

# Labour returns to the attendance of new universities: evidence from Italy\*

Paolo Ghinetti<sup>†</sup> and Simone Moriconi<sup>‡</sup>

**February 2010; preliminary and incomplete, do not quote**

## Abstract

In this paper we use a representative sample drawn from the ‘Indagine Statistica sull’ Inse-  
rimento Professionale dei Laureati’ by the Italian National Statistical Institute and data by the  
Italian Ministry of Education to look at the labour market returns from attendance to a new  
university three years after graduation. Our results show that, after accounting for a number  
of observed characteristics of individuals and colleges, a degree in a new university is associ-  
ated with higher labour market returns: graduating in a regional university entails a higher  
wages and higher expected earnings while does not have any significant impact on employment  
probabilities three years after graduation; our results also show that labour market gains are  
concentrated on individuals with high family background, in terms of parental education.

## 1 Introduction

It is largely acknowledged that competitive forces in the tertiary education sector trigger a ‘race  
to the top’ in terms of education quality which increases the earning prospects of graduates in  
private colleges relative to those in public ones. The lack of competition has often been advocated

---

\*This work benefits of the financial support from Regione Piemonte within the ‘Alfieri project’. We acknowledge  
Carmen Aina, Eliana Baici, Massimiliano Bratti, Giorgia Casalone, Daniela Sonedda, Mauro Sylos-Labini, Corrado  
Andini and Giorgio Brunello for suggestions and discussions. All the remaining errors are our own.

<sup>†</sup>SEMeQ, Università del Piemonte Orientale. Email: paolo.ghinetti@eco.unipmn.it

<sup>‡</sup>SEMeQ, Università del Piemonte Orientale and Center for Economic Performance, London School of Economics  
and Political Sciences. Email: simone.moriconi@eco.unipmn.it

instead to explain the absence of big quality differences attached to factors such as university age and prestige, particularly in the public sector (Brewer et al. [9], Brunello and Cappellari [10]). Many policy observers however claim that this conclusion will be probably reversed in the medium run due to the effects of the reforms of university governance in several European countries. The latter in fact, is being re-organized according to managed competition models that encourage university attendance while the State finances, regulates and monitors the quality of education. As a result, higher education systems in the EU are taking the form of ‘quasi-markets’, characterized by high competition and product differentiation in terms of organisational arrangements, number and quality of teachers, services to students, characteristics of the curricula and relationships with the entrepreneurial environment (Agasisti and Catalano [1]; Eurydice [17]). Reform paths are broadly similar across EU countries; in the UK, ‘new’ universities appeared in 1992 when the old, vocationally oriented polytechnics were granted degree awarding power (Chevalier and Conlon [12]). In Sweden and Italy, new universities were established in the more peripheral areas of the country in the 1980s and 1990s to encourage university access by the more immobile individuals. In Italy some universities were also located in metropolitan cities to relieve congestion in the traditional metropolitan universities (Persson and Regnér [24], Bratti et al. [7]). New universities may improve access to tertiary education to individuals located in peripheral areas, attract students by offering them more favourable studying conditions, a shorter time to degree, closer relationship with the entrepreneurial environment and lower tuition fees, depending on the degree of financial autonomy.<sup>1</sup>

This paper uses the 2004 wave of survey on the transition from college to work (Indagine Statistica sull’Inserimento Professionale dei Laureati) carried by the Italian National Statistical Institute (ISTAT) to investigate the impact of graduating in a new university on employment probabilities, earnings and expected earnings of students three years after the completion of their studies. We build on the idea that, for the reasons explained before, studying in a new university provides a distinct quality dimension which create labour market ‘rents’ for their graduates. We define ‘new’ the universities which were founded or simply granted autonomy during the eighties

---

<sup>1</sup>in the EU, while private universities can set their tuition fees autonomously, for public institutions there is some limited autonomy only in Italy and the UK where governments set annually a maximum threshold of the overall tuition fee. In France, Germany and Spain student taxes are regulated by the government either at the central or regional level (Agasisti and Catalano [1]).

and the nineties as a consequence of the Italian laws no. 910/69 and 662/96 with the explicit purpose to increase the opportunity of access to tertiary education in non-metropolitan areas and reduce the problems of congestion of existing universities in the metropolitan cities.

We use the two-stages estimation procedure adopted by Brunello and Cappellari [10] that, due to the rich set of controls included in the first step regression, produces aggregated measures of economic outcomes that do not reflect individual level heterogeneity. As it is generally the case with papers on education quality and labour market outcomes, this approach assumes selection on observables i.e. that the influence of unobserved factors such as motivation, ambition etc. on both the choice of the college and labour market outcome are fully captured by observed variables such as career achievements or parental background.

Our results make sharp contrast with those from the existing literature as we show that after accounting for a number of observed characteristics of students and colleges, a degree in a new university is associated with higher wages and expected earnings three years after graduation while does not have any significant impact on the actual probability of employment. Existing studies carried in the UK, USA and Sweden conversely find, if anything, a wage gap of graduates in a modern university, relative to those in an elite-prestigious, or simply old institution (Chevalier and Conlon [12], Brewer et al. [9] Persson and Regnér [24]). Our results also point to a substantial difference of returns by family background, as the premium in (expected) earnings is substantially concentrated on individuals with high parental education levels. This result is in line with findings from other studies which find a non-linear distribution of returns to education quality with a strong concentration at the top of the wage distribution (Black and Smith [6]; Hussain et al. [22]).

The paper is organized as follows: in the next section we review the existing literature on education and employment outcomes; in section 3 we introduce our data and present some descriptive statistics; in section 4 we present our empirical analysis; section 5 concludes.

## 2 Existing Literature

Our paper is related to the strands of the literature which investigate the economic returns (particularly in the labour market) to various quality dimensions of tertiary education. Using data for the US, Brewer et al. [9] studies the wage impact of college quality as captured by different types

of institutions and its variation over time and across different cohorts. They find a large labour market premium to attending an elite private university and a smaller premium to attending a middle-rated private one relative to bottom rated public colleges. They do not find any significant impact of age or prestige within the group of public universities; Black and Smith [5] address the common support problem which is typical of an OLS estimator by means of a propensity score matching method and concludes that OLS tends to underestimate the true returns from college quality; Black and Smith [6] simultaneously consider average SAT scores, expenditure per student, faculty-student ratio, rejection rate and mean faculty salaries by using four different econometric approaches. Their results confirm the existence of a multiple dimension of college quality and the superiority of a generalized method of moments (GMM) estimator, relative to factor analysis, instrumental variables, the Lubotsky and Wittemberg's methods.

Using data for the UK, Hussain et al. [22] investigates the links between the same measures of university quality as in Black and Smith [6] and graduate earnings; they find a positive impact of university quality on graduates earnings with the returns being concentrated on the top of the wage distribution; Chevalier and Conlon [12] look at different returns to prestigious, old and modern universities and finds that a clear wage premium is only attached to attendance of a prestigious university relative to a modern one.

In the case of Sweden, Anderson, Quigley, and Wilhelmsson [2] and Persson and Regnér [24] analyse the economic effects of the spatial decentralisation of post-secondary education on productivity and output in Sweden. Persson and Regnér [24] use four different outcome measures for economic performance (survival rate of firms, employment growth at the establishment level, employment growth of high tech industries, growth of the share of highly educated) but do not find any significant effect of new colleges/universities on economic performance. The analysis of Anderson, Quigley and Wilhelmsson [2] differs from the one from Persson and Regnér [24] in that they identify a 10 years lag (1977-1987) for the education reform to be effectively implemented. They estimate separate models for the impact of students and researchers in new vs. old universities on regional productivity using different specifications with and without time, county, and community fixed effects and find significant effects of education reforms on regional economic performance.

For Italy, Brunello and Cappellari [10] use a representative sample from ISTAT Microdata to

check whether university education matters for earnings and employment three years after graduation. They find that the attended college matters and that substantial college related differences exist between regions. They also show that going to a private university increases returns (in terms of earnings and employment probability) during the first part of the career. Bagues and Sylos-Labini [4] assess the impact of electronic labour markets (Alma Laurea) on university to work transition in Italy. By using a difference-in-difference estimator on a repeated cross-section, they find that Alma Laurea reduces the individual unemployment probability and improves matching quality. Bratti et al. [7] study the effect of the expansion of higher education supply on the equality of tertiary education opportunities in Italy during the nineties. They do not find significant positive effects on equality in access to higher education. This is mainly due to the fact that increased availability of courses has a positive effect on university enrollement but not on the probability of getting a degree. Theodora [26], finally, carries a descriptive analysis on the effects of decentralisation on economic performance in Greece and concludes that the gradual reform of the education system started in the late 60's did not contribute significantly to regional development in Greece.

### **3 Empirical Analysis**

#### **3.1 Data and descriptive statistics**

We use a representative sample drawn from the survey on the transition from college to work (Indagine Statistica sull'Inserimento Professionale dei Laureati) carried by the Italian National Statistical Institute (ISTAT). We use the last wave of the survey which includes people who graduated in 2001 and were interviewed in 2004; we have information on age, gender, education, (type of high school, high school grade and their interactions, faculty, university graduating marks, dummies for graduation after legal duration of studies), work characteristics (part-time job, type of contract, occupation, sector, region of work) and parental background (siblings, interacted parental education and occupation). We also use data on students and teachers by college and faculty drawn by the Italian ministry of Education, University and Research (MIUR).

Our focus is on the early labour market effects of graduating from a new university versus an old (metropolitan) one, in terms of both employment probability three years after graduation and

monthly wages, as well as expected earnings (the product of the former two). Employment, in the survey refers to all paid jobs, including training programs and seasonal ones. For our purposes, individuals in the latter scheme are classified as not employed. Since we are interested in the effects of university types on the probability of finding a paid job, we also excluded from the estimating sample all the youths who are in paid training, which includes some post graduate education (with the exclusion of apprentices, who are classified as workers), and those who declare that the main reason why they are not working because is that they are still studying (and therefore out of the labour force). About monthly wages, they are net of taxes and social security contributions. The survey provides them topcoded at 3000 euros. According to our selection criteria, the final sample from the ISTAT survey is made of about 13,700 individuals. The 77% (about 10600 individuals) is working at the time of the interview.

Our main regressor is the dummy *NEW* which takes value one if the college founded after the 1969 reform of the university system and, more recently the law no. 662/96 (see Bratti et al. [7]). These are universities founded or that became autonomous after the end of the '70s. This dummy is meant to capture any difference in college quality, organizational skills, reputation or any other supply factor between new/old universities. To improve comparability along the different dimensions of our analysis, we exclude from our sample private universities and students of the faculty Physical education (which offered only short term university degrees and for which no new college was opened).<sup>2</sup> Since in Italy the supply of higher education is particularly fragmented and there are several - both new and old - universities located in periphial areas, we also construct the dummy *REGIO*, which takes value one if the individual is graduated in one of the 34 'regional' colleges located in an area classified as a non-metropolitan one (compare the Italian law 142/90 and D. lgs 267/2000)<sup>3</sup>.

Table 1 reports the resulting classification of the Italian colleges in our final sample. We have a first group of 39 traditional colleges (old) founded at latest during the 1950s and divided

---

<sup>2</sup>the included fields of study are: scientific, medicine, chemistry, geo-biology, architecture, engeneering, griculture, economics-statistics, law, political science, humanities, psychology, foreign languages, teachers college.

<sup>3</sup>In Italy there are 14 metropolitan areas identified by the Italian law. There are Torino, Genova, Milano, Venezia, Bologna, Firenze, Roma, Bari, Napoli, Trieste, Cagliari, Catania, Messina and Palermo (Law no. 142/90 and D. lgs 267/2000)

into 19 metropolitan and 20 regional ones. The second group includes the 19 new universities which were established during the 1980s or 1990s with the objective of relieving the education burden of central universities in metropolitan areas or established during the 1980s or 1990s to increase access to higher education in relatively peripheral areas in Italian regions. Table 2 shows average pay and employment probability by college types. On average, graduates from traditional universities earn 1338 euros per-month i.e. 20 monthly euros more than graduates in new ones. Old institutions guarantee a probability of holding a paid job three years after graduation of the 78% i.e. 5 percentage points higher than graduates in new universities. Obviously, these values are influenced by individual attributes; new universities attract a significantly lower share of ‘good’ students i.e. students with a ‘liceo’ diploma or a high final graduation grade, relative to old ones; the distribution is more homogeneous in terms of grade at the secondary school and parental background (having at least one parent with a university degree or both with a high secondary school degree).

Table 3 reports averages and standard deviations of some quality indicators by college type that we reconstructed from the extensive quantitative information about students and teachers which the Ministry of Education makes available for each university; they are aggregated at the Area of study level, which includes five categories (Humanities, Law, Scientific, Social Sciences, Medicine, Engineering and Architecture) instead of the fourteen fields of study. These are the average number of students in the area, and indicators which capture the quality of the supply of tertiary education and of college attractiveness such as the students-teachers ratio, the graduated-enrolled student ratio and the share of external (i.e. not faculty) teachers. New universities differ from traditional ones in several dimensions; they present a lower average number of students within areas of study, higher students-to-teachers ratios, a higher share of external teachers and a lower graduated-to-enrolled ratio. The former may suggest that these may better tailor the supply of tertiary education to students while the latter may signal relatively less skilled teachers or lack of organizational skills. Finally, the lower graduated-to-enrolled ratio of regional universities may indicate a ‘lower productivity’ in terms of number of graduated for traditional universities. However the lower ratio may also hide a quality-quantity trade off of graduated or simply increasing enrollements rates in the face of a stable number of graduated. Moreover, a lower share for very

new colleges may also simply reflect the fact that only a smaller part of the first cohort of students enrolled in that university has reached the end of the legal length of studies. Overall, the above considerations suggest that part of the heterogeneous labour market outcomes by college type could be due to observable differences in the way students select in the two college types as well as the way education is produced; it is very important to account for these aspects in the empirical analysis.

### 3.2 Empirical Strategy

We use the two-stages estimation procedure adopted by Brunello and Cappellari [10]. In the first stage we express (log) wages of individual  $i$  as a function of the attended college-faculty cluster ( $q^{cf}$ ) and of a vector of observable attributes ( $\mathbf{X}_i$ ) i.e.:

$$y_i = \sum_c \sum_f q_i^{cf} \alpha^{cf} + \mathbf{X}_i' \beta + \epsilon_{it} \quad (1)$$

where  $y_i$  is either the log of monthly earnings or the latent propensity to be employed. In the first case we use linear regression, in the second one we assume  $\epsilon_{it}$  normally distributed and estimates are based on probit regressions.  $\mathbf{X}_i$  includes more than 100 controls for family and schooling track characteristics i.e. age, gender, type of high school, high school grade and their interactions, faculty, university graduating marks, dummies for graduation after legal duration of studies, and parental background indicators such as siblings, and a complete and extended list of indicators for the education of the two parents and their occupation. Parental background and school performance before college capture unmeasured individual ability and selection effects. We also allow some of the regressors related to personal attributes to enter the model non-linearly by including on both the interactions between parental education and occupations, and marks and school types<sup>4</sup>. In the specification with earnings, we also add work characteristics such as having a part-time job, type of contract, occupation, sector, region of work and whether such region is different from that of where the college is located. In the participation equation the latter two has been replaced with the region of residence and a dummy for such region being different from that of the attended

---

<sup>4</sup>Finally, to ease the interpretation of second step results, in the first step we do not use observations from clusters in which there are only persons either employed or not employed. We verify that this imposes a very small cost in the first step in terms of coefficients estimates, but has the key advantage that second step results of both wage and employment are obtained from the same set of clusters.

college. As Brunello and Cappellari [10] notice, allowing for non linear combination of personal attributes attenuates the risks of misspecifying the functional form and endogeneity issues related with employment participation and wages. The inclusion of the 19 regional dummies is intended to capture local labor and product market effects. While such effects are also important for the decision whether to work or not, of course we cannot observe the region of work for who is without job. The presence of the regional effects implies that the identification of the college by field of study fixed effect relies on the existence of a sufficient number of "movers", i.e. individuals who studied in a region and work in another one<sup>5</sup>. This would be the unique source of variation if there was only one college with one field of study in each region. When there is enough college variation within each region (more than one university and/or more than one field of study in each college), also the stayers contribute to the identification of college dummies. The underlying assumption to identify these coefficients is then that the relevant local labour market is the regional one, i.e. that there is not substantial variation in economic conditions within regions. Otherwise, the university fixed effects may reflect differences in college quality but in local (intra-regional) labour market returns. This would happen especially when the region of study and of work coincides, i.e. for stayers. If the propensity to move correlates with the college type, we may expect the graduates from regional universities being perhaps intrinsically less likely to move for both study and work reasons. We manage to attenuate the bias by controlling in the first step for working in the same region where the university is located and for working in a different region than that of residence.

Regression (1) is the first step in our procedure and allows us to predict logmonthly earnings and employment likelihood for 334 college/faculty clusters. In the second step we analyze the determinants of such clusters, i.e. we aggregate the data at the college by faculty level and exploit the ensuing variation to estimate the wage impact of our dimension of interest of college quality (Card and Krueger [14]). As noticed by Brunello and Cappellari [10] the main advantage from this approach is that, due to the rich set of controls included in the first step regression, aggregated measures of economic outcomes average out individual-level unobserved heterogeneity within clusters.

let  $\hat{\alpha}_{cf}$  be the prediction of average earnings, employment probability or the expected wages

---

<sup>5</sup>In our case, they amount to more than 45% of the sample

defined as the product between earnings and employment probability i.e.  $E(w_{cf}) = \pi_c * w_{cf}$  where  $\pi$  and  $w$  are the average employment probability and wages, within each college by faculty cluster<sup>6</sup>. In the second step of our procedure, we specify a model in which each college-faculty cluster is expressed as a function of attendance to a newly established one, i.e.:

$$\hat{\alpha}_{cf} = \phi NEW_c + \mathbf{F}'_f \gamma + \mathbf{Z}'_{cf} \delta + \epsilon_{cf}, \quad (2)$$

where  $\mathbf{F}_f$  is a set of faculty dummies,  $\mathbf{Z}_{cf}$  is a vector of college characteristics including a dummy for being located in a non metropolitan area (*REGIO*) and other college quality measures.

In the equation (2) the coefficient for *NEW* capture the change in outcome associated to graduating from a new university. Estimates of (2) are based on Weighted Least Squares to account for the fact that our dependent variable is a first step estimate, and the weight are proportional to the inverse of the standard deviation of  $\hat{\alpha}_{cf}$ . Thus, a positive and significant coefficient of *NEW* would suggest that, a graduate in a new university enjoys some rent in terms of higher wage, employment probability or expected wage with respect to a graduate in an old university. Such a rent may be induced, for example, by teaching quality, more modern education systems, evaluation criteria and closer relationships between students and teachers as well as local externalities and network effects with the economic environment which are not captured by the college quality indicators we included in  $\mathbf{Z}_{cf}$ .

We finally want to check whether such rents are evenly distributed across individuals. We may think that returns from the quality of teaching are similar for all students while rents from network activities may be substitutes for the lack of good labour market opportunities, and therefore be higher for disadvantaged students. Conversely education quality and network effects may be complementary to parental education and family networks, so that returns are higher for students with a good background. We further investigate this point by splitting individuals in the the first stage sample into 'high' and 'low' background, depending on the degree of parental education and running the first stage regression (1) separately for the two groups; we thus obtain two set of college by faculty effects which are to be used to fit separate second stage models for the two groups. A comparison of the coefficient of *NEW* in the two models reveals whether the RENT associated

---

<sup>6</sup>In the case of the employment equation, we turn the college by faculty coefficient into the associated probabilities by using the standard normal distribution evaluated at the mean of observable characteristics.

to the attendance of a new university is enjoyed by a specific (parental) skill group or it is evenly distributed across individuals with different (parental) skill levels.

### 3.3 Results

Results from the first stage estimates are in line with the existing evidence (A summary is in the Appendix); females are paid less than males; the time needed to get the degree matters, and graduating later than expected has a negative wage payoff. Since the information on college quality indicators is missing for some clusters, the final sample for the second stage is made by 345 university-by-field-of-study fixed effects. Table 4 for each group of universities compares the effective average log wages and employment probabilities to the coefficients of the college by faculty clusters in the first stage regression i.e. the estimated average effects which are only motivated by college and faculty characteristics. While being purely descriptive, these estimates suggest that, once we control for students characteristics, old colleges pay higher wages than new ones. However, the differential almost disappears when we look at the estimated  $\hat{\alpha}_{cf}$  and it is not significant, meaning that for the most part it is due to the quality of enrolled students and not to the quality of the institution. About employment probabilities, the differential of the estimated ones is again smaller than that computed on raw data. The difference is rather small but in general the net employment prospects of new institutions are lower than that of old ones.

Table 5 presents three sets of 2nd stage estimates for equation (2) on wages, employment probabilities and expected wages, respectively. For each set of estimates specification (a) includes only the *NEW* dummy and the 14 dummies for the field of study while specification (b) also includes a number of education quality, university attractiveness and reputation indicators such as: being a regional university, number of students, and the students to teachers ratio.<sup>7</sup> Results for the specification (a) in Table 5 show that graduation in a new university is associated to a wage which is 6 percent higher than in old universities. In terms of expected wages, the premium is as high

---

<sup>7</sup>Because of the small sample available for the second stage estimation and the fact that these indicator have a level of aggregation higher than the fixed effects, a preliminary analysis suggested that including in the empirical model all the indicators presented in Table 3 produces very imprecise estimates. We then choose to include in the model only the number of students and the students to teachers ratio. To ease the interpretation of coefficients, in the estimates the former is divided by 1,000.

as 10 percent. Interestingly, there are no effects on the employment probability, meaning that the type of college matters little for finding a job, but it is then important for the wage earned in that job. If we compare results in 4 with 5, we can argue that, on average, new universities offer a menu of curricula characterised by lower returns, and that, if we remove this asymmetry, the returns are for them higher.

Turning to specification (b), the higher R squared suggests that the presence of additional controls for college quality significantly increases the portion of explained variance of the dependent variables. However, the addition of the quality controls does not significantly change the returns to new universities. Quality controls only increase the positive impact of *NEW* on wages and expected earnings by a small amount. Moreover, they are not significant in the equation for employment probability, which is not affected by our variables except the faculty dummies. In other words, the job finding activity needed to be explained by additional factors. Turning to controls, graduation in a regional university is associated with 5 percent higher wages; as expected, an increase of 10 point in the share of students over teachers (say, from 20 to 30 students per teacher) would decrease the wage by 1.5 percent. Similarly to Brunello and Cappellari [10], the number of students in the field exerts a positive effect on actual and expected wages, capturing mostly reputation and attractiveness effects by universities which offer a good education, but the magnitude is small: an increase of 5 thousands students is associated with a 3 percent increase in wages.

Overall these results suggest that, relative to old ones, new universities present quality and reputation effects which may be motivated, for example, by teaching quality, more modern education systems, evaluation criteria and closer relationships between students and teachers as well as local externalities and network effects with the economic environment. As explained before, such rents may be unevenly distributed across different groups of individuals. In the light of the democratisation process of higher education which motivated the opening of new universities, it is then very important identifying who receive the associated benefits. In Table 6 we report the second stage estimates for the groups of students with low and high (parental) skill. Results show that going to a new university favours especially students with a high background, both in terms of wages and employment probabilities. In terms of expected wages, the gain is about 28 percent. Conversely,

the attendance of a new university does not affect actual and perspective wages but is associated with lower employment probabilities for students with low background. We interpret this result as an evidence of complementarity between family skills and the underlying qualitative attributes of modern universities. Moreover, there are asymmetries in the mean effect of the included quality indicators. While the number of students - a proxy of the attractiveness and reputation of the faculty - matter more for good background students, a lower students to teacher ratio - which measure more the intrinsic quality of teaching - favour especially students with a poor background.

## 4 Concluding Remarks

In the last 30 years, the tendency to increase the supply of undergraduate education by creating or granting financial autonomy to universities has been increasingly common in many European countries. Generally, new universities respond to precise policies such as enhancing the overall human capital stock - especially for individuals from disadvantaged backgrounds -, create specific skills needed by the local economic environment, improving knowledge and innovation and R&D activities through strong relationships with local firms. The present paper looks at the impact of universities founded starting from the end of the '70s with the purpose to promote the democratization of higher education in Italy on wages of graduates three years after the completion of their studies.

Our results suggest that, after accounting for individuals' and colleges' observed characteristics, a degree in a modern university is associated to higher actual and expected wages, while there are no effects on employment probabilities. However, results for the overall sample hide substantial heterogeneity across different students' groups. A finer disaggregation based on parental education reveals that the gains from attendance to a new university are earned especially by students with a good background, while the opposite happens in the case of a poor background. These findings suggest the existence of a gradient due to the quality of education from new universities in terms of internal organization, adoption of more modern education systems, evaluation criteria, closer relations between students and teachers and between universities and entrepreneurship, and that these rents are lower for disadvantaged students.

## References

- [1] Agasisti, T. and G. Catalano (2006) "Governance models of university systems-towards quasi-markets? Tendencies and perspectives: A European comparison" *Journal of Higher Education Policy and Management*, Vol. 28, No. 3, November, pp. 245-262;
- [2] Anderson, R., Quigley, J. and M. Wilhelmsson (2001) "University Decentralisation as Regional Policy: The Swedish Experiment" *Program on Housing and Urban Policy Working Paper* No. W01-003, Insitute of Business and Economic Research (Iberi);
- [3] Andres, L., and E.D. Looker (2001) "Rurality and Capital: education expectations and attainment of rural, urban/rural and metropolitan youth" *The Canadian Journal of Higher Education*, 31 (2), 1-45;
- [4] Bagues, M. and M. Sylos-Labini (2007) "Do on-line Labour Market Intermediaries Matter? The impact of Almalaurea on the University-To-Work Transition";
- [5] Black, D. and J. Smith (2004) "How robust is the evidence on the effects of college quality? evidence from matching", *Journal of Econometrics* 121, 99124;
- [6] Black, D. and J. Smith (2006) "Estimating the Returns to College Quality with Multiple Proxies for Quality", *Journal of Labor Economics* 24, no.3;
- [7] Bratti, M. Checchi, D. and G. De Blasio (2008) "Does the expansion of higher education increase the equality of educational opportunities? Evidence from Italy" *Labour* (forthcoming);
- [8] Brewer, D.J. and R.G Ehrenberg (1996) "Does it pay to attend an Elite Private College? Evidence from the High School Class of 1980" *Research in Labor Economics* Vol. 15, 239-271;
- [9] Brewer, D.J. Eide, E.R. and R.G. Ehrenberg (1999) "Cross-Cohort Evidence on the Effects of College Type on Earnings" *Journal of Human Resources* Vol. 34, No.1;
- [10] Brunello, G. and L. Cappellari (2008) "The Labour Market Effects of Alma Mater Evidence from Italy" *Economics of Education Review* No. 1562;

- [11] Brunello, G. and F. Gambarotto (2007) "Do spatial agglomeration and local labor market competition affect employer-provided training? Evidence from the UK" *Regional Science and Urban Economics* No. 37 1-21;
- [12] Chevalier, A. and G. Conlon (2003) "Does it pay to attend a prestigious university?" *CEE Discussion Papers* No. 0033, March; Centre for the Economics of Education, LSE
- [13] Corak, M., Lipps, G., and J. Zhao (2003) "Family Income and Participation in Post-Secondary Education" *Analytical Studies Branch Research Paper Series* Catalogue no. 11F0019MIE2003210. Ottawa: Statistics Canada;
- [14] Card, D. and A. Krueger, (1990), Does school quality matter? Returns to education and the characteristics of public schools in the United States, *Journal of Political Economy*, 1-39.
- [15] Di Pietro, G. (2006) "Regional Labour Market Conditions and University Dropout Rates: Evidence from Italy" *Regional Studies*, Vol. 40.6, pp. 617-630, August;
- [16] Eskeland, G and D. Filmer (2007) "Autonomy, Participation and Learning: Findings from Argentine Schools, and Implications for Decentralization" *Education Economics* Vol. 15, No. 1, March pp. 103-127;
- [17] Eurydice (2000) "Two decades of reform in higher education in Europe: 1980 onwards" *Eurydice Studies*, Brussels;
- [18] Frenette (2005) "Is post-secondary access more equitable in Canada or the United States?" *Analytical Studies Research Paper Series*. Catalogue no. 11F0019MIE2005244. Ottawa: Statistics Canada
- [19] Frenette (2009) "Do universities benefit local youth? Evidence from the creation of new universities" *Economics of Education Review* Vol. 28, pp. 318-328;
- [20] Gibbons S. and A. Vignoles (2009) "Access, choice and participation in higher education" *CEE Discussion Papers* No. 101, January; Centre for the Economics of Education, LSE;
- [21] Gunasekara, C. (2006) "Universities and Associative Regional Governance: Australian Evidence in Non-core Metropolitan Regions" *Regional Studies*, Vol. 40.7, October pp. 727-741;

- [22] Hussain, I., McNally, S. and S. Telhaj (2009) "University quality and graduate wages in the UK" *CEE Discussion Papers*, No.99, March; Centre for the Economics of Education, LSE;
- [23] Moretti (2004) "Estimating the social returns to higher education: evidence from longitudinal and repeated cross-sectional data" *Journal of Econometrics* Vol. 121(1-2), pp. 175-212;
- [24] Persson H. and H. Regnr (2004) "Universities In The Regional Economy. Evidence From Swedish Employer-Employee Linked Data" Working Paper 7/2004, Swedish Institute for Social Research (SOFI), Stockholm University;
- [25] Schiller, D. (2006) "Nascent Innovation Systems in Developing Countries: University Responses to Regional Needs in Thailand" *Industry and Innovation*, Vol. 13, No. 4, December pp. 481-504.
- [26] Theodora Y. (2007) "Approach to the Effects of Greek Regional Universities on Development of the Country Regions" mimeo;

Table 1: Classification of the Italian colleges according to their location and time of establishment

OLD COLLEGES		NEW COLLEGES	
Torino, Uds	Bergamo, Uds	Vercelli, UPO	Milano Bicocca, Uds
Torino, Politecnico	Pavia, Uds	Varese, Insubria	Roma, UTV
Genova, Uds	Sassari, Uds	Brescia, Uds	Roma, III Uds
Milano, Uds	Padova, Uds	Verona, Uds	Napoli, II Uds
Milano, Politecnico	Parma, Uds	Udine, Uds	Bari, Politecnico
Venezia, Uds	Modena, Uds	Viterbo, Tuscia	
Venezia, IU Architettura	Ferrara, Uds	Cassino, Uds	
Trieste, Uds	Urbino, Uds	Benevento, Sannio	
Bologna, Uds	Ancona, Uds	Teramo, Uds	
Firenze, Uds	Macerata, Uds	Campobasso, Uds	
Roma la Sapienza	Camerino, Uds	Foggia, Uds	
Napoli, Uds	Siena, Uds	Catanzaro, Uds	
Napoli, Parthenope	Perugia, Uds	Reggio C. Uds	
Napoli, Orientale	Salerno, Uds	Potenza, Uds	
Bari, Uds	L'Aquila, Uds		
Palermo, Uds	Chieti, Univ.		
Messina, Uds	Lecce, Uds		
Catania, Uds	Cosenza, Uds		
Cagliari, Uds	Trento, Uds		
	Pisa, Uds		
	Obs. 11,709	Obs. 2004	
	#: 85.39	#: 14.61	

Table 2: Earnings, employment probability and students' characteristics by college type

	New	Old (%)
Earnings (2008)	1318.61	1337.73
Employment prob.	0.73	0.78
Comprehensive high sch	0.55	0.59
grade uni>105/110	0.39	0.41
grade high sch> 56/60	0.25	0.23
High family backgr.	0.44	0.435

High family backgr.: at least one parent with university degree or both with high secondary  
 Comprehensive high schools are the "licei": "classico", specialised in humanities,  
 "scientifico", in scientific subjects, "artistico" in Arts and  
 "linguistico" in foreign languages.

Table 3: Indicators of college quality by type of college (means)

	NEW UNIV.	OLD UNIV.
students	3,476	8,619
students/teachers	29.93	28.32
graduated/students (%)	7.83	10.13
share of not faculty teachers (%)	29.02	22.42
N	68	277

Quality indicators available at the Area of study level.

Areas are: Humanistic, Social Sciences, Scientific, Medicine, Law, Engineering and architecture.

Table 4: Average wages by college type- 1<sup>st</sup> vs. 2<sup>nd</sup> step wages

	Inwage	$\hat{\alpha}_{cf}$	Employm. prob.	$\hat{\alpha}_{cf}$
New Colleges	7.10	7.57	0.73	0.73
Old Colleges	7.13	7.57	0.78	0.75
Obs.	10,598	345	13,703	345

Table 5: The impact of new and regional colleges on wages and employment. WLS results

	Wages		Employm. Probab		Expected Wages	
	(a)	(b)	(a)	(b)	(a)	(b)
NEW	0.0669*** (0.026)	0.0779*** (0.025)	-0.0004 (0.017)	0.0044 (0.018)	0.1020** (0.042)	0.1175*** (0.043)
regio		0.0544** (0.022)		-0.0077 (0.016)		0.0731* (0.043)
000's students		0.0060*** (0.002)		0.0015 (0.002)		0.0081** (0.004)
students/teachers		-0.0014** (0.001)		-0.0006 (0.000)		-0.0018* (0.001)
R sq.	0.61	0.63	0.30	0.30	0.27	0.29
N	345	345	345	345	345	345

Statistical significance: \* : 10% \*\* : 5% \*\*\* : 1%

Each regression includes 14 faculty dummies.

Table 6: The impact of new and regional colleges on wages and employment. WLS results by family background

	Wages		Employment Probab		Expected Wages	
	High backgr	Low backgr	High backgr	Low backgr	High backgr	Low backgr
	b/se	b/se	b/se	b/se	b/se	b/se
NEW	0.0816** (0.043)	0.0563 (0.046)	0.0798*** (0.022)	-0.0574** (0.024)	0.2803*** (0.069)	-0.0392 (0.079)
regio	0.0761 (0.053)	0.0537 (0.055)	0.0057 (0.026)	-0.0074 (0.020)	0.1151 (0.079)	0.1014 (0.080)
000's students	0.0101** (0.004)	0.0032 (0.003)	0.0038* (0.002)	0.0006 (0.002)	0.0194*** (0.007)	-0.0034 (0.008)
students/teachers	-0.0006 (0.001)	-0.0016** (0.001)	-0.0012* (0.001)	0.0001 (0.001)	-0.0013 (0.002)	0.0013 (0.002)
R sq.	0.31	0.57	0.20	0.29	0.26	0.23
N	345	345	345	345	345	345

Statistical significance: \* : 10% \*\* : 5% \*\*\* : 1%

Each regression includes 14 faculty dummies.

## Appendix: First step results for the full sample: log wages and employment probability

	Log wages	Employment probab.
Female	-0.088*** (0.01)	-0.280*** (0.03)
Have siblings	0.010*** (0.00)	-0.002 (0.02)
Graduation age: over30	0.086*** (0.01)	0.080* (0.04)
Graduated 1 year later than expected	-0.036*** (0.01)	-0.113** (0.05)
Graduated 2 years later than expected	-0.049*** (0.01)	-0.098** (0.05)
Graduated 3 years later than expected	-0.053*** (0.01)	-0.053 (0.05)
Graduated 4 years later than expected	-0.053*** (0.01)	-0.191*** (0.05)
University final mark	0.010*** (0.00)	0.007 (0.01)
Work parttime	-0.559*** (0.01)	
Atypical contracts	-0.093*** (0.01)	
Fixed term contract	-0.074*** (0.01)	
Work in the same region of the college	-0.030*** (0.01)	
Province of work different to province of residence	0.040*** (0.01)	
Residence in the same region of the college		-0.129*** (0.05)
Region residence different to region birth		0.109** (0.05)
Area dummies	yes	yes
Sector and occupation dummies	yes	no
Interactions of parents' education and occupation	yes	yes
Interactions of type secondary school and final mark	yes	yes
University by field of study dummies (334)	yes	yes
N	10607	13703

Statistical significance: \* : 10% \*\* : 5% \*\*\* : 1%

Censored regression for log of (net monthly, in 2008 euro) wages, probit for employment.