Euros and have been calculated for 23,755 individuals that provide it. The bold differences are the results of a difference in difference estimation, where $Diff = (Y^{01}_{Alma} - Y^{98}_{Alma}) - (Y^{01}_{nonAlma} - Y^{98}_{nonAlma})$. In parenthesis are displayed robust standard errors of regressions of the dependent variables on dummies for year, belonging to *AlmaLaurea*, and their interaction.

concerning their employment status.[17] We split our total sample in two groups of graduates: the 9,218 individuals that obtained their degrees from colleges that have joined *AlmaLaurea* in between 1995 and 1998 (the treated group) and the 28,464 that graduated from the remaining colleges (the control group).

Table 4 presents samples characteristics, means, and standard errors for key variables. Control and treated groups present very similar characteristics in both years, reducing the possibilities of major interactions (beyond the treatment itself) at the individual level between being enroled in a college member of *AlmaLaurea* and being graduates of 1998.

A first outlook concerning the impact of *AlmaLaurea* is obtained comparing differences in means concerning key outcomes (employment, unemployment, and wages) for graduates in universities that joined *AlmaLaurea* and graduates in universities that did not. In Italy labor market conditions have improved sharply in between 1998 and 2001.[18] For individuals three years after graduation, Table 5 shows that, while employment rates have improved modestly, the unemployment rate dropped dramatically from 1998 to 2001. Moreover, and most importantly for the present paper, those in the treated sample have improved the most both in employment and unemployment rates: employment rate increased 1.46% more within the treated group then within the control one and unemployment decreased 2.72% more. Similarly, wages increased slightly more for *AlmaLaurea* graduates then for the control group. Of course, the above results are very preliminary, given that the treatment (i.e. university enrolment in *AlmaLaurea*) is not randomly assigned across universities and we do

[17]Following standard definitions, we consider employed those individuals that declare to be on a paid job or have worked at least one our during the week before the interview. Within the non employed, the unemployed are the ones who declare to be looking for a job.

[18]Italian standardized unemployment rates for the entire population were 11.7 in 1998 and 9.4 in 2001. Similarly, employment rates shift from 52.2 to 54.9.

not control for many important individual, university and geographical characteristics. The remaining part of the paper uses the approach outlined in Section 3 in order to assess the extent to which the observed changes between the treated and the control group do stem from *AlmaLaurea*.

5. The Impact of *AlmaLaurea*

We begin our empirical investigation studying the factors affecting employment and unemployment probabilities of individuals three years after graduation and then we move to consider monthly earnings and three distinct self-reported measures of job satisfaction, concerning economic compensation, job security, and matching between job tasks and knowledge acquired at university. As mentioned in Section 2, job search theory does not predicting any clear impact of lower search costs on unemployment. On the other hand, job match productivity is supposed to unambiguously improve as a consequence of lower search costs.

We split our control variables in three broad groups. The first includes relevant individual characteristics that are predetermined with respect graduates' college choices and performances. The second contains individual variables that are related with college curricula. Notice that this set of variables could be potentially correlated with individuals and (or) universities's unobservables. If this were the case, they would be endogenous and our estimates would be inconsistent. Finally, the third group includes a few measures of university quality.

Our analysis is structured along the above classification and therefore for each dependent variable considered we display four specifications: the first (column 1) includes only predetermined individual control, the second (column 2) considers all individual controls and universities dummies, and the third (column 3) incorporates time-variant university char-

acteristics. Finally, in a fourth specification (column 4), which does not consider private colleges because of lack of data, also the amounts of public funding are controlled for.

The Effect on Employment and Unemployment

Table 6 and Table 7 depict the marginal effects of a linear probability model[19] for the probability of being employed and unemployed three years after graduation. Note that in the latter only those individuals that belong to the labor force (i.e. that are either working or looking for a job) have been considered.[20]

The coefficients of the predetermined controls confirm the findings of previous studies (e.g. Brunello and Cappellari (2005)). Female graduates are less likely to be employed and more likely to be unemployed, while the opposite is true for older individuals. The employment and the unemployment probabilities are also affected by the type of high school attended and the grade obtained. Family factors seem to matter too: both the education and occupation of the parents and the number of siblings have a significant effect on employment outcomes. We also observe a positive effect of average provincial per capita income of the province of origin and, more generally, the significance of many of the province of origin dummies seems to reflect the existence of unobserved heterogeneity across provinces and (or) the presence of mobility costs.

According to our third specification, university controls also matter. First, the university attended affect graduates employment status three years after graduation. Second, the degree obtained is also very important. However, the previous coefficients should be interpreted

[19]Results of a probit model give very similar results.

[20]This estimation might be subject to a potential sample selection bias, as long as the individuals' decision of not being in the labor force is influenced unobservables that have an effect on our dependent variables.

Table 6: **Determinants of Employment Probability.**

	1	**2**	**3**	**4**
*Alma**98	.003 (.014)	.008 (.015)	.014 (.016)	.024 (.017)
Alma	-.018 (.021)	.045 (.056)	.051 (.056)	.037 (.056)
98	.006 (.008)	-.007 (.010)	-.397 (.008)	-.687 (.670)
Female	-.098*** (.007)	-.061*** (.006)	-.061*** (.006)	-.064*** (.006)
Age	.004*** (.001)	.005*** (.001)	.005*** (.001)	.005*** (.001)
H. School Grade	.001** (.000)	.000 (.000)	.000 (.000)	-.000 (.000)
GDP before gr.	.003*** (.000)	.002*** (.001)	.002*** (.001)	.002*** (.001)
Dummy for H. School	-.080*** (.009)	-.029*** (.005)	-.029*** (.005)	-.030*** (.006)
Dummies for moth. edu.	Yes	Yes	Yes	Yes
Dummies for fath. edu.	Yes	Yes	Yes	Yes
Dummies for moth. occ.	Yes	Yes	Yes	Yes
Dummies for moth. occ.	Yes	Yes	Yes	Yes
Dummies for province	Yes	Yes	Yes	Yes
Dummies for siblings	Yes	Yes	Yes	Yes
Univ. Grade	No	.001 (.002)	.001 (.000)	.001 (.000)
Distinction	No	-.007 (.007)	-.008 (.008)	-.008 (.008)
Years of delay	No	.001 (.002)	.000 (.002)	.001 (.002)
GDP university	No	.040 (.025)	.040 (.025)	.039 (.026)
Dummies for degree	No	Yes	Yes	Yes
Dummies for univ.	No	Yes	Yes	Yes
Prof/Stud.	No	No	-.410 (.508)	.719 (.685)
Stud.	No	No	.000 (.000)	-.000 (.000)
Delayed Stud.	No	No	.000 (.000)	.000 (.000)
Fundings	No	No	No	-6.69 (10.8)
R-squared	0.078	0.183	0.183	0.180
Obs.	37,323	35,580	35,543	32,878

Notes: Results of four different specifications of a linear probability model are displayed. Column 1 includes only predetermined individual control, column 2 considers all individual controls, column 3 incorporates time variant universities characteristics, and column 4, which does not consider private colleges because of lack of data, includes public funding. Robust Standard Errors in parenthesis.

* significant at 10%; ** significant at 5%; *** significant at 1%.

Table 7: **Determinants of Unemployment Probability.**

	1	**2**	**3**	**4**
*Alma**98	-.016 (.013)	-.020* (.012)	-.023* (.013)	-.026** (.013)
Alma	.026 (.020)	-.015 (.038)	-.021 (.040)	-.026 (.041)
98	-.087*** (.007)	-.082*** (.007)	.028 (.417)	.475 (.517)
Female	.093*** (.006)	.063*** (.005)	.063*** (.005)	-.066*** (.006)
Age	-.003*** (.001)	-.004*** (.001)	-.004*** (.001)	.004*** (.001)
H. School Grade	-.003*** (.000)	-.001*** (.000)	-.001** (.000)	-.001* (.000)
Dummy for H. School	.028*** (.005)	.013*** (.005)	.013*** (.005)	.014*** (.005)
Ex-Ante GDP.	-.004*** (.001)	-.004*** (.001)	-.004*** (.001)	-.004*** (.001)
Dummies for moth. edu.	Yes	Yes	Yes	Yes
Dummies for fath. edu.	Yes	Yes	Yes	Yes
Dummies for moth. occ.	Yes	Yes	Yes	Yes
Dummies for moth. occ.	Yes	Yes	Yes	Yes
Dummies for province	Yes	Yes	Yes	Yes
Dummies for siblings	Yes	Yes	Yes	Yes
Univ. Grade	No	-.002*** (.000)	-.002*** (.000)	-.003*** (.000)
Distinction	No	.013* (.007)	.014* (.007)	.015** (.007)
Years of delay	No	.005*** (.002)	.005*** (.002)	.006*** (.002)
GDP university	No	-.033 (.028)	-.033 (.028)	-.032 (.029)
Dummies for degree	No	Yes	Yes	Yes
Dummies for univ.	No	Yes	Yes	Yes
Prof/Stud.	No	No	.117 (.433)	.567 (.528)
Stud.	No	No	.000 (.000)	-.000 (.000)
Delayed Stud.	No	No	.000 (.000)	.000 (.000)
Fundings	No	No	No	-6.54 (8.78)
R-squared	0.117	0.162	0.162	0.159
Obs.	33,242	31,554	31,522	29,066

Notes: Results of four different specifications of a linear probability model are displayed. Robust standard errors, adjusted for clustering by university-discipline-year, are in parentheses. Column 1 includes only predetermined individual control, column 2 considers all individual controls, column 3 incorporates time variant universities characteristics, and column 4, which does not consider private colleges because of lack of data, includes public funding. Robust Standard Errors in parenthesis.

* significant at 10%; ** significant at 5%; *** significant at 1%.

very cautiously, given their potential endogeneity. The effect of grades obtained in university is more mixed. Those individuals that performed better when they were students—higher grades, faster to finish—are less likely to be unemployed but do not have significantly different probabilities of being employed.[21]

As mentioned above, the identification of the *AlmaLaurea* effect is obtained comparing employability of graduates between 1998 and 2001 in those universities that have joined to Alma Laurea *vis-à-vis* the graduates of universities that have not. The large number of controls included assures that the variation is measured by comparing the situation of individuals that exhibit similar characteristics. Moreover, note that when provincial and university dummies are included, the comparison restricts to individuals that both originate from the same province and decide to study in the same university. *AlmaLaurea* increases the employment probability by near 1%, and decreases the unemployment probability by around 2%. While the effect on employment is not statistically significant different from zero, according to our results if a university affiliates to *AlmaLaurea* the probability that its graduates will be unemployed three years after graduation significantly decreases.

Additionally, in order to avoid an omitted variable bias, one wants to control for other changes that may have affected universities in the period considered (see columns 3 and 4). The inclusion of such controls—number of students, proportion of professors, students delayed, funding—does not affect the previous results, and is in itself only marginally significant.[22]

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[21] This make sense, given that better students may go on studying and therefore are not necessarily looking for a job.

[22] Note again that the estimated effects of changes in these characteristics might be endogenous and should be interpreted very cautiously.

Job Satisfaction

Lower search costs are expected to improve the quality of labor market matches. As stated above, we use five different proxies of quality. One of them is quantitative—i.e. montly earnings—while the rest concerns four different self-reported measures of job satisfaction.

Table 8 shows the coefficients of four OLS regressions, which have as dependent variable the logarithm of earnings. As above, in the first column it is depicted the effect of those individual characteristics that are predetermined with respect to university. In line with the literature, female graduates tend to earn relatively lower wages than male. Interestingly, father's education and occupation appear to be significantly correlated with wages, while no significant effect is observed for mother's education and occupation. Graduates that originate from richer provinces tend to earn higher wages. Given the heterogeneity in prices and living standards across provinces, in column 2 we have also included a control for the new province of residence, but the above results do not change significantly.

University performance also seems to affect labor market success (column 3). Those graduates that obtained higher grades are more likely to earn higher wages. Also the number of years that the individual employs to finish her degree matters: each additional year of delay in graduating reduces wages of a 1.5%. Finally, distinct universities and degrees are associated with significantly different wages. *AlmaLaurea* tends to increase graduates wages by between 1 and 2%, depending on the controls considered. This effect is not statistically significant from zero, though. The introduction in the regression of some controls for university quality (columns 4 and 5) does not affect the previous results.

In the last part of our investigation, we analyze the determinants of job satisfaction measured by an array of self-reported indicators. Both a linear and an ordered probit estimation have been performed. The results obtained in the two specifications are qualitatively similar and therefore we do not report the latter.

Table 8: **Determinants of Earnings.**

	1	**2**	**3**	**4**
*Alma**98	.014 (.025)	.014 (.016)	.020 (.016)	.021 (.017)
Alma	-.060** (.024)	.033 (.059)	.034 (.060)	.019 (.061)
98	.178***(.016)	-.191***(.009)	-.575 (.450)	-.359 (.653)
Female	-.141***(.006)	-.101***(.007)	-.101***(.007)	-.100***(.007)
Age	.010***(.001)	.016***(.001)	.016***(.001)	.016***(.001)
H. School Grade	.006** (.000)	.002***(.000)	.002***(.000)	.002***(.000)
Dummy for H. School	.004 (.006)	-.008 (.006)	-.008 (.006)	-.007 (.006)
GDP now	No	.001 (.001)	.001 (.001)	.001 (.001)
Ex-Ante GDP	.003** (.001)	.003***(.001)	.003***(.001)	.003***(.000)
Dummies for moth. edu.	Yes	Yes	Yes	Yes
Dummies for fath. edu.	Yes	Yes	Yes	Yes
Dummies for moth. occ.	Yes	Yes	Yes	Yes
Dummies for moth. occ.	Yes	Yes	Yes	Yes
Dummies for pr. orig.	Yes	Yes	Yes	Yes
Dummies for siblings	Yes	Yes	Yes	Yes
Dummies for part-time	Yes	Yes	Yes	Yes
Univ. Grade	No	.004***(.001)	.004***(.001)	.004***(.001)
Distinction	No	.006 (.009)	-.005 (.009)	.004 (.010)
Years of delay	No	-.015***(.002)	-.015***(.002)	-.013***(.002)
GDP university	No	-.022 (.033)	.022 (.033)	-.009 (.034)
Dummies for degree	No	Yes	Yes	Yes
Dummies for univ.	No	Yes	Yes	Yes
Dummies for pr. work	No	Yes	Yes	Yes
Prof/Stud.	No	No	-.802* (.508)	-.600 (.669)
Stud.	No	No	.000 (.000)	-.000 (.000)
Delayed Stud.	No	No	.000* (.000)	-.000 (.000)
Fundings	No	No	No	-12.3* (10.8)
R-squared	0.360	0.426	0.426	0.427
Obs.	23,609	22,423	22,406	20,496

Notes: Results of four different specifications of a linear probability model are displayed. Column 1 includes only predetermined individual control, column 2 considers all individual controls, column 3 incorporates time variant universities characteristics, and column 4, which does not consider private colleges because of lack of data, includes public funding. Robust Standard Errors in parenthesis.

* significant at 10%; ** significant at 5%; *** significant at 1%.

The coefficients depicted in Tables 9, 10, and 11 are quite consistent with the above findings concerning the determinants of unemployment and wages. Female graduates tend to be less satisfied in all three measures. On the other hand, those graduates that had a better performance at high school are more satisfied of their job in the three dimensions considered. Family controls matter except when the perceived adequacy of the knowledge acquired at university for the actual job requirements is at stake. The effect of the GDP in the province of origin is mixed: richer provinces are associated with higher satisfaction in terms of earnings and stability, but there is no correlation with professional perspectives and it is negatively correlated with the knowledge acquired in university adequacy.

The effect of age is ambiguous. Even when we control for university performance and other personal characteristics, older graduates are less satisfied with respect to wage and the professional potential of their job, but are more pleased with respect to job stability and security. Not surprisingly, those graduates that obtained better grades in university and took less time to finish report to be more satisfied both with professional possibilities, wages, job stability and knowledge adequacy.

Most importantly, *AlmaLaurea* appears to have a big impact on job satisfaction. Comparing those individuals that graduated in 1995 with those that graduated in 1998, we observe that job satisfaction has increased relatively more among the graduates from a university that joined *AlmaLaurea*. The effect is significantly different from zero in two of the three specifications. Moreover, results are only slightly different when we control for time-variant university characteristics (columns 3 and 4).

Table 9: **Determinants of Wage Satisfaction.**

	1	**2**	**3**	**4**
*Alma**98	-.056 (.045)	-.071* (.039)	-.088** (.042)	-.101** (.044)
Alma	.128***(.047)	.344** (.174)	.346** (.176)	.351** (.178)
98	-.570***(.026)	-.577***(.021)	.782 (.985)	.203 (1.73)
Female	.157***(.015)	.118***(.018)	.119***(.018)	-.110***(.019)
Age	.022***(.002)	.011***(.003)	-.011***(.003)	-.010***(.003)
Dummy for H. School	-.010 (.016)	-.012 (.016)	-.013 (.016)	-.013 (.017)
H. School Grade	-.008***(.001)	-.004***(.001)	-.003***(.001)	-.004***(.001)
Ex-Ante GDP	-.005** (.002)	-.004***(.002)	-.004***(.002)	-.004** (.002)
Dummies for moth. edu.	Yes	Yes	Yes	Yes
Dummies for fath. edu.	Yes	Yes	Yes	Yes
Dummies for moth. occ.	Yes	Yes	Yes	Yes
Dummies for moth. occ.	Yes	Yes	Yes	Yes
Dummies for pr. orig.	Yes	Yes	Yes	Yes
Dummies for siblings	Yes	Yes	Yes	Yes
Dummies for part-time	Yes	Yes	Yes	Yes
Univ. Grade	No	-.003** (.002)	-.003** (.002)	-.003** (.002)
Years of delay	No	.028***(.006)	.028***(.006)	.029***(.006)
Distinction	No	-.024 (.025)	-.023 (.026)	-.014 (.025)
GDP university	No	-.057 (.082)	-.057 (.082)	-.068 (.087)
Dummies for degree	No	Yes	Yes	Yes
Dummies for univ.	No	Yes	Yes	Yes
Dummies for pr. work	No	Yes	Yes	Yes
Prof/Stud.	No	No	1.41 (1.02)	.816 (1.77)
Stud.	No	No	3.97 (4.41)	6.84 (5.31)
Delayed Stud.	No	No	-1.51 (9.62)	-7.13 (11.7)
Fundings	No	No	No	9.89 (27.1)
R-squared	0.044	0.052	0.052	0.051
Obs.	26,752	25,573	25,556	23,384
Cut 1	-1.34	-3.62	-2.03	-3.02
Cut 2	.279	-1.97	-.384	-1.38
Cut 3	1.30	-.949	.641	-.346

Notes: Results of four different specifications of an ordered probit are displayed. Column 1 includes only predetermined individual control, column 2 considers all individual controls, column 3 incorporates time variant universities characteristics, and column 4, which does not consider private colleges because of lack of data, includes public funding. Robust Standard Errors in parenthesis.

* significant at 10%; ** significant at 5%; *** significant at 1%.

Table 10: **Determinants of Knowledge Adequacy Satisfaction.**

	1	**2**	**3**	**4**
*Alma**98	-.081* (.049)	-.074** (.035)	-.065* (.037)	-0.67 (.017)
Alma	.026 (.046)	.048 (.194)	.027 (.192)	.046 (.061)
98	-.058** (.028)	-.071***(.023)	-2.07* (1.24)	-3.36 (.653)
Female	.113***(.015)	.085***(.016)	.085***(.016)	-.075***(.007)
Age	.009***(.002)	-.003 (.003)	-.003 (.003)	-.002***(.001)
Dummy for H. School	-.051***(.016)	-.035** (.018)	-.035** (.018)	-.037 (.006)
H. School Grade	-.008***(.001)	-.003***(.001)	-.003***(.001)	.002***(.000)
Ex-Ante GDP	.006** (.002)	.005***(.006)	.005***(.002)	.006***(.000)
Dummies for moth. edu.	Yes	Yes	Yes	Yes
Dummies for fath. edu.	Yes	Yes	Yes	Yes
Dummies for moth. occ.	Yes	Yes	Yes	Yes
Dummies for moth. occ.	Yes	Yes	Yes	Yes
Dummies for pr. orig.	Yes	Yes	Yes	Yes
Dummies for siblings	Yes	Yes	Yes	Yes
Dummies for part-time	Yes	Yes	Yes	Yes
Univ. Grade	No	-.009***(.002)	-.009***(.001)	-.004***(.001)
Years of delay	No	.042***(.001)	.042***(.005)	.040***(.005)
Distinction	No	-.003***(.025)	-.004 (.025)	-.000 (.010)
GDP university	No	-.031 (.087)	-.030 (.087)	-.037 (.092)
Dummies for degree	No	Yes	Yes	Yes
Dummies for univ.	No	Yes	Yes	Yes
Dummies for pr. work	No	Yes	Yes	Yes
Prof/Stud.	No	No	-2.08 (.129)	-3.39** (1.70)
Stud.	No	No	-1.57 (4.67)	.383 (5.47)
Delayed Stud.	No	No	22.0 (13.8)	-28.3** (14.4)
Fundings	No	No	No	19.6 (10.8)
R-squared	0.008	0.021	0.021	0.019
Obs.	26,835	25,656	25,639	23,464
Cut 1	-.573	-2.89	-5.00	-6.35
Cut 2	.507	-1.78	-3.90	-5.25
Cut 3	1.368	-.899	-3.02	-4.36

Notes: Results of four different specifications of an ordered probit are displayed. Column 1 includes only predetermined individual control, column 2 considers all individual controls, column 3 incorporates time variant universities characteristics, and column 4, which does not consider private colleges because of lack of data, includes public funding. Robust Standard Errors in parenthesis.

* significant at 10%; ** significant at 5%; *** significant at 1%.

Table 11: **Determinants of Stability & Security Satisfaction.**

	1	**2**	**3**	**4**
*Alma**98	-.053 (.067)	-.065 (.042)	-.089** (.044)	-.079** (.044)
Alma	.127* (.065)	.280***(.107)	.254** (.110)	.232** (.110)
98	-.375***(.037)	-.385***(.022)	1.27 (1.28)	-.281 (1.28)
Female	.174***(.016)	.088***(.017)	.088***(.017)	.095***(.017)
Age	-.002 (.003)	-.022***(.003)	-.022***(.003)	-.022***(.003)
Dummy for H. School	.026 (.019)	.020 (.018)	.019 (.018)	.018 (.017)
H. School Grade	-.014***(.001)	-.007***(.001)	-.007***(.001)	-.007***(.001)
Ex-Ante GDP	-.002 (.003)	-.002 (.002)	-.002 (.002)	-.003 (.002)
Dummies for moth. edu.	Yes	Yes	Yes	Yes
Dummies for fath. edu.	Yes	Yes	Yes	Yes
Dummies for moth. occ.	Yes	Yes	Yes	Yes
Dummies for moth. occ.	Yes	Yes	Yes	Yes
Dummies for pr. orig.	Yes	Yes	Yes	Yes
Dummies for siblings	Yes	Yes	Yes	Yes
Dummies for part-time	Yes	Yes	Yes	Yes
Univ. Grade	No	-.006***(.002)	-.006***(.002)	-.006***(.002)
Years of delay	No	.051***(.006)	.052***(.006)	.052***(.006)
Distinction	No	.009 (.025)	.011 (.025)	.018 (.025)
GDP university	No	-.085 (.102)	-.086 (.084)	-.108 (.087)
Dummies for degree	No	Yes	Yes	Yes
Dummies for univ.	No	Yes	Yes	Yes
Dummies for pr. work	No	Yes	Yes	Yes
Prof/Stud.	No	No	1.74 (1.34)	.110 (1.34)
Stud.	No	No	8.19 (5.51)	6.77 (5.51)
Delayed Stud.	No	No	11.9 (13.2)	5.58 (13.2)
Fundings	No	No	No	-5.99 (27.1)
R-squared	0.031	0.056	0.056	0.056
Obs.	26,758	25,579	25,562	23,393
Cut 1	-1.27	-5.33	-3.30	-5.91
Cut 2	.279	-4.19	-2.16	-4.77
Cut 3	1.30	-3.41	-1.38	-3.99

Notes: Results of four different specifications of an ordered probit model are displayed. Column 1 includes only predetermined individual control, column 2 considers all individual controls, column 3 incorporates time variant universities characteristics, and column 4, which does not consider private colleges because of lack of data, includes public funding. Robust Standard Errors in parenthesis.

* significant at 10%; ** significant at 5%; *** significant at 1%.

6. Conclusions

The main contribution of this article is to document that the adoption of *AlmaLaurea* by Italian universities has improved labor market outcomes of their graduates three years after graduation. We perform a "difference-in-differences" estimation exploiting a pooled cross section data set.

Given that enrolment in *AlmaLaurea* is not random, evaluating its impact is not trivial. However, the assumptions of the so called the fixed-effects model make our estimation valid. The time variant indicators of university quality do not raise major concern on the most important assumption of our approach: within university changes in graduates unobservable quality over time are supposed to be independent with the adoption of *AlmaLaurea*, given observable individual and college characteristics.

If our assumptions are correct, we find that *AlmaLaurea* decreases the unemployment probability by around 2% and significantly increases distinct self-reported measures of job satisfactions. Results concerning employment and wages go in the same direction, but are statistically less robust.

Our work is intended to make two main contributions. First, we find that an on-line labor market intermediation has a positive effect on labor market functioning. Recently some skepticism concerning the effectiveness of electronic labor market has arisen and several authors have underlined the possibility of adverse selection in the use of electronic intermediaries. We argue that *AlmaLaurea* organizational features, and in particular high graduates participation rates, prevent it from such form of market failure.

Second, we contribute to the policy discussion that concerns university-to-work transition. Italian case is interesting for a number of reasons, and its poor performance have always been ascribed to over-education and mismatch. We show that graduates labor market

functioning can be improved independently of individual enrolment choices.

In future research we aim at exploring the pros and cons of similar labor market intermediaries, trying to single out with more precision the key features that make *AlmaLaurea* a successful case.

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