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Does *Alma Mater* matter? Evidence from Italy*

By

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Abstract

In this paper we investigate in the Italian institutional context the effect of the attended university on earnings and employment prospects three years after graduation. We find that Alma Mater matters significantly for the early labour market performance of Italian graduates. In particular, graduates from universities located in the Northern part of the country experience three years after graduation significantly higher employment probabilities but only slightly higher *nominal* earnings than graduates from Southern universities. We also find that the mobility of Italian students across universities – and particularly from the South to the North - is limited. There is little support, however, to the view that mobility is hampered by liquidity constraints.

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Introduction

Does the attended college affect the earnings and employment prospects of graduates? This question is particularly important for the households sending their offspring to college and paying part of the cost, and for the government, which in a number of countries runs most universities and needs to know whether and why some institutions may be delivering better outcomes than others.

Spurred by the interest on the quality of education, a recent literature has investigated the labour market effects of college quality, mainly but not exclusively in the US. Black and Smith, 2003, and Brand and Halaby, 2003, review the key contributions. The main focus in this literature has been so far on comparing elite versus non – elite colleges, and the degree of selectivity has been measured either with the average SAT score of the incoming freshmen – in the US – or with the average A-level score of the intake of students – in the UK (see Chevalier and Gonlon, 2003). The basic finding of this literature is that college quality matters for labour market outcomes.

In this paper we investigate in the Italian institutional context the effect of the attended university on earnings and employment prospects three years after graduation. Since we cannot measure unambiguously selectivity, we focus instead on the location of the college, on the public/private divide and on observable measures of college quality. We find that Alma Mater matters significantly for the early labour market performance of Italian graduates. In particular, graduates from universities located in the more developed Northern part of the country experience three years after graduation significantly higher employment probabilities but only slightly higher *nominal* earnings than graduates from Southern universities.

We also find that the mobility of Italian students across universities – and particularly from the under-developed South to the more developed North - is limited. There is little support, however, to the view that mobility is hampered by liquidity constraints. Alternative explanations include regional price differentials, which reduce the earnings gap between the North and the

South – and can even turn the gap into an advantage, and the possibility that uncovered differences are temporary. The finding that the expected returns to college are not significantly higher for the graduates of Northern universities combines with the higher cost of living, opportunity costs and tuition fees in the North to explain why so many Southern students still prefer to enrol in the South.

We also find that going to a private university matters especially for the probability of finding a job, but not always in a positive way. Heterogeneity in early labour market returns spread from public to private universities. When the attended private college yields negative employment and earnings gains, the question arises why households should enrol their offspring in such institutions at a higher tuition fees than in public universities. The natural explanation is that these losses are temporary, and turn into gains as labour market experience increases. Religious and cultural reasons, access to networks and leisure are additional and not necessarily mutually exclusive explanations.

Available indicators of college quality explain some but not all the difference between private and public tertiary education. There is evidence that the pupil – teacher ratio, the size of the university – in terms of the number of enrolled students - and the proportion of female teachers affect in a statistically significant way either wages or employment or both. The location of the college also matters, as universities located in the South usually deliver inferior outcomes.

The policy implications clearly depend on whether the effects of measured college quality three years after graduation persist over time. While limited mobility from lower to higher performing universities suggests that some of these effects are temporary, better data than those available are required to answer this key question. In particular, it would be critical to re-interview graduates at regular times during their career, as in the UK Graduate Cohort Study, which repeats interviews three, six and eleven years since graduation.

Assuming that the uncovered effects are at least in part permanent, they suggest that policies favouring the diffusion of universities in the Italian territory need not be farsighted, as employment probabilities are significantly higher with larger – and older - institutions, possibly because of their entrenched reputation in the labour market. Policies promoting equal opportunity and a higher percentage of female professors have ambiguous labour market effects, negative on male graduates and positive on female graduates. Finally, and conditional on measured quality and on local labour market effects, Southern universities perform less satisfactorily than the universities in the rest of the country. Understanding why this is the case is an important area of policy evaluation.

The paper is organized as follows. Section 1 provides some institutional background; Section 2 discusses the empirical approach; Section 3 introduces the data and Section 4 presents the results. Conclusions follow.

1. Institutional background

By international standards, Italy has 10 graduates out of 100 individuals aged 25 to 64, significantly lower than the OECD average of 15. Relatively low attainment is matched by a relatively low rate of return, 6.5 percent per year of college education, compared to 11.8 percent in the main developed economies (see OECD, 2003). Assuming a downward sloping demand for college education and an upward sloping supply, the combination of low attainment and low returns suggests that the relative demand for college graduates in Italy is relatively low by international standards[1].

Reasons for relative low demand could be that the Italian industrial structure is biased against higher education, or that the perceived quality of tertiary education is low, or both. According to the OECD, Italy spends less than the major developed economies for tertiary education. In the year 2000, the average expenditure per student was 8065 US dollars, compared to 8373 dollars in France, 10898 dollars in Germany, 9657 dollars in the UK and 20358 dollars in the US. Low expenditure is partly due to the fact that average pay in

[1] See Brunello, Comi and Lucifora, 1999, and Checchi and Jappelli, 2004, and Checchi, 2002.

universities is low and partly to a higher than average students to teacher ratio (22.4 compared to the OECD average of 16.5[2]). Moreover, Italy has a relatively low share of private universities, which enrol only 6.4 percent of college students, compared to 12 in the OECD average.

Only 10.9 percent of the budget comes from tuition fees. See Perotti, 2002, for a very good discussion of the funding of Italian universities.

2. Empirical strategy

The recent literature on the estimation of college quality (wage-) effects highlights a few issues inherent to such exercise. Specifically, Black and Smith (2003) discuss the pitfalls that a standard log-wage regression could lead to, and how matching estimators can solve/mitigate those issues. First, there is the issue of selection on unobservables, omitted variable bias in the language of linear regression: as long as factors that influence both treatment receipt (in their case college quality) and the outcome (earnings) are omitted from the estimating model, resulting effects are biased and inconsistent. Second, there is the issue of common support, multicollinearity in the language of linear regression: in order for the effect to be identified the variability of the treatment over the sample must not be already captured by other covariates in the model, which is achieved when there are cells defined by the intersection of the covariates in which both treated and non-treated individuals are observed. Black and Smith stress an important implication of this property: the effect estimated by a linear regression is identified non-parametrically only in the common support, while outside the common support it is a parametric projection of the effect estimated using observations in common support. Thirdly, and finally, they point to the issue of linear conditioning on observables, functional form misspecification in the language of linear regression: even if all the relevant personal attributes are controlled for, an omitted variable bias could emerge if they enter the estimating equation with an inappropriate functional form. The Black and Smith approach is to resort to

[2] Notice that Italy has a very low ratio in primary and secondary education, as discussed in detail by Brunello and Checchi, 2004. Perotti, 2002, contains an interesting comparison between the Italian and the British higher education systems.

a (propensity score) matching estimator. As explained in their paper, such an approach: a) assumes that there is no selection on unobservables problem; b) '…does not solve the support problem… (page 5)'; and c) solves the linear conditioning issue, since rather than assuming that the expected value of the outcome conditional on the observables is a linear function of the observables, makes a fully non-parametric comparison of mean outcomes between treated and non-treated individuals in the common support.

In this paper we take a different estimating approach, which we illustrate by focussing on wages as the outcome of interest (we also study employment probabilities and we detail later our methodology in that case). Let

$$w_i=\alpha_w+\Sigma_f\Sigma_c d^{cf}{}_i\theta^{cf}+x_i'\gamma_w+u_i \qquad (1)$$

be the log-monthly wage for individual *i (i*=1*…N)*, a linear function of the college-faculty cluster from which she graduated ($d^{cf}{}_i$) and observable attributes (x_i). The vector of observables includes controls for gender, region of employment, labour market experience parental background in terms of occupation and education, the final graduation mark, the type of high school attended (whether generalist or technical/professional) and the marks reported in the high school graduation exam. Given the inclusion of detailed parental background, these latter variable are likely to proxy the impact of ability. Most importantly, we allow for interactions between parental education and occupations, on the one hand, and marks and school types, on the other. Therefore, we allow all regressors related to personal attributes to enter the model non-linearly, which might result in an attenuation of the risks of misspecifying functional form. As for the first problem discussed in Black and Smith (2003), we assume, as they do, selection on observables, and specify a rather extended list of observables. Finally, we can not identify effects on college faculty dummies for which there is no common support.

Regression (1) serves as the first step in our procedure and allows us to predict log-monthly earnings by college/faculty clusters. In the second step, we take an approach a-là- Card and Krueger (1991) and analyse the

determinants of college/faculty wage effects. Specifically, let q^{cf} be the estimate of θ^{cf} from (1). Let q be the vector stacking these estimates: they are the mean wages by college-faculty clusters. In the second step of our procedure, we estimate the effect of several dimension of college quality by regressing estimated wage effects on college quality measures derived from published sources or other measures of college heterogeneity, plus college and faculty fixed effects. We employ a Weighted Least Squares, using weights proportional to the (inverse) of var(q) to account for the fact that our dependent variables are estimates from the first stage.

As we said above, we also analyse the impact of Alma Mater on employment probabilities. In that case, equation (1) is substituted by a probit equation, the dependent variable scoring one for the employed and zero otherwise.[3] From such a probit equation we can estimate the employment probability (and its variance) for each college/faculty cluster, which we then employ as dependent variable (and weight) in the second step regression.

3. The Data

The National Statistical Office (ISTAT) carries out on a regular basis a statistical survey – the "Indagine statistica sull'inserimento professionale dei laureati" - on the transition from college to work of a representative sample of Italian graduates. The last available wave interviews individuals who graduated in 1998 three years after completion of the degree, in 2001. The survey covers school curriculum, labour market experience in the three years after graduation, job search activities, household and individual information. We match these data with the information on college quality disaggregated by field of study and provided by ISTAT for the academic year 1996-7[4].

We focus our analysis on the effects on the college on the probability of being employed three years after graduation and on net monthly earnings in the job held at the time of the interview. Employment in the survey includes all

[3] In this case, the conditioning set excludes labour market experience, while regions of work are substituted by regions of birth.

[4] ISTAT, Lo stato dell'università, several issues. Since the publicly available micro-data do not include the university the interviewed individual graduated from, we carried out the matching at the ADELE ISTAT laboratory in Rome.

paid jobs, including apprenticeship contracts[5]. About 4 percent of the currently employed are on a training contract – which includes post-graduate education. This percentage raises to close to 44 percent among those not currently working. Monthly earnings in 2001 are in euros and net of taxes and social security contributions[6]. Average earnings in the sample are 1140,1 euros per month, with a standard deviation of 422.8, and range from a minimum of 103,2 € to a maximum of 4389,8 €. On the other hand, the average probability of being employed three years after graduation is 0.664, with a standard deviation of 0.472.

Table 1 shows average pay and employment probability by gender, type of college – public or private – and area where the college is located. On average, male graduates earn about 25 percent more than females, and are more likely to have a paid job three years after graduation. Having graduated from a private college yields a close to 10 percent wage premium, and a close to 20 percent premium in the probability of employment. Finally, graduation from a college located in the Northwest yields a 20 percent wage premium and a close to 50 percent higher employment probability than having graduated in a Southern college. The regional wage premium falls considerably from 20 to 8.3 if we compare individuals who graduated from a college in the Northwest and work in the same area with individuals who graduated in the South but work in the Northwest.

Table 1. Average earnings and employment probability by gender, type of college and college area

	Average monthly earnings	*Average employment probability*
Male	1249,6	0,716
Female	1040,0	0,622
Private college	1239,5	0,793
Public college	1132,3	0,655
College located in Northwest Italy	1218,2	0,773

[5] The relevant question is: "Are you now – at the time of the survey – on a paid job? " Only a very small minority of those not currently employed were employed in the week before the interview. Since we do not have information on wages, we drop these individuals from the sample.

[6] Earnings in the publicly available data are provided in ranges rather than as a continuous variable. All our computations based on continuous variables were carried out at the ADELE ISTAT laboratory in Rome.

College located in Northeast Italy	1124,7	0,733
College located in Central Italy	1121,0	0,631
College located in Southern Italy	1054,6	0,513

Needless to say, these averages are affected by individual characteristics, the college and the field of study. Table 2 reports average earnings and employment probabilities in 16 fields of study, which correspond to different faculties.

Average earnings are highest for graduates in Medicine, who face on the other hand the lowest employment probability, and lowest for graduates in Foreign Languages. Figure 1 and Figure 2 show that both earnings and employment probabilities vary substantially within each field of study by college. The within-field of study variation in earnings – measured by the coefficient of variation - is highest for the graduates in Medicine, Sociology and Statistics. In the former field, a graduate from Verona and Padova earn per month close to 100 percent more than a graduate from Pisa and L'Aquila.

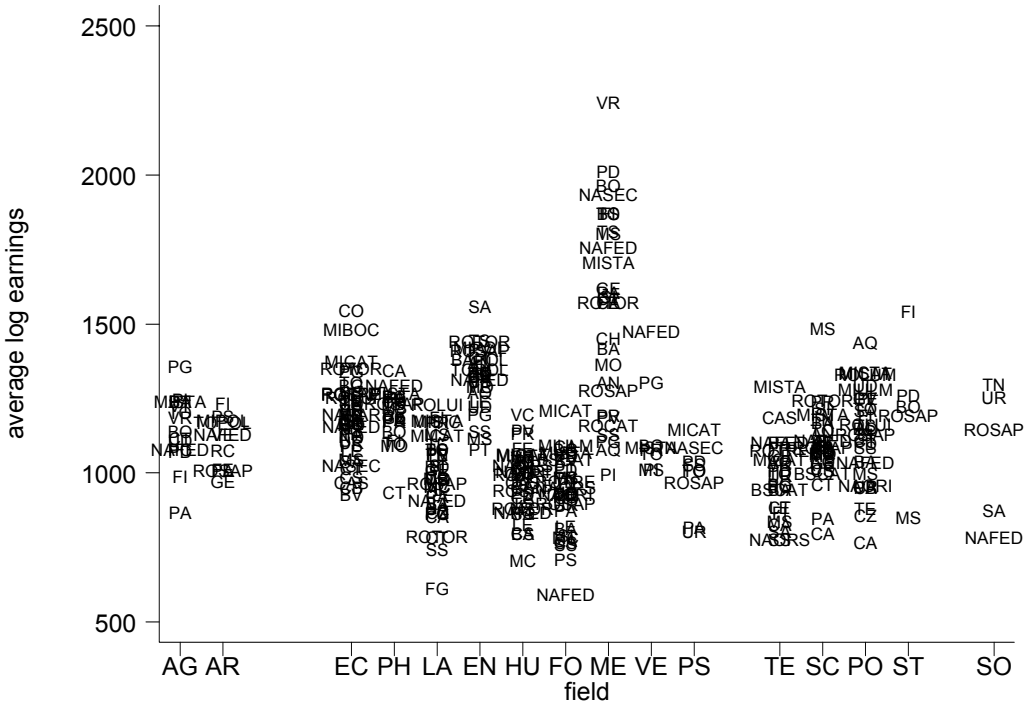
Table 2. Average earnings and employment probability by field of study

	Average monthly earnings	*Average Employment probability*
Agricultural studies (AG)	1127,2	0,636
Architecture (AR)	1077,3	0,696
Economics and Business (EC)	1163,9	0,752
Pharmacy (PH)	1174,1	0,788
Law (LA)	962,9	0,479
Engineering (EN)	1298,8	0,854
Humanities (HU)	949,5	0,589
Foreign languages (FO)	910,6	0,632
Medicine (ME)	1531,7	0,201
Veterinary (VE)	1118,3	0,605
Psychology (PS)	966,4	0,686
Teachers college (TE)	956,4	0,670
Natural sciences (SC)	1073,2	0,607
Political Science (PO)	1104,8	0,735
Statistics (ST)	1191,2	0,740
Sociology (SO)	1048,8	0,582

In the latter field, a graduate from Florence earns on average 84 percent more per month than a graduate from Messina. Moreover, the average monthly earnings of a graduate in Economics from Bocconi University, a private institution, are about 60 percent higher than the earnings of a graduate in the same field from the University of Benevento, at the bottom of the list.

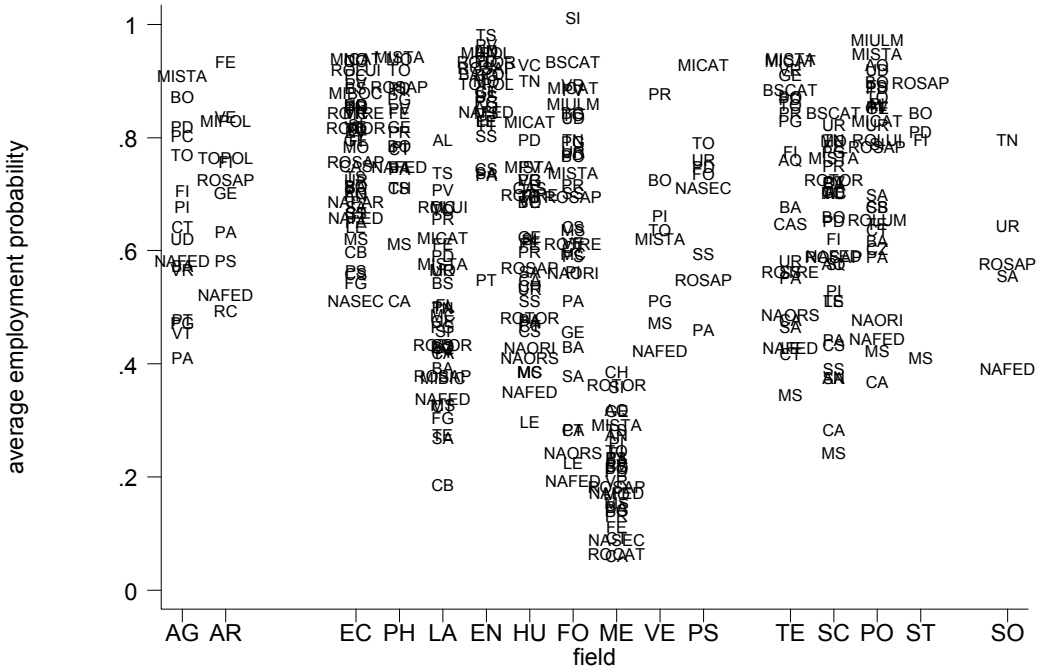
Turning to employment probabilities, it is always the case that these are lowest for graduates of Southern colleges, independently of whether they look for a job in the North or in the South of the country. For example, a graduate in Engineering from the University of Trieste has a probability of employment after three years close to 1, compared to less than 0.6 for a graduate from Potenza, in the deep South.

Figure 1. Within field variation in average earnings



Note: see the legend in the Appendix

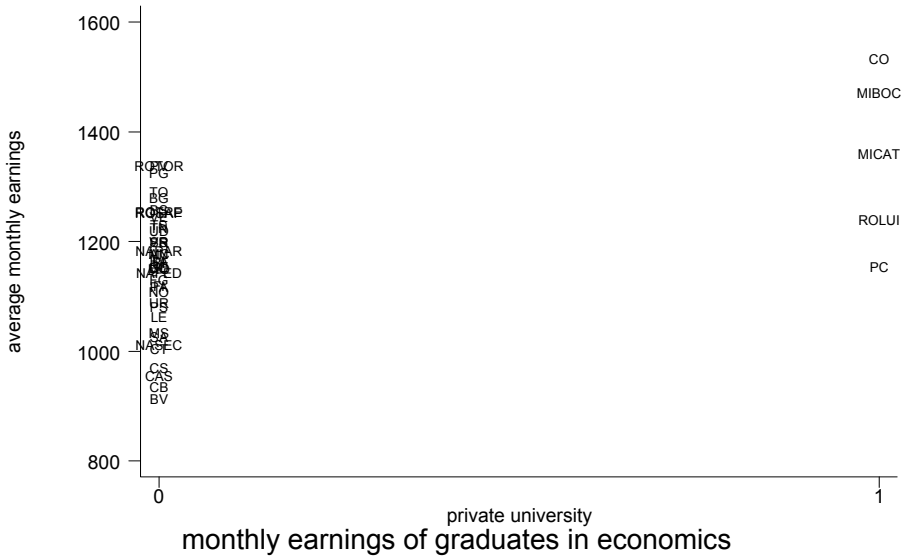
Figure 2. Within field of study variation in employment



Note: see the legend in the Appendix

Next, we compare the average earnings and employment probabilities of graduates of public and private colleges – by restricting attention to economics, which include a few private universities. Figures 3 and 4 show that private colleges do better on average than public colleges, both for earnings and for employment. Some private universities, however, perform worse in terms of earnings and at least as well in terms of employment as top public institutions.

Figure 3. Average monthly earnings in public and private colleges - Economics



Note: see the legend in the Appendix

Figure 4. Average employment probability in public and private colleges

Note: see the legend in the Appendix

For instance, the graduates of Roma Luiss, a private college, earn on average about the same as the graduates of Roma Tre and Roma La Sapienza, but less than the graduates of Rome Tor Vergata, a public institution located in the same city. On the other hand, the graduates of Bocconi University earn on average more than the graduates of other Milanese universities, both public and private.

Both private and public colleges generate heterogeneous outcomes in the labour market. Part of this heterogeneity could fade away over time, as graduates settle in their jobs, but part could depend on measurable differences in inputs and outputs. Table 3 illustrates some of these differences, separately for public and private colleges.

Table 3. Differences in inputs and outputs, by type of college

	Public college	*Private college*
Year when the faculty was established	1932	1958
Student / teacher ratio	41.69	25.78
Percentage of students not completing their degree in the requested time	38.61	38.42
Number of students	4605	3698
Percentage of graduates over enrolled students	7.54	11.76

Note: the year of establishment is coded as 1800 if the college was established in 1800 or before.

The table shows that private universities tend to be younger, smaller, and have a significantly lower ratio of students to teachers. While the average age of professors is about the same, the percentage of female professors is slightly lower, and the percentage of graduates over enrolled students significantly higher. The Data Appendix shows how these indicators vary across colleges and fields of study.

The list of indicators in Table 3 cannot be considered as exhaustive. An indicator that is missing in our data is the average peer effect. This is an important measure if we believe, as Epple and Romano, 1998, that school quality critically depends on the average quality of enrolled students. Another missing indicator is a measure of network effects, which might play an important role if private colleges provide access to better networks, and if these networks are important in the search of a good job, as suggested for Italy by Pellizzari, 2003. Finally, we miss information of teacher quality. The recent literature on school quality (see Hanushek, 2002, for a survey), clearly emphasizes this variable as key to explain school performance.

4. Results

In the first step regressions (REPORT IN THE APPENDIX), we fit individual earnings and employment probabilities separately by gender on 411 college by field of study dummies, individual experience, experience squared, number of siblings, cohort of birth dummies, type of job (whether the current job is part time or full time), dummies for additional years in college after the required years, dummies for the region of current residence, individual graduation marks – relative to the highest attainable mark – type of school before college, graduating marks in upper secondary education, family background – measured by the education and occupation of both parents when the individual was 14 years of age – and interactions between education before college and family background. The maintained hypothesis is that performance at school before college, family background and their interactions fully capture unobserved individual ability, which affects earnings as well as selection into employment.

4.1 College effects on wages and employment

We interpret the estimated coefficients of the 411 dummies as the net impact of college and field of study on individual earnings and employment three years after graduation. Under our maintained assumption, these estimates are consistent. We distinguish the net from the gross impact, because the college and field of study can affect some of the controls, such as labour market experience, performance in college, type of job, region of residence and actual time to complete the degree. We also compute the gross impact of college and field by re-estimating the first step regressions after excluding such controls. To save space, we present some results based on the gross effect in the Appendix.

The region of residence three years after graduation does not necessarily coincide with the region where the college was located, as individuals migrate to the areas of the country where they can locate better matches. Table 4 illustrates the mobility flows across the four macro areas of the country. As

expected, individuals completing a degree in the Centre or in the South are more likely than individuals in the North to relocate and work in another macro-area, typically the North West, where many college jobs are located. In spite of these mobility flows, the percentage of individuals who currently reside in the same area where they went to college is at least equal to three quarters of the population of graduates.

Table 4. Mobility flows among the four macro areas of Italy

	Residence North West	*Residence North East*	*Residence Centre*	*Residence South*
College North West	93.52	3.47	1.65	1.36
College North East	12.30	81.87	3.86	1.97
College Centre	6.95	3.95	75.91	13.18
College South	9.17	3.34	6.87	80.62

Note: the numbers in the table are percentages, which add up to 100 by row.

We disentangle the contributions of the field of study and the university to the wage and employment effects by regressing the estimated net effects on separate field of study and college dummies. In order to have sufficient observations for each university, we restrict our attention to the institutions with at least five faculties. The college dummies in these regressions measure the effect of each university on earnings and employment, conditional on the field of choice and on the individual effects controlled in the first stage. As shown in Figures 5 and 6, the variation of college effects is substantial, both for wages and for employment.

Figure 5. College effects on earnings, by gender

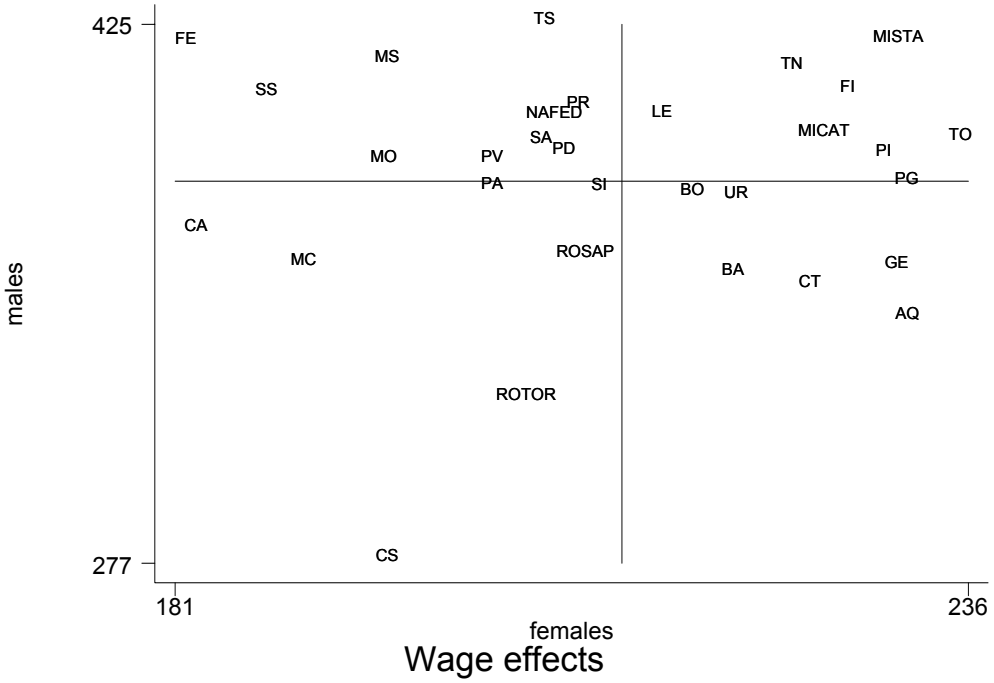
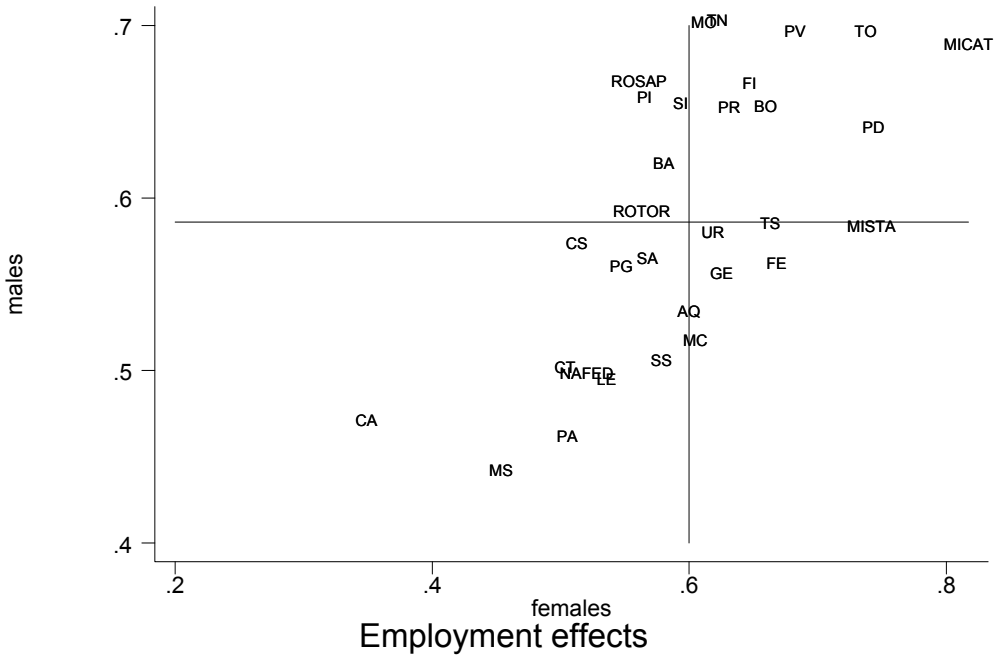


Figure 6. College effects on employment probability, by gender



Consider first wages. The difference between the highest and the lowest college effect is higher than 25 percent for both genders. For instance, male

graduates from the University of Trieste, in the North-East, earn 53 percent more on their current job three years after college than graduates from Cosenza, in the South of the country. Female graduates from Torino, in the North West, earn about 29 percent more than graduates from Ferrara, in the North-East. There is also a significant difference in the earnings of graduates from the largest universities in Rome – La Sapienza and Tor Vergata – and the largest colleges in Milan – Statale and Cattolica. For instance, male graduates from La Sapienza earn three years after graduation 16 percent less than male graduates from Statale.

If we use the mean wage effects for males and females to divide the diagram in four quadrants, we discover some interesting heterogeneity. While Northern colleges tend to perform better than Southern colleges, there are exceptions: Ferrara and Modena, for instance, do well for males but poorly for females. On the other hand, Lecce is located in the outward quadrant, above both means. On average, Northern wage effects are 6.7 and 3.4 percent higher that Southern wage effects for maels and females respectively.

Turning to employment probabilities three years after college, the difference across universities is large, with graduates from Turin enjoying a probability higher than 70 percent and graduates from Messina experiencing probabilities lower than 50 percent, independently of the region of current residence. Compared to earnings, the difference in employment probabilities for the graduates of the large universities located in Rome and Milan is negligible for males but large for females. Furthermore, the segregation of Southern colleges in the lowest quadrant near the origin is much more marked than in the case of wages. On average, Northern employment effects are 25 and 32 percent higher that Southern wage effects for maels and females respectively.

Figures 7 and 8 plot wage and employment effects by gender. A natural reading here is that the points in the figures lie on different demand curves, which express the labour market trade-off between earnings and employment probabilities.

Figure 7. Wage and employment effects, by college. Males

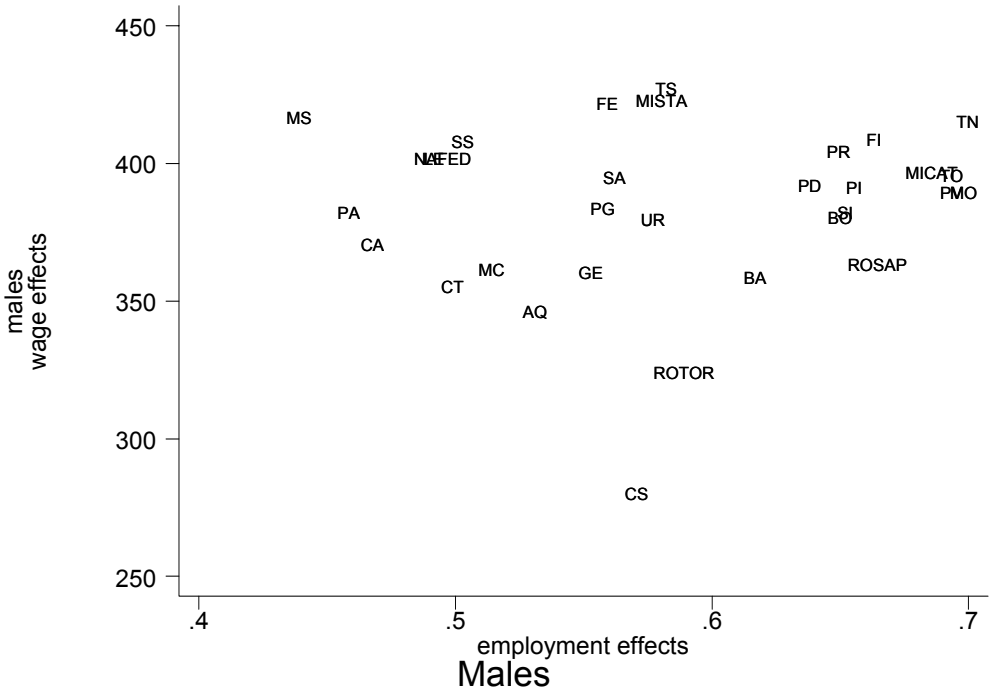
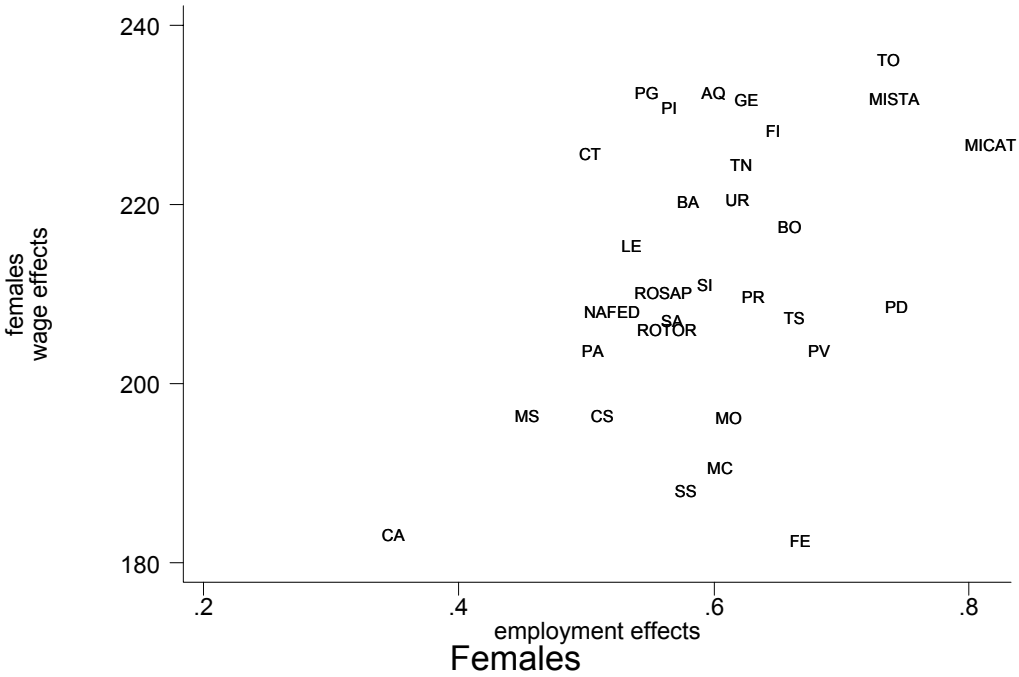


Figure 8. Wage and employment effects, by college. Females



Focusing on males, the wage and employment effects in Figure 7 are delimited by a demand curve close to the origin and connecting the Southern colleges of Messina, Palermo, Catania, Cagliari and Cosenza, and by an

outward demand curve connecting several universities of the North, Trento, Torino, Milano Catholic, Modena, Pavia and one in the Centre, Florence. A similar reading is possible for female graduates in Figure 8. If we rank universities on the basis of the demand curve they lie upon, the North-South divide emerges quite clearly. This divide is driven by employment probabilities rather than by wages.

If students were perfectly mobile across universities, and the private costs of graduating from each institution were homogeneous across the country, we would expect these large differences in college – specific labour market returns to be washed away. Mobility of university students, however, is limited. Our survey provides information both on the region of residence before going to college and on the region where the college is located. As shown by Table 5, there is very little mobility across macro-regions, not only in the Northern and Central areas, where many high performing universities are located, but also in the South, where universities are among the worst performing in the sample. More in detail, students who resided in the South before college either remain there for college (73.5%) or move to the nearby Centre (18.8%): less than 8% move to the North[7].

Table 5. Mobility flows among the four macro areas of Italy, before college and during college

	College North West	*College North East*	*College Centre*	*College South*
Before College North West	90.78	7.39	1.52	0.30
Before College North East	3.79	93.41	2.50	0.31
Before College Centre	0.88	4.79	93.69	0.64
Before College South	3.56	4.04	18.86	73.54

Note: the numbers in the table are percentages, which add up to 100 by row.

These number cover, however, some interesting heterogeneity within macro-areas. In the South, for instance, the percentage of students remaining in their region to go to college is higher than 80 percent in Sicily and Sardinia and close to 40 percent in Calabria.

[7] The differences in performance across universities are net of local labour market effects, because we control for region of residence dummies in the first step when estimating net wages and employment effects.

How do we explain the limited mobility flows between macro-areas? One natural possibility is that low mobility depends on family background and on liquidity constraints. According to this story, the internal rate of return of graduating from a Northern college is higher than in the South, but the higher costs prevent many Southerners from enrolling in the North. Studying in a university located in the North is likely to be expensive for a Southern student for a number of reasons. First, tuition is higher. Even though fees are not high by international standards, Northern colleges have used to a much larger extent than other universities in the country the opportunity to raise tuition in the second part of the 1990s above the centrally established ceiling (Law 122/94). This and the endogenous selection of students to college have implied that average tuition in 1995 was about 50 percent higher in Northern than in Southern public universities – 511 € versus 326 € at current prices (see Silvestri et al, 1996). Second, both opportunity and living costs – including housing – are higher in the North. Third and last, income support provided by the national and local government is considered to be largely inadequate to eliminate liquidity constraints, as documented by Silvestri et al, 1996. [NON SAREBBE MALE AVERE QUALCHE DATO SUI COSTI DI VIVERE FUORI CASA ALL'UNIVERSITA]

If liquidity constraints had played a significant role in hampering the mobility of students from the South to the North, we would expect to find that inter-regional mobility is much lower for students belonging to less educated and less wealthy households. Surprisingly enough, this is not the case. If we replicate Table 5 separately for individuals with "good" and "poor" family background at age 14 – good background being defined when the father was an entrepreneur, a manager, a high ranked director, a teacher or a high ranked white collar, and bad background when the father was in a low paying occupation – there is no difference worth noticing – see Table 6 below. The percentage of students in our dataset residing in the South who went to college in the South is 72.99 percent if from a good family background and 74.12 percent if from a bad background. On the other hand, the percentage of students residing in the South before college who moved to the North for

college is 8.22 among those with good background and 6.94 percent among those with bad background. These differences remain small even when we measure background with parental education[8].

Table 6. Mobility flows among the four macro areas of Italy, before college and during college.

Good bakground

	College North West	*College North East*	*College Centre*	*College South*
Before College North West	91.37	6.77	1.55	0.31
Before College North East	4.49	92.50	2.73	0.28
Before College Centre	1.15	4.64	93.48	0.73
Before College South	3.99	4.23	18.79	72.99

Bad background

	College North West	*College North East*	*College Centre*	*College South*
Before College North West	90.06	8.17	1.49	0.29
Before College North East	2.97	94.46	2.24	0.33
Before College Centre	0.53	4.99	93.45	0.53
Before College South	3.10	3.84	18.94	74.12

We conclude that liquidity constraints cannot be the key reason of the observed low mobility flows of students from the South to the North. The alternative explanation is that the expected excess return from going to a Northern college is not sufficiently high to trigger mobility flows from the South. One key reason for this is that regional price differentials are known to be substantially lower in the South. If many Southern graduates work and live in the same area they went to college, the relatively low nominal earnings gap with respect to graduates from Northern colleges can be more than compensated by lower consumer prices. Another reason is that the observed college differences in wages and employment probabilities three years after graduation are simply temporary effects, which are washed away over time, as individuals settle down in the labour market and in permanent jobs.

[8] Results available from the authors upon request.

Evidence that the effects of college quality of earnings and employment probabilities wane over labour market careers is discussed by Warren, Hauser and Sheridan, 2002, and Brand and Halaby, 2003, for the US. Employers use credentials, including college quality, as a signal of skills at labour market entry, but as individuals age this signal loses importance relative to other sources of information, such as direct screening. Since mobility is triggered by expected differences in lifetime earnings profiles, university – specific temporary differences may be not sufficient to reallocate enrolment from the South to the North in the presence of cost differentials. In a way, the low mobility shown by Table 4 could simply be telling us that the internal rate of return to going to a Northern or a Southern college is not very different, once the entire profile of lifetime earnings is properly considered.

Support for this alternative explanation comes from the 2002 wave of the Survey on the Income and Wealth of Italian Households (SHIW), carried out by the Bank of Italy, which includes information on the college of graduation. The sample of graduates is much smaller than the one we are using in this paper, but has the advantage of covering individuals of different age rather than only labour market entrants. We define a dummy for the young – aged from 25 to 34 – and for the adult – aged from 35 to 55, and regress both monthly earnings and employment probabilities on individual controls, area of residence, field of study dummies and age dummies. We also interact both age group dummy with a dummy equal to 1 if the college of graduation was located in the North and to zero otherwise. Our key results are presented in Table 7.

They show that monthly earnings do not differ in a significant way with the area where the college of graduation was located. Employment probabilities, however, differ, because the young age group from Northern colleges enjoys a significantly higher probability of employment. More importantly for our purpose, however, is the finding that this relative advantage disappears among adults.

Table 7. Monthly wages and employment probabilities , by age group and region where the college is located. Weighted least squares

	Monthly wages	*Employment probabilities*
Young * College North	.129 (.117)	.751** (.312)
Adult	.339*** (.091)	1.475*** (.214)
Adult * College North	.044 (.082)	.430 (.351)
Nobs	518	870

Note: each regression includes gender, region of residence and field of study dummies. The wage regression also includes a part-time dummy. The young age group in the Centre and South in the baseline. One, two and three stars for coefficients statistically significant at the 10, 5 and 1 percent level of confidence. Heteroskedasticity consistent standard errors.

These alternative stories can explain why Southern students do not move to Northern colleges, but do they account for the differences within macro-areas, which seem to be particularly large for the students of Sicily and Calabria? The figures above show that male graduates of the university of Cosenza (CS) earn much less than other graduates, including those from other Southern universities. Female graduates of the same university also do badly, even if not as bad in relative terms as males. While this relatively poor performance can help explaining the larger mobility flows, an important additional reason is that the largest university in the region was established fairly recently, in the seventies. Before that, students from Calabria had to move elsewhere to study, and moving for college education was part of the social custom, contrary to the Sicilian experience, where universities where established in the nineteenth century.

4.2 Private and public universities

Why do earnings and employment probabilities three years after graduation vary depending on the college the individual graduated from? The natural answer is that colleges differ in quality, and that this quality is priced by the labour market. One important dimension of college quality is whether the university is public or private. We investigate this dimension by replacing the college dummies in the second step regression either with a dummy equal to 1 if the university is private and to zero otherwise or with the interactions of this dummy with field of study dummies. By so doing, we allow the effects of

the private college dummy to vary with the field of study[9]. These effects can be identified because there is within-field variation in college status – either public or private.

Table 8 presents the results for the net wage effects, separately for males and females. The gross effects are reported for the sake of comparison in the Appendix. Since the dependent variable is in logs, we can interpret the estimated coefficients as percentage changes. We find that going to a private university has a positive effect on graduate earnings, but that this effect is statistically significant only for female graduates. Behind the average effect there is substantial heterogeneity. Male graduates of private universities in the fields of Law and Political Science earn close to 20 percent more than graduates of public colleges in the same fields. The opposite occurs for male graduates in the fields of Medicine and Natural Sciences, who lose between 35 and 6 percent with respect to their colleagues from public colleges.

Table 8. The effects of private college dummies on average wage effects

Private college dummies	*Males*	*Males*	*Females*	*Females*
Private universities	.043		.059**	
	(.041)		(.026)	
Economics		.009		.111***
		(.070)		(.034)
Law		.221*		.041
		(.115)		(.079)
Humanities		.012		.085*
		(.057)		(.043)
Medicine		-.353***		.113*
		(.054)		(.068)
Natural Sciences		-.060*		-.114**
		(.031)		(.048)
Political Science		.212***		.016
		(.060)		(.060)
Nobs	391	391	397	397
R Squared	.97	.97	.97	.97

Note : each regression includes faculty dummies. One, two and three stars for statistically significant parameters at the 10, 5 and 1 percent level of confidence.

Turning to female graduates, going to a private university yields a 11 and 8.5 percent gain in the fields of Economics; Medicine and the Humanities respectively, and a 11.4 percent loss in the field of Natural Sciences. Table 9

[9] Notice that there are some fields of study – Engineering for example – which are only available in public universities. We pool together some fields – Psychology, Foreign Languages and Education with Humanities, Agricultural Studies with Natural Sciences – in order to have a sufficient number of observations in the second step estimation.

shows that going to a private college unambiguously increases employment probabilities, especially for female graduates.

Table 9. The effects of private college dummies on average employment effects

Private college dummies	*Males*	*Males*	*Females*	*Females*
Private universities	.099**		.125***	
	(.041)		(.039)	
Economics		.252***		.143***
		(.034)		(.049)
Law		.105		.239***
		(.066)		(.044)
Humanities		.175***		.069
		(.037)		(.062)
Medicine		-.183***		-.120***
		(.020)		(.025)
Natural Sciences		-.023		.262***
		(.047)		(.038)
Political Science		-.004		.125***
		(.093)		(.048)
Nobs	347	347	380	380
R Squared	.88	.89	.92	.92

Note : see Table 8

The gain for males is particularly significant in the field of Economics, and turn into a large loss in the field of Medicine. The increase in the probability for females is highest in the fields of Law and Natural Sciences, and turns again into a loss in the field of Medicine.

Our results suggest that going to a private college makes a difference, especially for the probability of finding a job after graduation. Since this difference is not always positive, however, there is also heterogeneity in the performance of private universities. Such heterogeneity emerges also when we differentiate the effect of private colleges on earnings and employment not by faculty but by college location – the North and the rest of the country. As shown in Table 10, earnings gains are marginally significant for female graduates of Central and Southern private universities, and employment gains are large and significant only for the graduates of Northern private universities.

Table 10. The net effects of private college dummies on average earnings and employment probabilities.

Private college dummies	*Wages Males*	*Wages Females*	*Employment Males*	*Employment Females*

North	.025	-.015	.080	.154***
	(.097)	(.050)	(.092)	(.057)
Rest of the country	.027	.067*	.047	.072
	(.094)	(.040)	(.087)	(.049)
Nobs	391	397	347	380

Note : see Table 8

Finally, Table 11 presents the results of second step regressions with private college dummies, conditional on controls for the field of study. There are 9 private universities in our sample of 68 colleges, for which we have second step estimates of wage and employment effects. We find evidence that the graduates of Castellanza, Roma LUMSA and Milano Bocconi enjoy significant earnings gains – ranging from 11 to 37 percent - with respect to the graduates of public universities. However, the male graduates from Roma Catholic and the female graduates of Brescia Catholic earn on average 15 to 35 percent less than the graduates of public colleges. On the other hand, the effect on employment probability of going to a private college is positive and larger for the graduates of the private universities in Milan and neighbouring areas – Brescia and Castellanza - and negative both for the male and female graduates of Roma Catholic and for the male graduates of Roma LUMSA.

Table 11. The effects of private college dummies on earnings and employment

Private college dummies	*Males Wages*	*Males Employment*	*Females Wages*	*Females Employment*
Piacenza	-.023	-.023	-.051	.190**
	(.026)	(.042)	(.044)	(.090)
Roma Luiss	.095	.150***	.023	.186***
	(.146)	(.043)	(.056)	(.065)
Milano Bocconi	.114***	.217***	.130***	.240***
	(.015)	(.025)	(.014)	(.015)
Milano Cattolica	.042	.121***	.062	.236***
	(.047)	(.040)	(.042)	(.023)
Castellanza	.184***	.217***	.160***	-
	(.015)	(.025)	(.014)	
MIlano IULM	.090	-	.128***	.248***
	(.058)		(.045)	(.029)
Roma Cattolica	-.353***	-.183***	.113*	-.120***
	(.053)	(.020)	(.068)	(.025)
Brescia Cattolica	.060	.241***	-.149***	.284***
	(.056)	(.036)	(.028)	(.030)
Roma LUMSA	.369***	-.167***	.154***	.092***
	(.029)	(.046)	(.033)	(.036)
Nobs	391	347	397	380
R Squared	.97	.89	.97	.92

Note : see Table 8.

4.3 College quality

Is the difference made by private colleges due to observable measures of college quality? We capture quality with the (log) pupil – teacher ratio, the classical indicator used in the related literature (see Hanushek, 2002), but also control for the (log) number of students in the college and field of study and the year of establishment of the college and field of study. Since selection at entry is rare in Italian universities – and restricted to some fields of study such as Medicine – a larger size, conditional on the pupil-teacher ratio, can be interpreted as a measure of the relative attractiveness of the university and field. Similarly, if the year of establishment is a proxy of prestige, we should find that later establishment affects negatively labour market outcomes. If, on the other hand, it proxies a younger and more dynamic faculty – the correlation between year of establishment and the average age of professors in our sample is -.24, we should expect a positive relationship. We add to the regressors in Tables 8 and 9 the selected measures of college quality and present the estimates in Tables 12 and 13, limited to the case of net effects.

Table 12. The effects of private college dummies on average log earnings

	Males	*Males*	*Females*	*Females*
Log pupil - teacher ratio	-.185***	-.214***	-.128***	-.128***
	(.049)	(.052)	(.036)	(.039)
Log number students	.282***	.288***	.258***	.258***
	(.029)	(.030)	(.022)	(.022)
Year of establishment	.004***	.004***	.004***	.004***
	(.000)	(.000)	(.000)	(.000)
Private college		-.152*		-.000
		(.090)		(.057)
Nobs	311	311	303	303
R squared	.99	.99	.99	.99

Note : see Table 8

Table 13. The effects of private college dummies on average employment probability

	Males	*Males*	*Females*	*Females*
Log pupil - teacher ratio	-.087***	-.070***	-.113***	-.092***
	(.020)	(.020)	(.021)	(.022)
Log number students	.081***	.078***	.082***	.079***
	(.014)	(.014)	(.014)	(.014)
Year of establishment	.0001***	.0001***	.0001***	.0001***
	(.000)	(.000)	(.000)	(.000)
Private college		.114***		.170***
		(.032)		(.041)
Nobs	294	294	295	295
R squared	.93	.93	.95	.95

Note : see Table 8

Since both the pupil – teacher ratio and the number of students are in logs, the number in the tables can be interpreted as elasticities. We find evidence of a negative and statistically significant relationship between the pupil-teacher ratio and the college by field of study wage and employment effects. The elasticity ranges from -.128 to -.214 for earnings and from -.070 to -.113 for employment probability. The faculties in private colleges of our sample have on average a pupil – teacher ratio which is close to 50 percent lower than the ratio in the faculties of public universities. Our estimates suggests that this gap translates in a 5 to 10 percent positive gap for earnings and in a 5 percent positive gap for employment.

There is also evidence of a positive and statistically significant relationship between log size and the wage and employment effects, with elasticities close to .25 for earnings and to .08 for employment. In our sample, the faculties of private colleges are about 23 percent smaller than the faculties in public universities. Therefore, this effect partially cancels out the effect of the pupil – teacher ratio. One possible objection is that larger faculties may have more students who are staying longer than required to complete the degree (*fuori corso*). In this case, size is not necessarily an indicator of good quality. In regressions not displayed here, we control for the percentage of "fuori corso" students, but this variable is never statistically significant, nor does it change the effect of size.

Finally, we find that the younger the faculty the higher the wage and employment effect. In particular, a faculty 10 years younger generates a 0.04 percent increase in earnings and a 0.001 percent increase in the probability of employment. Therefore, these effects are small.

The differences in pupil – teacher ratio, size and year of establishment explains an important part of the difference in wage effects between private and public institutions. The private college dummy remains, however, positive and statistically significant in the case of the employment effects, suggesting that other factors are at play.

4.4 Family background

In the previous two sections we have allowed the college by field of study effects to vary by gender. Another possibility is that they vary by family background, ad example because of the complementarities between college quality and labour market networks. We classify family background into "poor" and "good", depending on the profession of the father when the surveyed individual was aged 14. In particular, we define family background as "good" when the father was a professional, a manager, a teacher or a high ranked white collar, and as "poor" when the father was in agriculture, a blue collar, a self-employed or a low ranking white collar.

We run separate first stage regressions for good and poor background and retrieve the estimated college by field of study effects. In the second stage, we ask whether having a "good" family background can improve the labour market effects of going to a private college. Tables 14 and 15 report the results separately for wages and employment.

We find that individuals with a good family background gain significantly in terms of their employment prospects if they graduate from a private university. There is little evidence that they gain in terms of entry wages, however. On the other hand, individuals with poor background who graduate from a private college do not gain significantly – in a statistical sense – in terms of higher entry wages or of a higher probability of employment. Overall, there is evidence that the returns to a private college are higher for those who come from a "better" family background, because they have a significantly better probability of employment.

Table 14. The effects of private college dummies on average wage effects

Private college dummies	*Poor Background*	*Poor Background*	*Good Background*	*Good Background*
Private universities	.066		.043	
	(.041)		(.033)	
Economics		.143***		.106
		(.048)		(.067)
Law		.328**		.084
		(.132)		(.081)
Humanities		.064		.065
		(.059)		(.048)

Medicine		.004		-.358***
		(.071)		(.043)
Natural Sciences		-.181		-.009
		(.125)		(.075)
Political Science		.067		.063
		(.062)		(.067)
Nobs	400	400	404	404
R Squared	.97	.97	.97	.97

Note : see Table 8.

One reason why people enrol in private colleges and schools is because they provide access to a potentially valuable network. We find some evidence that the quality of this network and the quality of the network before going to college are complements in the production of labour market returns.

Table 15. The effects of private college dummies on average employment effects

Private college dummies	*Poor Background*	*Poor Background*	*Good Background*	*Good Background*
Private universities	.051		.116***	
	(.044)		(.039)	
Economics		.204***		.165***
		(.035)		(.026)
Law		.123***		.154***
		(.026)		(.051)
Humanities		.030		.084
		(.080)		(.055)
Medicine		-.087***		-.205***
		(.015)		(.026)
Natural Sciences		.141**		.245***
		(.065)		(.030)
Political Science		.059		.138**
		(.066)		(.065)
Nobs	378	378	377	377
R Squared	.91	.91	.92	.92

Note : see Table 8.

Finally, we differentiate the effect of a private college in Table 16 and find that the wage and employment effects are higher for those with better background if they graduate from a milanese private university and lower if they graduate from a roman university.

Table 16 The effects of private college dummies on earnings and employment

Private college dummies	*Wages Good Background*	*Wages Bad Background*	*Employment Good Background*	*Employment Bad background*
Piacenza	-.030	.015	.198***	.095

	(.060)	(.021)	(.067)	(.070)
Roma Luiss	-.042	.301**	.224***	-
	(.031)	(.136)	(.020)	
Milano Bocconi	.207***	.096***	.192***	.226***
	(.026)	(.018)	(.020)	(.018)
Milano Cattolica	.129***	.102*	.193***	.130***
	(.042)	(.056)	(.042)	(.047)
Castellanza	.298***	.316***	-	.146***
	(.026)	(.018)		(.018)
MIlano IULM	.169***	.147***	.315***	255***
	(.061)	(.025)	(.028)	(.029)
Roma Cattolica	-.358***	.004	-.204***	-.087***
	(.046)	(.072)	(.026)	(.016)
Brescia Cattolica	-.048	-.110	.203***	.245***
	(.058)	(.122)	(.025)	(.044)
Roma LUMSA	.108**	.135***	.075**	.119***
	(.054)	(.035)	(.038)	(.040)
Nobs	404	400	377	378
R Squared	.97	.96	.92	.91

Note : see Table 8.

Paper to be completed

References

Black and Smith, 2003 : How robust is the evidence on the effects of college quality? Evidence from matching, NBER working paper

Brand and Halaby, 2003

Chevalier A and G. Conlon, 2003, Does it pay to attend a prestigious university, Centre for the Economics of Education, London School of Economics, DP

OECD Education at a glance 2003

Brunello, C., Comi, S. and Lucifora C. 2001 : The Returns of Education in Italy: a New Look at the Evidence, in Colm Harmon, Ian Walker and NW Nielsen (eds.), The Returns to Education in Europe, Edward Elgar,

Checchi and Jappelli, 2003, School Choice and Quality, IZA DP No. 828

Checchi, D. (2003). The Italian educational system: family background and social stratification, mimeographed, Università di Milano.

Perotti, R. 2002 The Italian University System: Rules vs. Incentives, mimeographed, Bocconi University

Card and Krueger (1991), Does School Quality Matter? Journal of Political Economy

Data Appendix

Figure A1: Enrolled students per teacher, by field of study and college

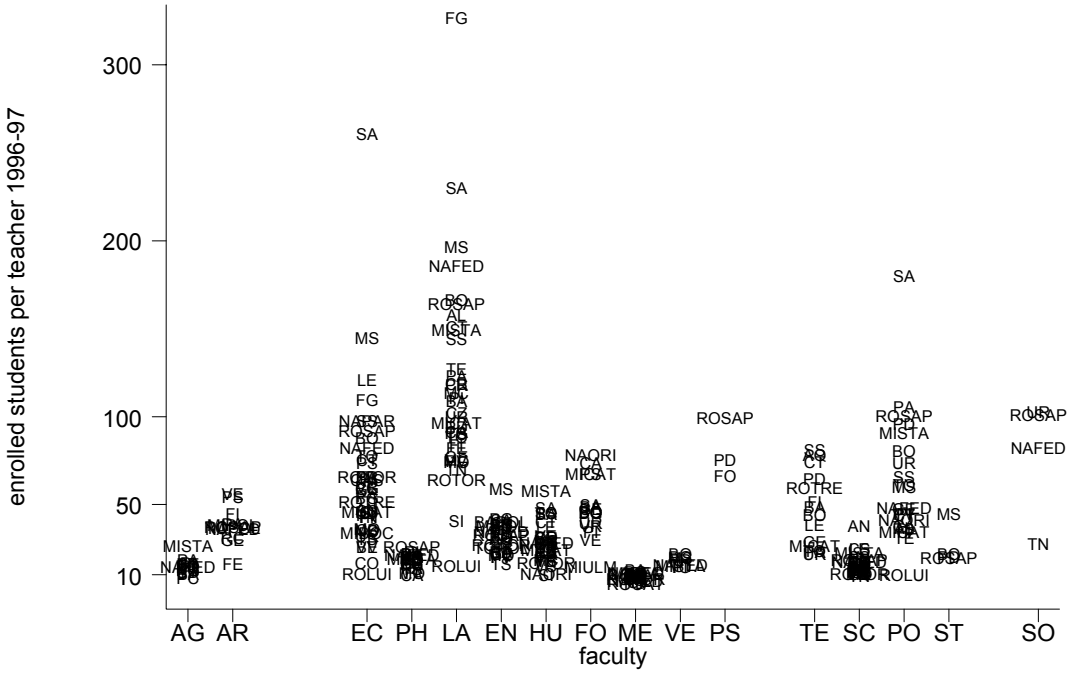


Figure A2: log number of students, by college and field of study

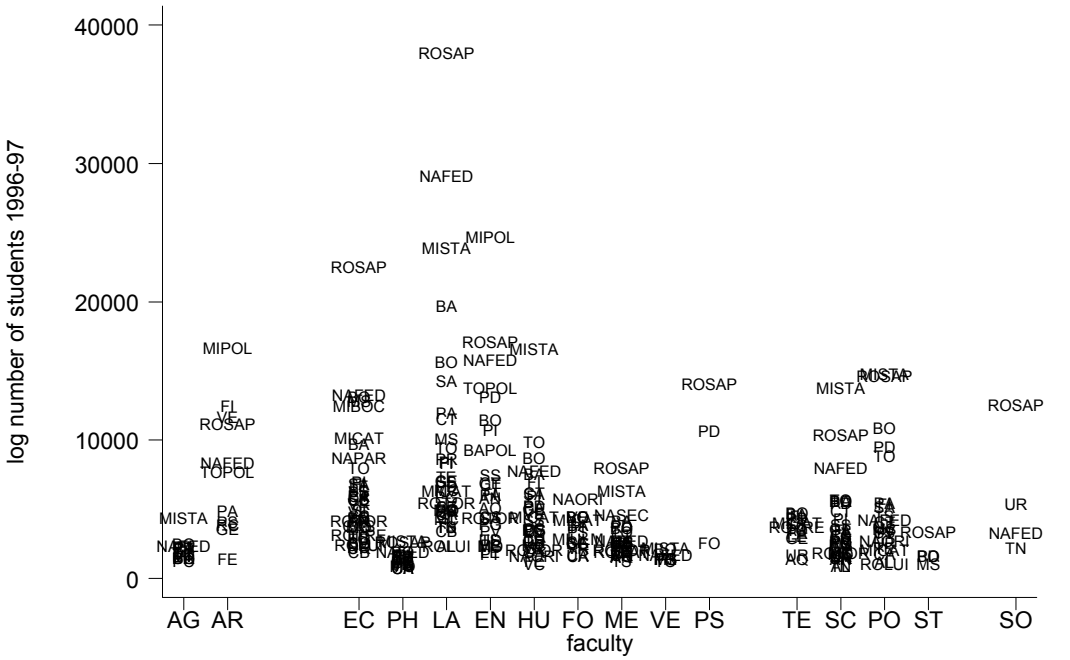


Figure A3: percentage of graduates over students, by field of study and college

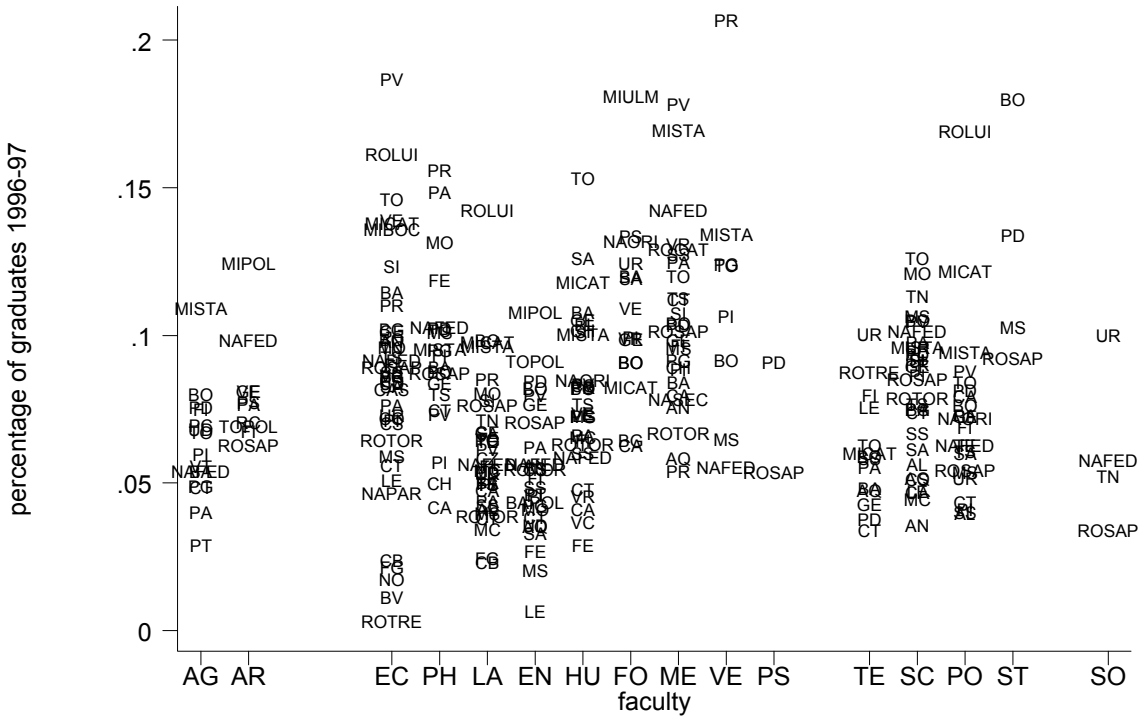


Figure A4: percentage of female professors, by field of study and college

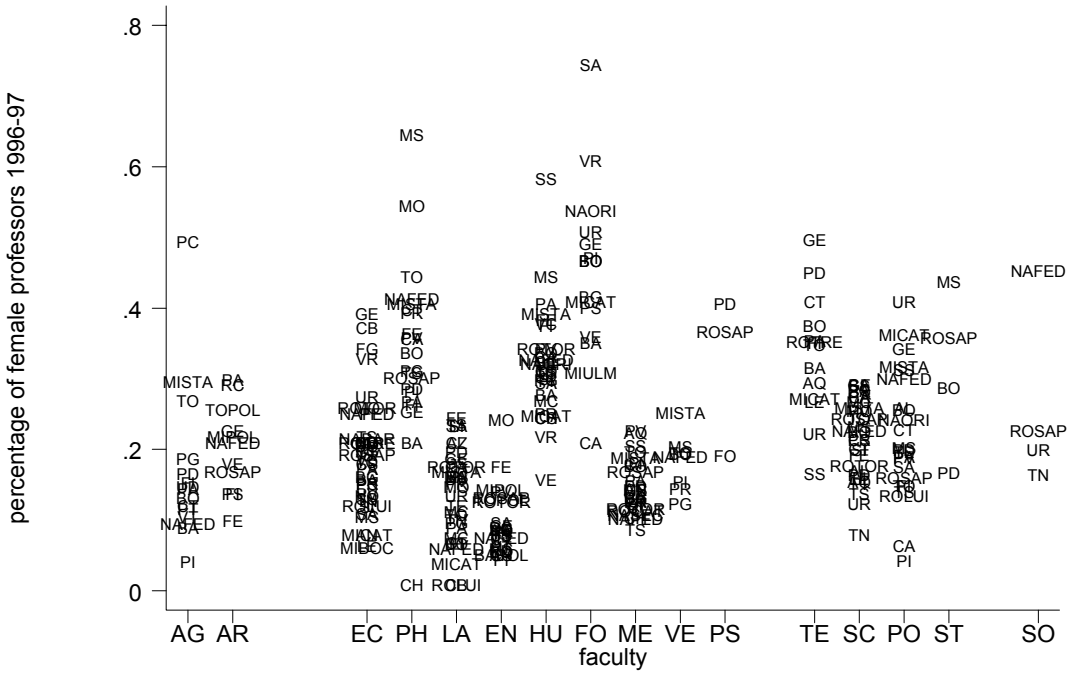


Figure A5: average age of professors, by field of study and college

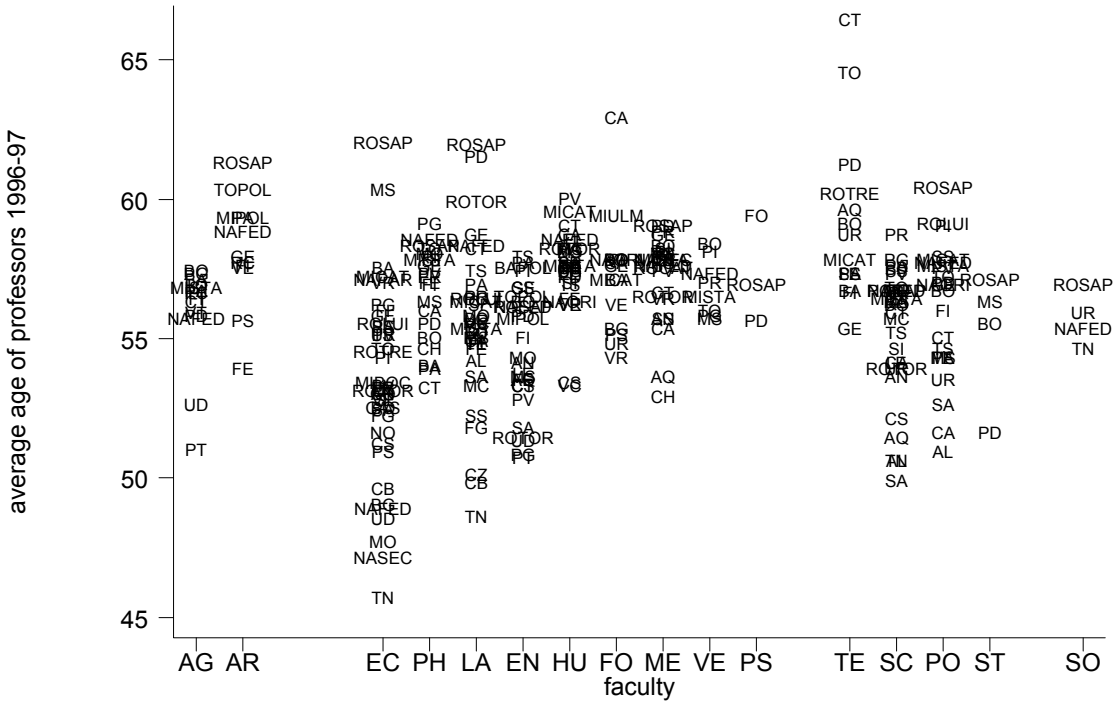


Figure A6: gross college wage effects, by gender

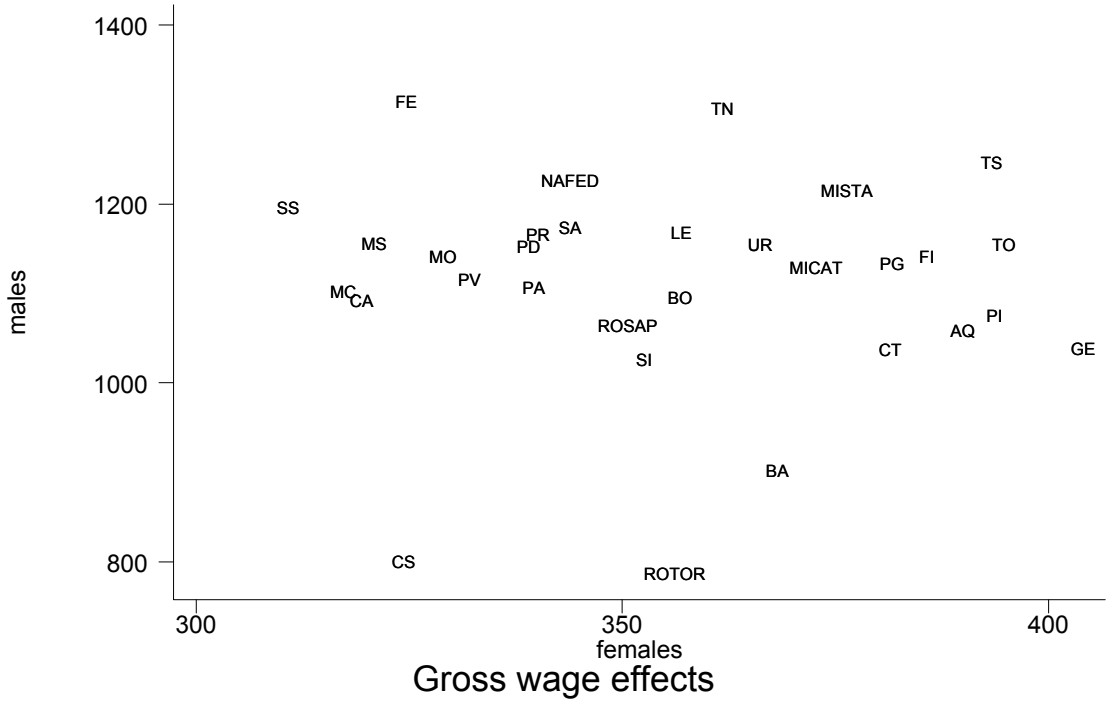
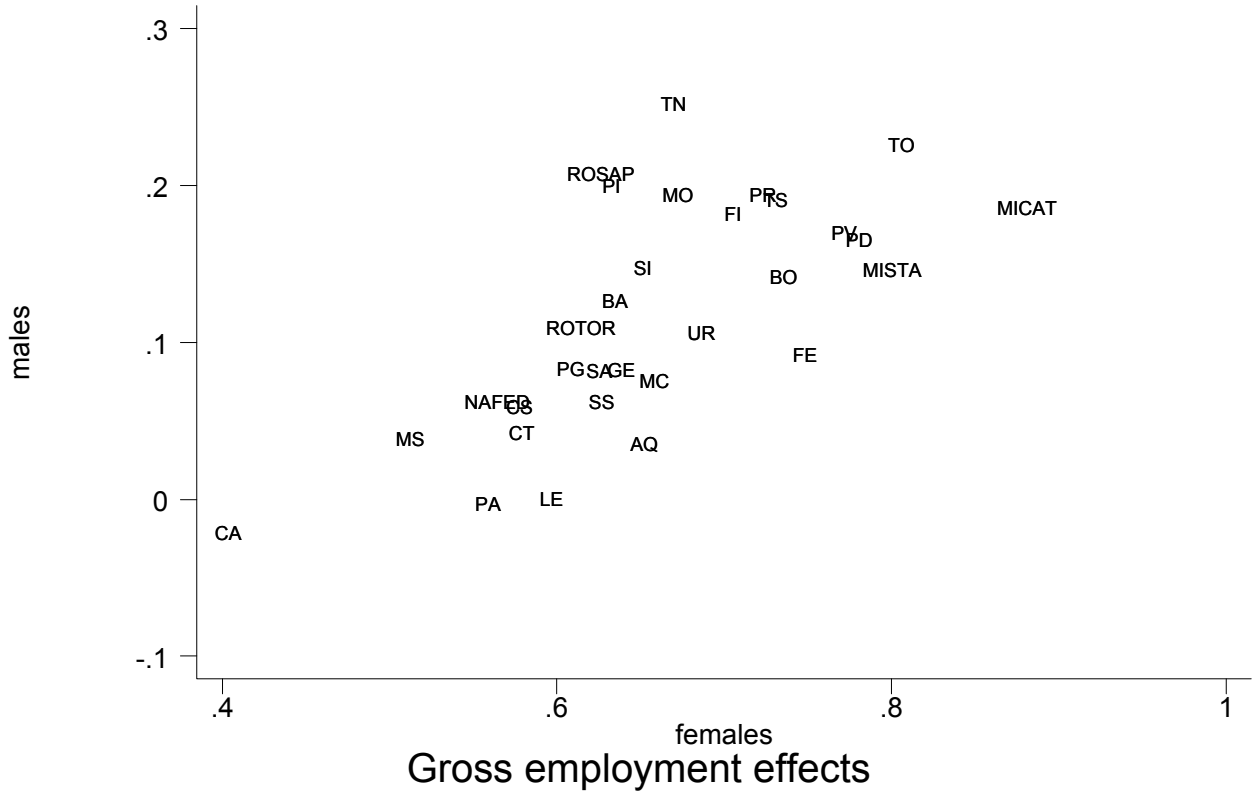


Figure A7: gross employment effects, by gender



Note: the numbers in the table are percentages, which add up to 100 by row.

Table A1. The gross effects of private college dummies on average wage effects

Private college dummies	*Males*	*Males*	*Females*	*Females*
Private universities				
Economics				
Law				
Humanities				
Medicine				
Natural Sciences				
Political Science				
Nobs				
R Squared				

Note : each regression includes faculty dummies. One, two and three stars for statistically significant parameters at the 10, 5 and 1 percent level of confidence.