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of an expansion of tertiary education supply

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HOME OR AWAY?
GENDER DIFFERENCES IN THE EFFECTS OF AN EXPANSION OF TERTIARY EDUCATION SUPPLY

by Lucia Rizzica*

Abstract

The aim of this paper is to estimate the effects of the expansion of tertiary education supply on the educational choices of young Italian high school graduates. A quasi-experimental setting given by the reform of the tertiary education system implemented in 2001 is exploited. The reform was embraced at different points in time and to different degrees: it created significant changes in local educational supply in certain provinces while being only marginally relevant in others. This geographical variation is exploited through a diff-in-diff strategy to estimate the impact of the increase in tertiary education supply on enrolment and the mobility decisions of high school graduates. Major gender differences emerge: the increase of local tertiary education supply generated a significant increase in female enrolment rates leaving unchanged those of males; men, on the other hand, switched from studying outside their province of residence to studying at the local university. These results would suggest the existence of a relationship of substitutability between studying away from home and studying at the local university for boys, but not for girls.

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1 Introduction[†]

The classical economic models have shown that the accumulation of human capital is a key ingredient for long-term growth. Moreover the current global economic trend seems to require the more developed countries to assume a role of technological leaders, thus urging them for the formation of high skilled workers. The positive returns to education both in terms of wage and employability premia are a proof of the high demand for skilled workers on the labour market and therefore *'as global competition for jobs moves up the education ladder, it will be crucial for countries to develop policies that encourage the acquisition and efficient use of these competencies to retain both high value jobs and highly educated labour'*[1].

The comparison with other OECD countries shows that, despite significant improvements in the last ten years, Italy is still characterized by very low enrolment (51.4% versus 56.9% OECD average) and graduation rates (32.8% versus 37.7% OECD average)[2] coupled with extremely high drop out rates (55% versus 31% OECD average)[3]. These figures are translated into the lowest values of stock of tertiary human capital among OECD countries[4].

Figures provided by the Italian National Institute for Statistics (Istat) and by the Ministry for Higher Education (MIUR) show that there exist significant differences in the attitude of men and women towards university studies: women graduate more often and more quickly than men, no matter what is the field of studies we look at and, as in the majority of OECD countries, the number of women at university has outweighed that of men since the beginning of the Nineties. Such differences suggest that the response of men and women to changes in the structure of tertiary education supply is likely to be different as well[5].

[1]OECD (2010).

[2]Graduation rate is computed as the number of graduates, regardless of their age, divided by population at typical graduation age; OECD (2010).

[3]OECD (2009).

[4]Martins et al. (2007).

[5]Noè (2010) provides evidence of differences in attitudes and behaviors between men and women in higher education in Italy.

Aim of this paper will be to evaluate the impact of an increase in the provision of tertiary education opportunities and to see how this impact differs depending on the gender of the student. In particular, I will be interested in analyzing the degree of substitutability between local education and education away from home. If these were perfect substitutes there would be no reason to spread university supply across the national territory, as students would be ready to move to other cities to gain tertiary education. If, instead, the cost of attending a university far from home outweighed the benefits of tertiary education, then the opening of university campuses in undersupplied provinces would prove to be a successful tool to increase the stock of tertiary educated human capital.

The contribution of this paper is thus twofold: on the one hand it fits into the existing literature on the effects of the expansion of access to tertiary education on the accumulation of human capital, which has its foundations in the seminal work of Becker (1975) where the choice of pursuing university is modeled as a comparison between costs (direct costs of education as well as foregone earnings) and the discounted value of the wage and employability premia. In such a framework the expansion of tertiary education supply to previously unreached or undersupplied areas can lower the associated direct costs and thus bring to university those individuals for whom the costs of education were outweighing the stream of future returns. In this spirit, recent works have analyzed the impact of expanding access to primary education (Duflo, 2001), to secondary (Meghir and Palme, 2005) and to tertiary (Holzer, 2007).

On the other hand, the paper delves into mobility choices: in Italy approximately one student out of six attends university in a region different from that of residence and one out of two in a different province. Aim of this paper is thus to understand whether these choices are exclusively driven by supply constraints, i.e. the lack of local supply of tertiary education, or whether there are preferences for staying or moving that go beyond either supply or credit constraints. The literature on students' mobility choices is much less rich: some aspects are covered by studies on schooling choices (Hoxby, 2004) while Ordine and Lupi (2009) provide a contribution to the analysis of the Italian context.

In order to analyze enrolment and mobility decisions this paper will exploit a quasi-experimental setting created by the reform of the Italian university system, which was passed in 1999 and came into force in 2001. The different timing and intensities with which the reform was adopted in the various provinces will allow the unraveling of the causal relationship between the increase of the local supply of education and students' enrolment and mobility decisions.

The paper is structured as follows: Section 2 describes the Italian context and the reform of the university system of 1999; Section 3 introduces the data and provides some descriptive statistics; Section 4 outlines the identification and estimation strategies adopted; Section 5 describes the estimation results; Section 6 digs into the mechanisms that lie behind the results and finally Section 7 reports some specification tests and Section 8 concludes.

2   The Italian university system and the reform of 1999

The Italian university system is organized centrally with the national government being responsible for the institution of new colleges.

The number of colleges across the national territory has grown very little until 1969 when law no. 910 established that every student holding any five year secondary school degree could be admitted to university (before that, high school graduates from professional or technical schools did not have full access to university but could only enrol to courses related to their field of studies). 1969 was therefore a turning point for tertiary education in Italy: after that, the demand for education increased consistently and the government responded by opening many new colleges across the country (Udine in 1978; Viterbo, Cassino and a second university in Rome in 1979; Potenza in 1981; L'Aquila, Chieti-Pescara, Brescia, Campobasso, Reggio Calabria, Verona and Trento in 1982).

Until 1990 the opening of a new college had to be approved centrally by the national parliament. After 1990 (Law no. 341) it was decided that universities were entitled to propose new degrees, but these were still to be approved by the central government. According to the law each university would present three years plans to be approved by the Ministry of Education; such plans could contain proposals of decentralization of educational supply, i.e. each university could propose to open a secondary campus in a different city.

In 1996 (Law no. 662) a further expansion of university campuses took place with the central government ruling that the biggest universities, with more than 40,000 students, had to split in two. This led to the institution of a third university in Rome, a second university in Milan, plus new universities such as Teramo, Catanzaro, Benevento, Varese, Vercelli, Foggia.

Finally, in 1998, universities were allowed to open (or close) new schools (*facoltà*) and/or courses without central approval, conditional on self-financing of the initiative

(DPR no. 25 27/1/1998).

In this context of gradual geographical expansion of university supply, a sudden and significant shift happened with the reform of the university system passed in 1999 (Law no. 509) and implemented in 2001. The reform substituted the traditional curricula of four to five years of length with a "two-step" mechanism in which students get a three year undergraduate degree first and a two year advanced degree after that.

This principle was translated into a significant expansion of the supply of tertiary education: whereas there were around 320 first level courses before the reform (of which about 170 were four year courses and 150 were three year diplomas), in 2001 the number of first level courses jumped up to almost 1200 first level courses.

The increase of tertiary education supply generated through the reform, was not uniform all across the national territory: the reform generated a significant expansion of smaller universities in the explicit attempt of granting equal opportunities of access to tertiary education across the country. In this spirit it was thus decided to encourage the development of smaller universities so as to fill the gap with the more supplied areas.

Indeed the reform of 1999 came as a response to a sharp declining trend in rates of enrolment to university. Indeed, in the Nineties, enrolment rates in Italy had decreased by about 8 percentage points at a constant rate (Cappellari and Lucifora (2009), elaboration on MIUR data). Through the reform the Government thus intended to reduce both the direct costs of education by bringing university closer to the students, and the opportunity costs by shortening the duration of studies from five to three years.

Authors have evaluated the effects of the reform of 1999 on enrolment decisions and educational attainment (Cappellari and Lucifora (2009), Di Pietro and Cutillo (2006), Bratti et al. (2006)), on equality of access to tertiary education (Brunori et al., 2010), and on labour market outcomes (Bosio and Leonardi, 2010). This paper expands the existing literature with an analysis of mobility choices and a focus on gender differences.

3   Data and descriptive statistics

This study mainly relies on three sources of data. The first are the records of the Ministry of Education (MIUR) which provide complete information about the changes that took place on the supply side. Starting from 1998 the Ministry has been collecting yearly data about all tertiary level courses available in each town of Italy. It is thus possible to precisely identify which courses are offered in which province even if the courses are provided by the university of another province (which is typically the case of decentralized campuses whose number has grown up massively during the Nineties).

The use of the MIUR data allows characterizing the alternatives provided to each single student after high school depending on her province of usual residence (where she attended high school). Depending on this, every student will be faced with a different degree of *intensity* of the change of educational supply induced by the reform; for example a student that lives in a small town may have seen the constitution of a new campus where there wasn't any, while a student living in a big metropolitan area would be faced with only a marginal increase of the education supply.

Figure 1 shows the trend of the number of first level degrees offered, the red vertical line represents the year of adoption of the reform. The blue line at the top is the average total number of degrees offered to high school graduates in each province per year. The figure shows a significant increase in the average supply of tertiary education to high school graduates. This increase is also split by type of course offered: it appears that the abolition of the old four or five year curricula (*Corsi di laurea*) and of the three year long Diplomas (*Diplomi Universitari*) was more than offset by the creation of the three year long first level degrees (*Corsi di laurea di primo livello*), while changes in the supply of other types of courses are irrelevant.

Figure 1: Number of degrees offered to high school graduates per province, by course type
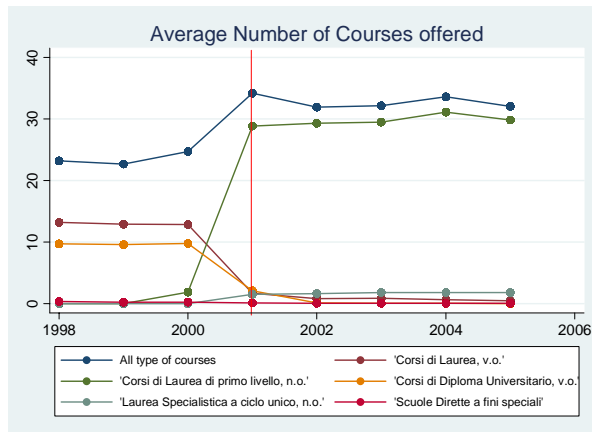
Despite its sharp increase in 2001, the number of degrees offered might be a spurious measure of the actual change in the supply of tertiary education as often one degree was split into two or more without any actual increase of human nor financial resources. Therefore alternative measures of educational supply have been considered: the number of colleges, the number of degrees, the number of departments (*facoltà*) and the number of disciplinary areas, as coded by the OECD, covered by the degrees offered in each province.

The most relevant changes in the supply of tertiary education took place in provinces were new university campuses were opened. Figure 2 shows the trend in the number of university campuses (average number per province) existing in Italy between 1998 and 2005. The data gathered by MIUR reveal that between 1998 and 2005 14 new university campuses were opened in provinces were there previously wasn't any; nevertheless this process was not limited to the year of the reform but started earlier.

Another available measure of educational supply is the number of departments (*fa-coltà*) present in each province. This provides a good proxy of the financial and human resources effectively available. Its trend is shown in figure 2.

A final option is to look at the *variety* of courses available: the OECD classifies all tertiary level degrees into fifteen disciplinary categories. The present work will consider that the actual supply of tertiary education has effectively increased whenever degrees belonging to a new disciplinary area are offered. The higher the number of disciplinary areas covered by the degrees offered in a province, the higher the supply of tertiary education in that province. The trend of variety is also represented in figure 2. This last measure of educational supply will be the one I will focus on: the idea is that a student will effectively be attracted to university if she is offered the field of studies she likes.

Figure 2: Variation in the supply of tertiary education
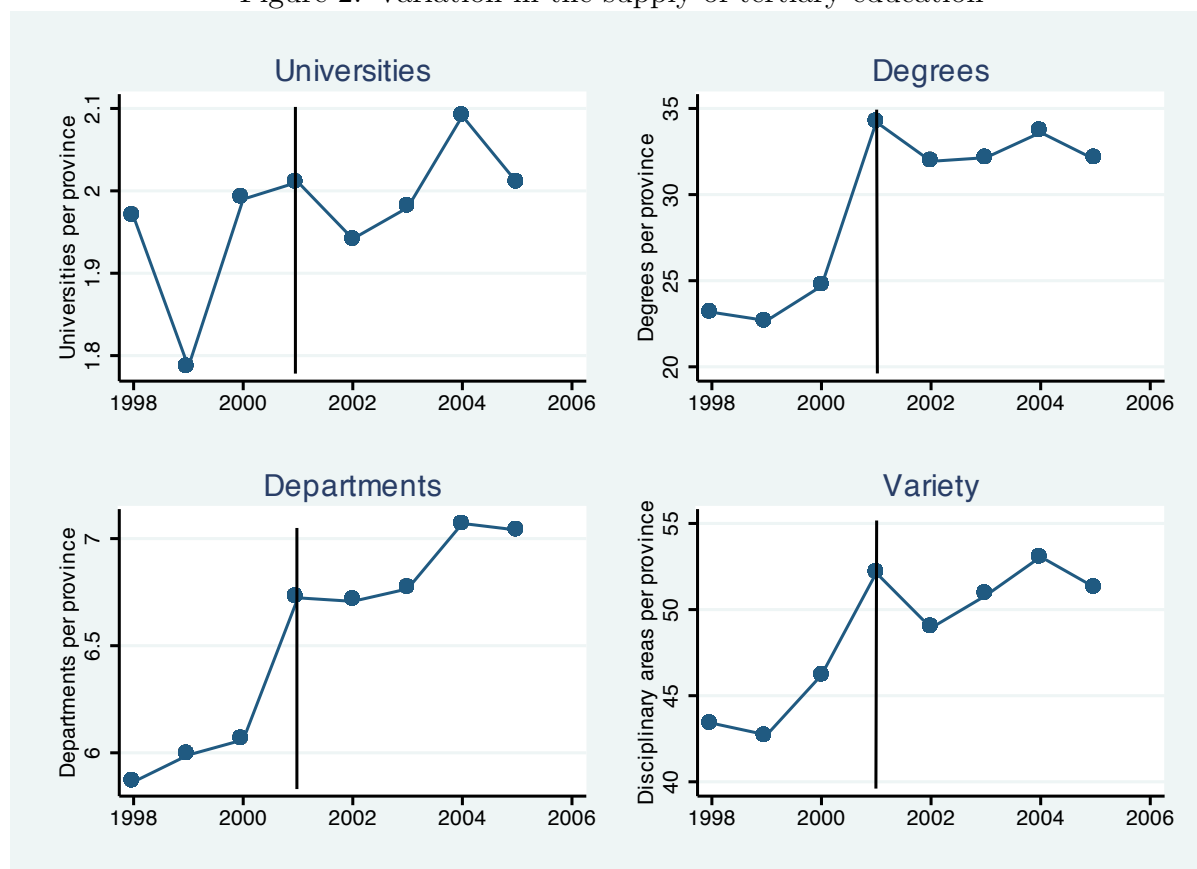
The MIUR data show that a significant increase in the average variety of degrees offered by each province took place between 1999 and 2002, while the increase between 2002 and 2005 is only marginal (figure 2). Only eight provinces remained stable over 90% of variety of university supply and these were Torino, Milano, Padova, Roma, Firenze, Napoli, Bari and Palermo. Overall, as shown in figure 2, all reported measures of educational supply showed a significant increase between 1999 and 2005.

The second source of data used are the Istat surveys on high school graduates (Istat (2004), Istat (2007a), Istat (2010a)); such surveys are conducted every three years on a nationally representative sample of high school graduates who are interviewed three years after completion of high school and asked about their working and educational experience during the past three years. These surveys contain detailed information about the students' family background and are representative at regional level, by type of high school and by gender. The Istat surveys of high school graduates are merged with the MIUR data on the basis of the province in which the student attended high school. This allows us to recover the exact local educational supply that each student was faced with before and after the reform.

Given that the reform has been adopted in 2001 (despite being approved in 1999) I use the surveys of 1998 and 2004 high school graduates, so as to have observations both before and after the reform, with a time window large enough not to be concerned about anticipation nor transitory effects.

Table 1 shows the main characteristics of the sample by treatment group as will be defined in Section 4: the upper panel refers to individual characteristics, the lower panel to province characteristics.

Labour market characteristics are derived from the Italian Labour Force Surveys (Istat, 2008). Specifically, the regressions will include: a youth unemployment rate at province level for the age class of 15-24 so as to proxy for the opportunity cost of higher education and the employability premium for college versus high school graduates at the age of 35-39 to proxy for the returns to college. The reason why this specific age group is chosen is that Italy is characterized by a slow process of entrance of young people into the labour market which implies that the investment in tertiary education typically yields its full returns with respect to stopping after high school only several years after graduation (see Appendix A).

Table 2 and figure 3 report the enrolment rates computed from the Istat surveys of high school graduates. They clearly show that the increase in the supply of university

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degrees and the lowering of the cost of acquiring tertiary education determined by the adoption of the reform has lead to an increase in the number of high school graduates deciding to enrol to a university programme. The data in table 2 show an increase in overall enrolments of ten percentage points at the eve of the reform; the increase between 1998 and 2001 was very significant for both men and women but slightly larger for the latter.

Figure 3: Trend in Enrolment Rates, by Treatment Group
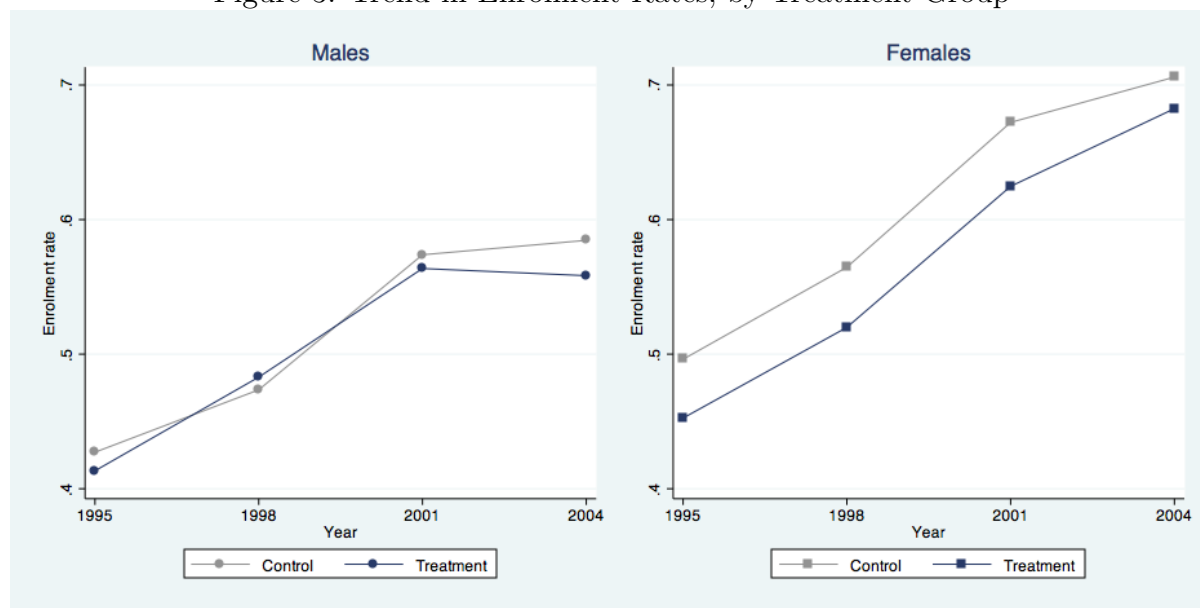
Nevertheless, there is an aspect that can raise concern: the reform of 2001 promoted an initiative that allowed professionals of several sectors (typically employees of the public sector) to have their working experience recognized as educational credits. The mechanism was such that if a professional decided to enrol to university she would not have to sit some of the regular exams. This initiative brought to university a vast cohort of employed individuals, thus plausibly leading to an inflation of the rates of table 2[6]. For this reason enrolment rates that take into account only students who enroled to university straight after having obtained their high school diploma are also computed (table 3).

The pattern of these enrolment rates differs significantly from that seen above. In particular, the *jump* in enrolment rates between 1998 and 2001 that we were observing in table 2 disappears and the pattern of women's enrolment rates now differs significantly from that of men: while men's enrolment rates increased by 2.21 percentage points between 1998 and 2001 and by only 0.59 between 2001 and 2004, women's increased by around 6.5 percentage points both between 1998 and 2001 and between 2001 and 2004.

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[6]The sample only contains individuals who graduated three years before the survey, therefore the number of "late" enrolments I observe is limited by the definition of the sample itself.

The second outcome variable of interest is the propensity to mobility of high school graduates, i.e. the probability of enroling to a college outside the province of usual residence. Indeed if the reform changed the supply of tertiary education opportunities available locally, then, in order to evaluate the reform, it is crucial to understand how men and women changed their propensity to move away from home to attend university.

Table 4 shows that in terms of inter-regional mobility in 1998 girls were moving less than boys, no matter where they came from; their mobility though increased substantially between 1998 and 2004 so that the difference between boys and girls disappeared (except for the islands). Looking at inter-province mobility (table 5 and figure 4), girls' mobility also increased relatively to boys' so that in 2004 they were eventually more likely than boys to attend university in a province different from that of high school.

Figure 4: Trend in Inter-Province Mobility Rates, by Treatment Group
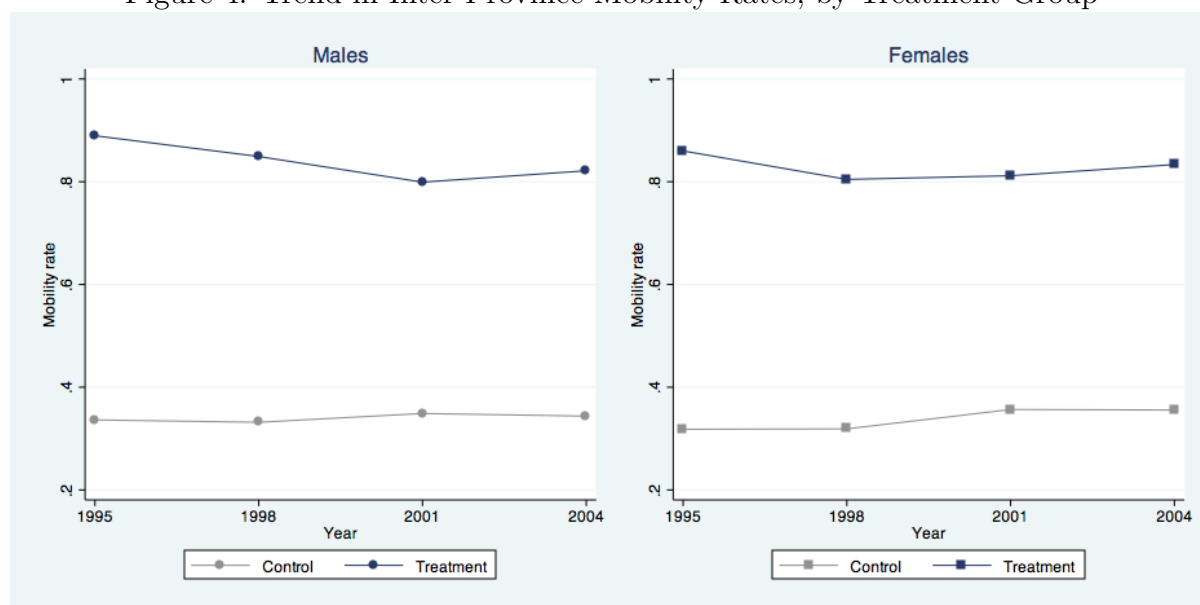
4 Identification Strategy

The set of reforms to the university system which took place in Italy during the Nineties provide a source of exogenous variation to the supply side structure and thus can allow us to identify its causal impact on students' choices.

In this work the effects of the expansion of tertiary education supply will be estimated by exploiting the fact that the supply side shocks induced by the reform of 1999 were relatively larger in some areas than others. A *Differences in Differences* (DD) approach will thus be employed (Ashenfelter (1978), Heckman and Robb (1985), Blundell and Costa-

Dias (2009)) .

This work considers that high school graduates have been exposed to different shocks to tertiary education opportunities depending on their year of birth (year of high school diploma) and province where they attended high school; the exogeneity of such characteristics and the unexpected timing of the reform will ensure the identification of the effects of supply side changes. In fact, by pinning down the province of the individual as that in which he attended high school, we rule out the possibility of strategic migration, given that, at the time individuals had to choose high school, the reform of university could not be anticipated. The identification strategy thus relies on the comparison between the schooling decisions of individuals who graduated from high school before and after the enforcement of the reform, having attended high school in provinces where, due to the reform, the supply of tertiary education increased markedly (i.e. treatment group) and in provinces where the increase of supply was not significant (i.e. control group).

In order to define the treatment and control groups, this paper looks at the change in the number of disciplinary areas (as described in Section 3) covered by first level degrees available to youths upon completion of high school. This can be held the most accurate measure of the effective magnitude of the change in the supply of tertiary education as disciplinary areas better proxy for the actual variety of the educational supply [7]. Treated

Figure 5: Treated and Control Provinces, by *Variety*
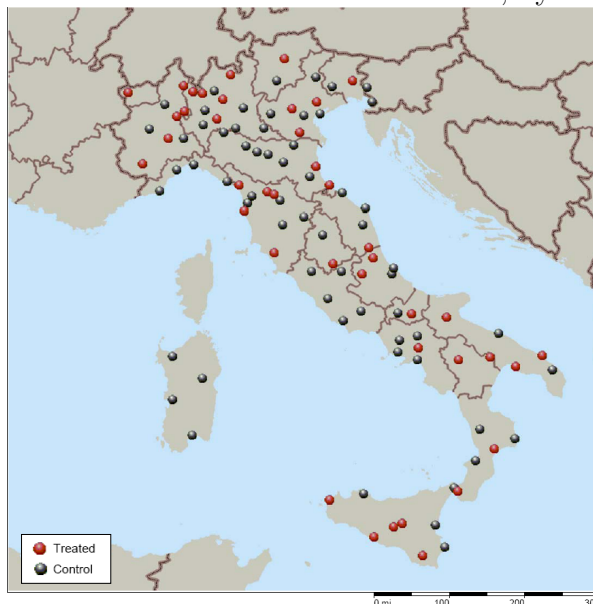
[7]Robustness checks in section 7 will extend the analysis to the other measures of higher education supply introduced in section 3.

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provinces are thus defined as those in which the number of disciplinary areas covered by first level degrees available to high school graduates increased by more than 25% between 1998 and 2004[8]. These provinces are pictured in figure 5.

Figure 6 shows the average number of disciplinary areas per province in the treatment and control groups between 1998 and 2004. By construction of the treatment group, the supply of tertiary education presents a kink in 2001 for treated provinces while it remains flat for the control ones.

Figure 6: Variety of Tertiary Education Supply in Treatment and Control Provinces
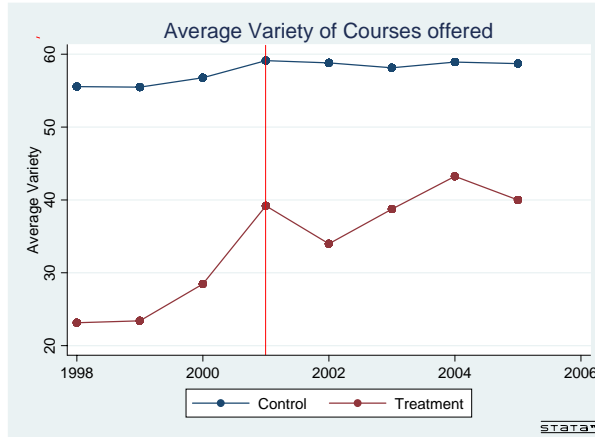
In order to get unbiased estimates the empirical strategy will rely on a key identifying assumption which is that, conditional on individual observed characteristics, the *change* in average outcomes between before and after the reform for individuals in the treatment group would have been the same as for individuals in the control group. This is equivalent to assuming that the treatment and the control group satisfy a common trend assumption by which the *slope* of the long-run trend is the same for both groups, whereas the level is not necessarily the same.

In the case considered, because treated provinces are by design of the policy intervention poorer than the control ones, the trend in enrolments and in other observable variables will be lower; still what matters is that the slope is the same[9].

The impact of the reform on the outcomes of interest will hence be estimated through equations of the following type:

$$Y_{ipt} = \beta_1 T_p + \beta_2 Post_t + \beta_3 (T_p \times Post_t) + \gamma_1 X_{ipt} + \gamma_2 Z_{pt} + \epsilon_{ipt} \tag{1}$$

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[8]Section 7 also provides sensitivity analysis to the 25% threshold.

[9]This is equivalent to assuming that $E[\epsilon_{ipt}|Treat_p = 1, t] = E[(n_{ip}|Treat_p) + m_t]$ with $E[m_t|Treat_p = 1] = E[m_t|Treat_p = 0]$ being the common trend component. This assumption will ensure that $E[\epsilon_{ipt_1} - \epsilon_{ipt_0}|Treat_p = 1] = E[\epsilon_{ipt_1} - \epsilon_{ipt_0}|Treat_p = 0]$ which is a first difference version of the usual error independence assumption required by randomization.

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where Y_{ipt} is the outcome of interest of individual i, who attended high school in province p, graduating at time t; $T_p = 1$ identifies treated provinces, $Post_t = 1$ indicates the wave after the reform, X_{ipt} are observable characteristics of individual i, in province p, at time t and Z_{pt} are province time-varying characteristics, while ϵ_{ipt} is the usual individual error term. The interaction term $(T_p \times Post_t)$ will give the effect of the reform on the individuals in the treatment group (*Average Treatment Effect on the Treated, ATET*)[10].

The same regressions will be run separately for men and women in order to evaluate whether the effects of such expansion of the supply of tertiary education were different depending on the gender of the student.

The first type of equation estimated is the probability of enrolment to university of individual i, who attended high school in province p, at time t, $Pr(E_{ipt} = 1)$:

$$Pr(E_{ipt} = 1) = \beta_1 T_p + \beta_2 Post_t + \beta_3(T_p \times Post_t) + \gamma_1 X_{ipt} + \gamma_2 Z_{pt} + \epsilon_{ipt} \qquad (2)$$

This will be estimated through probit because imposing linearity with a dichotomous outcome variable would likely yield predicted probabilities outside the [0,1] interval. A fully parametric linear index model with normally distributed error terms is employed and linearity in the index is imposed.

A second outcome of interest is then the possible substitution effect between studying out of one's province of residence and studying locally: in other words we expect that students will partially switch from studying in another province to studying in the local university once this is significantly expanded.

Therefore a second regression of the following type is estimated:

$$Pr(M_{ipt} = 1) = \beta_1 T_p + \beta_2 Post_t + \beta_3(T_p \times Post_t) + \gamma_1 X_{ipt} + \gamma_2 Z_{pt} + \epsilon_{ipt} \qquad (3)$$

Where $M_{ipt} = 1$ indicates that the individual i, who attended high school in province p, at time t enroled to university in a province different from p.

The latter equation will be estimated through standard probit first and then through a Heckman Two Step procedure (Heckman, 1979) to account for selection into enrolment (i.e. only for those who actually enroled to university can we observe the choice of where to study). In this case the type of school attended is used as an instrument for selection

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[10]Alternatively the estimating equation will include province fixed effects ϕ_p and drop the collinear treatment dummy: $Y_{ipt} = \phi_p + \beta_2 Post_t + \beta_3(T_p \times Post_t) + \gamma_1 X_{ipt} + \gamma_2 Z_{pt} + \epsilon_{ipt}$.

into university assuming therefore that this does affect the probability of enroling to university but not directly that of studying locally rather than away from home.

5 Results

The use of a DD approach allows us to isolate the effects of the reform from any time invariant characteristic as well as from those characteristics which do vary over time but do so in the same way in the Treated and Control provinces.

As table 1 shows, Treated and Control provinces do systematically differ on observable characteristics, but this difference tends to be stable over time. Nevertheless, to rule out the possibility that some of these characteristics may bias the estimates, all specifications will include both individual and province time varying characteristics. Moreover I allow for the possibility that standard errors are correlated among individuals living in the same province and therefore will cluster them at the province level.

All the coefficients associated to the control variables[11] have the predicted signs: both individual characteristics and family background seem to play a crucial role in determining the probability of attending university, with students from *licei* being by far the most likely to enrol; moreover intergenerational mobility seems to be very weak as there appears a very strong positive correlation between parents' and children's education. On the other hand, students living in areas where the rate of youth unemployment is higher show a higher propensity to enrol to university, thus confirming the idea that they face a lower opportunity cost of staying out of the labour market.

Tables 6 and 7 show the results of the DD probit estimation of Equation 2. The outcome variables are respectively the probability of enroling to university within three years from high school graduation and the probability of enroling in the same year. In each table the first line presents the coefficient of the $(T_p \times Post_t)$ term, i.e. the *ATET*.

The estimates show a significant gender differential in the effects of the local expansion of tertiary education opportunities: while men's demand for education turns out to be inelastic to changes on the supply side, women have responded to the increase in educational supply with a significant increase in enrolment rates, both within three years and immediately after high school.

It further appears that the treated provinces are associated with lower enrolment rates (negative treatment fixed effect, T_p), and that for both male and female students there was a positive common trend in enrolment rates (positive coefficient of $Post_t$). The ATET

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[11]These are not shown in the tables for the sake of brevity but are available upon request.

estimates show that over and above such trend there was a positive and significant effect of the reform on female enrolment rates: an increase of the variety of tertiary education supply by at least 25% between 1998 and 2004 translated into an increase of women's enrolment rates between 4.8 and 5.4 percentage points for enrolment within three years from high school graduation and between 6.2 and 7.8 percentage points for enrolment within the same year of high school graduation, while men's enrolment rates did not show any significant increase.

Tables 6 and 7 have so far shown that the average effect of the reform on girls from the treated provinces was an increase in the propensity to enrol to university of about 5 percentage points (for enrolment within three years from high school graduation). Turning to the analysis of mobility choices I will be able to identify the effect of the reform on boys: Table 8 shows the probit regression of equation 3.

Local labour market conditions are included either in their absolute values or in relative terms as the difference between the value of the province in which the individual lives and the level of the highest quartile: the 75th percentile of the employability premium, of the unemployment rate and of per capita GDP respectively in 1998 and 2004. The idea is that the decision to move will crucially depend on the *relative attractiveness* of the destination with respect the place of departure.

The probit regressions show a strong decrease in the mobility of male students and no effects on women. The ATET indicates that exposure to the increase of local educational supply by more than 25% decreased the propensity of male students to study away from home by between 6 and 7.7 percentage points.

This, coupled with the previous results on enrolment decisions, would suggest that men substituted "education away" with "education at home", while women who did not have a tertiary education facility nearby tended to drop out of education after high school.

The results on mobility reported in table 8 are likely to be biased because of sample selection: students who are faced with the decision about whether to study "at home" or "away" are only those who have already decided to get into tertiary education, therefore the coefficients estimated in the probit regression above are likely to overestimate the magnitude of the effect (downward bias)[12].

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[12]This is because those who decide to select into tertiary education represent a positive selection of the student population, i.e. it is the most capable and/or motivated students. On the other hand it is likely that there would be a positive correlation between ability and the decision of studying away, therefore not taking into account the selection process would overestimate the effect of the policy (as the effect is negative, we will have downward bias).

In order to correct this bias a Heckman two-step procedure is employed in which first the probability of enrolment is estimated using as excludable instrument a dummy variable for whether the student has attended a *liceo* or another type of school.

The results of the Heckman two step estimation, reported in Table 9, show indeed that the probit estimates were downward biased but confirm the idea for which the increase in the local supply of tertiary education decreased the probability of studying away only for male students who substituted "studying away" with "studying at home". The magnitude of such effect ranges between 3.2 and 4.3 percentage points, depending on whether one controls for the absolute values of labour market characteristics or for the difference between local labour market conditions and those of the highest quartile.

6 Mechanisms: the role of financial and cultural constraints

While the results presented in section 5 show that there is a significant and systematic difference between the effects of the reform on male and female students, it is crucial to understand what are the underlying mechanisms determining such outcomes.
In particular, being able to disentangle the effect of financial constraints from that of non financial ones would highlight what are the possible policy implications of the results found in section 5.

To do so have interacted the effect of the reform with two characteristics of the household: whether the student's mother has been to college, to proxy for the role of the maternal model, and whether the father is a manager, to proxy for the household's economic status.

The results, presented in table 11 and 12, show that there are indeed different mechanisms underlying the schooling choices of boys and girls: while the increase in enrolment rates induced by the reform has been larger for sons of more educated and richer, the opposite happened for girls: the reform brought to college those belonging to less affluent households and whose mothers had not been to college.

Table 12 shows the interaction between the effects of the reform, maternal models and family income on mobility decisions. Again different patterns emerge depending on the gender of the student: the signs of the coefficient suggest that boys have *switched* from education away from home to education at home when they belonged to less wealthy households, while girls whose father was a manager are those who were more likely to

return home consequent to the reform. These girls are unlikely to be facing a tight budget constraint which suggests that cultural models, rather than economic constraints, lay behind the choice of girls of not moving away from home.

Therefore, although the coefficients of tables 11 and 12 are, in most of the cases, not statistically significant at the standard levels, the pattern of their signs is consistent with the hypothesis that, rather than being limited by financial constraints, girls' schooling choices are rather hindered by *cultural* ones. In other words the estimates of tables 11 and 12 would point to the predominance of non financial costs over financial ones and thus indicate that either families or girls have a strong preference for staying close to home, a trait that instead does not anyhow emerge from the observed behaviors of boys.

A rough test of this hypothesis can be carried out by comparing the effects of the reform in each region with an indicator of women's role inside the family. The data provided by the Istat survey on time use for 2003 (Istat, 2007b) are used, and the average time women spend everyday on family care is compared with the region-wise estimated ATET.

Figure 7: The role of cultural models: time use and the effects of the reform
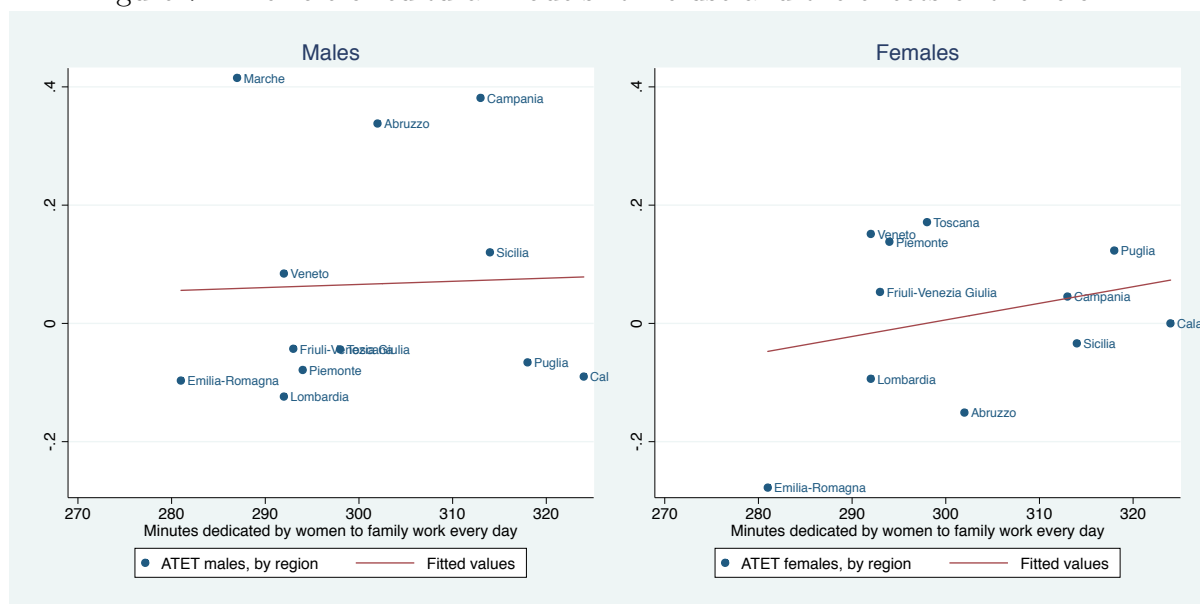
Figure 7 shows the relation for men and women: while there appears to be no correlation at all for men, the effect of the reform on female enrolment rates seems to be larger in regions where women usually spend more time on family care.

As one may be worried that the identification assumptions required by DD might not be satisfied region-wise, figure8 plots time women spend on family care against the

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detrended enrolment rates of males and females at the regional level (figure 8). This exercise shows that the relation is negative for boys and again positive for girls.

Figure 8: The role of cultural models: time use and enrolment rates
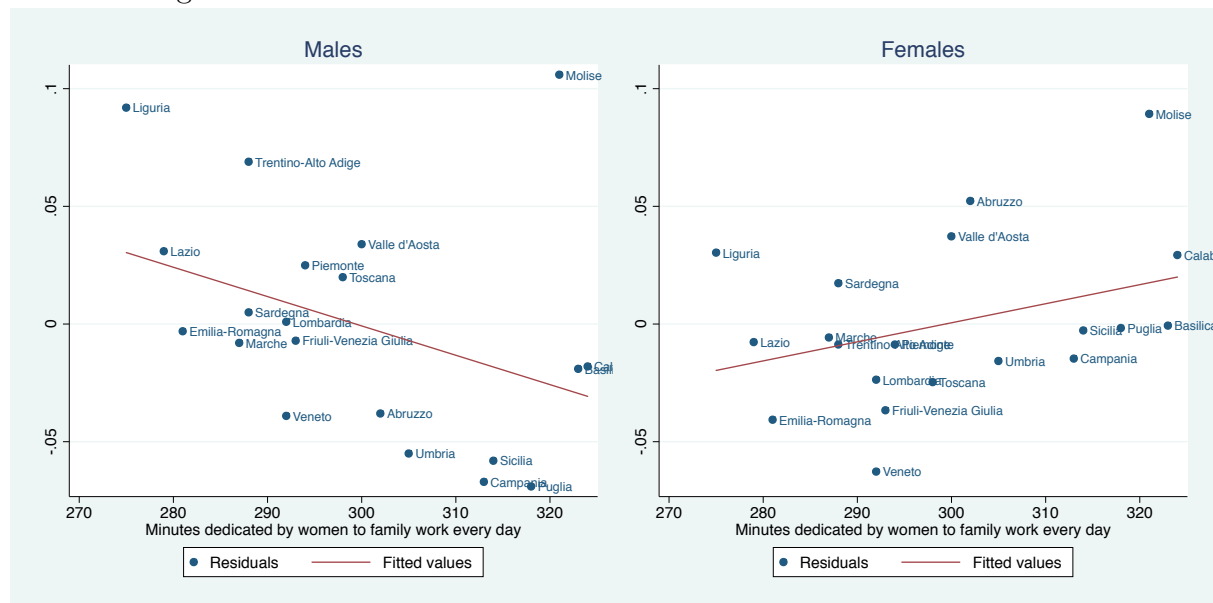
Despite being far from conclusive, the relations identified in this Section seem to point at the existence of a link between cultural factors and females' costs of attending tertiary education: for families where girls are faced with a female model that does not contemplate labour force participation or high education, and in areas where women traditionally spend more time on family care, the expansion of tertiary education supply can significantly enhance girls' educational attainment. Indeed the possibility of attending university without having to move away from the family would decrease the perceived cost of schooling for these girls.

7 Specification checks

Common Trend Assumption The first type of concern that arises when using a DD approach is that the underlying common trend assumption might not hold (footnote 9). Figure 6 showed that before 1998 and after 2004 the variety of tertiary education supply was stable and followed the same trend in treated and control provinces. More importantly, table 1 has proved that the differences in observable characteristics between treated and control groups did not significantly change between before and after the reform: the difference-in-difference in individual characteristic was essentially null and no significant change in trend was detected with respect to the local economic indicators (employability premium, unemployment rate and GDP per capita). As a matter of fact

figure 9 shows that the treated provinces did not experience any extraordinary growth nor significant transitory shock that might have pushed up average educational attainment[13].

Figure 9: log GDP per capita.
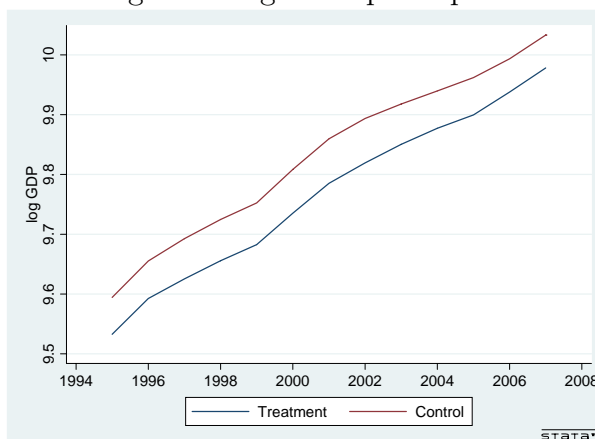
In order to test the common trend assumption the same regressions are run on a different time window: the treated and control provinces identified in section 4 are thus compared over the time window 1995 to 1999. The results of this *placebo* exercise are reported in tables 13 to 15: there is no effect on enrolment decisions and no difference between boys and girls.

When looking at mobility decisions instead it appears that the treated provinces were characterized by an excess decrease in mobility already before 2001, nevertheless there was no difference between boys' and girls' behaviors.

Instrumental Variables Approach One may be concerned that the selection of provinces into treatment might be demand driven and thus endogenous. In other words, the expansion would have increased the educational supply only in areas where there was anticipated unmet demand and thus the results would only be driven by such mechanism. While this would be hard to argue at the light of the results found in this paper, where it was only female enrolments that increased, it is preferable to use an instrumental variables approach to drive away such doubt.

This paper exploits proximity to provincial elections at the time of the reform as an instrument for the increase in local educational supply. The idea is that when local elections approach, local politicians will want to expand the supply of visible public services to gain the public favour[14].

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[13]Had this been the case we would be facing the so called 'Ashenfelter's dip': selection into treatment is driven by unobserved temporary shocks (Ashenfelter, 1978).

[14]The same reasoning was applied by Levitt (1997) to estimate the effects of police control on crime, where the supply of police forces increased at the approaching of local elections

Table 16 shows the results of the IV regression, where the excluded instrument is a dummy variable for whether provincial elections were held in 2001 or 2002. The first stage shows a strong positive relationship between this variable and the likelihood of having increased the supply of local tertiary education by more than 25% (i.e. the treatment variable defined above).

In terms of effects on enrolments, the coefficients of the IV are similar to those of the DD (table 6, columns 4-6) though not significant . Their similarity anyway reassures us about the validity of the quasi experiment exploited in this paper.

With respect to mobility[15] instead the coefficients are quite different from the previously estimated ones (table 9, columns 4-6). The positive sign of these coefficients is likely due to the omission of the province fixed effects (which would be collinear with the instrument); nevertheless the difference between the effect on boys and the effect on girls is very close to the results of table 9.

Excluding big cities The same regressions have been run taking out of the sample the students residing in the three biggest cities: Milan, Rome and Naples. This choice is driven by the concern that these cities, which all belong to the comparison group, might draw the average effect of the reform in the control group down and thus artificially expand the effect on the treated provinces.

The exclusion of these cities did not imply any relevant change in the estimates with the coefficients associated to the *ATET* remaining almost identical both in magnitude and in statistical significance (table 17).

Different Thresholds According to the definition introduced in Section 4, "treated provinces" are those in which the increase in the variety of courses between 1998 and 2004 was larger than 25%. Such threshold is clearly arbitrary and corresponds to the 63rd percentile in the distribution of the change in the variety of courses among the provinces. Because the choice of this threshold is arbitrary, one might be concerned that the results may be driven by this choice. For this reason this threshold has been shifted down to the median and up to the 75th percentile.

Tables 18 and 19 show the results of this exercise: the effect of the increase in tertiary education supply on female students' enrolments is larger the higher the threshold, i.e. the bigger the increase in supply. On the other hand, in all three cases there are no effects on male students' enrolments.

With respect to mobility choices then, boys' propensity to choose the local university

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[15]The Two Stage Least Squares are combined with the Heckman selection model by including the in the IV regression the Inverse Mills Ratio calculated from the probit estimation of the Selection Equation (Wooldridge, 2001).

rather than moving away from home increases proportionally with the threshold only in the probit specification with labour market controls expressed in relative terms. In all other specifications the effect on boys is stable and always larger than that on girls, which is never distinguishable from zero.

Different Treatments One might also be concerned that the results may be driven by the definition of treatment chosen. For this reason the same estimation exercise has been run under different definitions of treatment group. Increases in the number of universities, in the number of departments (*facoltà*), and finally in the number of degrees available to first year students at the time of enrolment have all been analyzed; as in the main specification, the treatment is always defined for increases of more than 25% between 1998 and 2004.

Tables 20 and 21 show the results under these alternative definitions of treatment, respectively for enrolment and mobility decisions.

The main results are robust to such different definitions of treatment, and in particular those on enrolment rates, where, no matter how we define the increase in local educational supply, girls respond to it with a significant increase in enrolment rates while boys don't. This is true in all specifications except the last two: effects of the increase in the number of departments and in the number of degrees on enrolments within one year from high school graduation. In the first case a positive strong effect is found on both boys and girls decisions, while in the latter no effect is found on either group.

The results on mobility are less significant but maintain the direction indicated in the main specification, with boys substituting education away from home with local education while girls not.

8   Concluding Remarks

This paper analyzed the effects of an expansion of tertiary education supply on schooling decisions of high school graduates. The idea is that the provision of local educational facilities can represent a major cut to the individual cost of attending tertiary education and thus generate an increase in the rates of enrolment to university of high school graduates. This is of particular relevance in Italy, where tertiary enrolment rates are below the OECD average and the value of tertiary human capital is the lowest among OECD countries (OECD (2010) and Martins et al. (2007)).

A Difference in Difference estimation strategy was employed to compare the schooling

decisions of high school graduates between provinces which, following to the reform of 1999, experienced a significant increase of tertiary education supply, and those where this change was negligible. The two main outcomes analyzed are the decision of enrolling to university at all and that of enrolling to the local university rather than to one that is farther away. While the first probability was estimated via a DD probit, the second required a two-step Heckman estimation to account for sample selection (i.e. only those who did enrol to university are observed in their choice of attending university locally or away).

This analysis has been implemented in a gender perspective, believing that the cost of moving away from home might be different for boys and girls. Indeed the finding that the provision of local tertiary education generated an increase in the number of girls that enrolled to university whereas boys tended to substitute education away from home with local education, confirms the idea that girls are faced with a higher cost of moving away from home and that thus the lack of local educational facilities leaves a significant fraction of them out of education. A crucial consequence of this finding further relates to the *quality* of females' education: given the extra constraints they face when taking their schooling decisions, they are likely to end up attending higher education institutions of relatively lower quality than those attended by their male peers.

This work also suggested that the most relevant constraint to girls' mobility (and thus schooling) is a non financial one, where girls coming from families in which the maternal model is mainly one of family caregiver would be less willing to move away from home and thus more positively affected by the local expansion of education supply. Indeed evidence was shown that the effect of the reform was more significant in areas where women are reported to dedicate more of their time to family care.

Some caveats need to be pointed out: spillover effects between treated and control areas cannot be ruled out. Still, their existence would imply that people in control provinces should respond to the treatment of the other provinces; so for example students living in a control province but on the border with a treated province might respond to the increase in educational supply in the treated province by switching from not enroling to college to enroling. Then, if this was the case, the treatment would generate an increase of enrolments of people in control areas as well, and thus the treatment effect estimated in this paper would be a lower bound of the actual effect of the reform. With respect to mobility decisions, on the other hand, it is very unlikely that students from the control provinces moved to the treatment provinces in response to the increased supply of tertiary

education in the latter because the difference between treatment and control provinces in terms of educational supply remained very large despite the reform.

A second caveat concerns the possibility of general equilibrium effects that might lower the returns to tertiary education: if more people attend higher education this is likely to lower the expected returns from such choice. If the reference labour market was the same for both treated and control provinces this would not be an issue. If instead the reference labour market is local, which is plausible, then again the actual effect of the reform would be mitigated by the anticipated counterbalancing general equilibrium effects.

The study by Bosio and Leonardi (2010) reassures us on this respect. They show that the reform increased the probability of employment of young graduates with a larger effect on men than on women. If they were anticipating general equilibrium effects, women should then have increased their enrolments less than boys. On the other hand, the same authors find a wage penalty for young graduates after the reform as would be predicted by a general equilibrium model, but this was again larger for girls than for boys.

A crucial point is that this analysis only looked at the effects of the expansion of educational supply onto relatively young high school graduates, i.e. those who graduated three years before the survey. Indeed there is evidence that a very large increase in enrolments to tertiary education came from mature students and in particular from workers, who were able to reconcile work and study thanks to the provision of local educational facilities. A simple analysis of the MIUR data shows that the treated provinces exhibited a sharp increase in the number of women aged over 30 enroling to university (figure 11 in appendix C). This aspect seems to be an essential one that should be adequately analyzed in order to fully evaluate the effects of the provision of tertiary education at a decentralized level.

Another aspect which has not been fully analyzed in this work regards the possibility that the reform and the consequent increase in enrolments might have brought to university less capable students who eventually did not reach graduation and crowded universities without making enough progress on their studies. To address this concern estimates of the effects of the policy on the probability of interrupting the studies, on the probability of attending classes regularly and on the number of exams passed after three years from the beginning of the studies are presented. The results are reported in appendix D. Unfortunately these results are not fully informative because do not take into account the sample selection problem entailed; nevertheless they point to the absence

of any negative effect of the policy in terms of educational achievements.

To conclude, while the results obtained in this paper clearly have limited *external validity*, this work provides a valuable tool of policy evaluation for its *internal validity*: the most recent educational reforms in Italy are aiming at a more "efficient" use of the financial resources, which should entail a strong centralization of the tertiary educational system and the dismissal of all small satellite campuses. This work showed that such an intervention, if not coupled with other instruments that can increase women's propensity to move, would leave a large slice of the female population out of the educational system, given that there exist significant differences in the perceived cost of moving away from home between men and women.

Table 1: Descriptive Statistics by Variety Treatment

	- 1998 Graduates -			- 2004 Graduates -			
	Control	Treatment	C-T	Control	Treatment	C-T	DD
Female	0.529	0.544	-0.015 ***	0.512	0.520	-0.008 ***	-0.007***
	(0.499)	(0.498)		(0.500)	(0.500)		
Liceo	0.296	0.293	0.003**	0.315	0.280	0.035***	-0.032 **
	(0.457)	(0.455)		(0.465)	(0.449)		
Grade High School	75.44	75.28	0.16 ***	78.24	77.88	0.36***	-0.2 ***
	(12.00)	(11.69)		(13.16)	(13.06)		
Father has college degree	0.103	0.0780	0.025***	0.124	0.0995	0.0245***	0.0005***
	(0.304)	(0.268)		(0.329)	(0.299)		
Mother has college degree	0.0880	0.0615	0.0265***	0.101	0.0897	0.0113***	0.0152***
	(0.283)	(0.240)		(0.302)	(0.286)		
Father upper class	0.167	0.150	0.017***	0.167	0.149	0.018***	-0.001
	(0.373)	(0.357)		(0.373)	(0.356)		
Mother upper class	0.0577	0.0466	0.0111***	0.0587	0.0467	0.012***	-0.0009
	(0.233)	(0.211)		(0.235)	(0.211)		
Mother Housewife	0.564	0.559	0.005***	0.489	0.492	-0.003**	0.008***
	(0.496)	(0.497)		(0.500)	(0.500)		
Number of Universities	2.016	1.439	0.577***	2.145	1.805	0.34	0.237
	(1.577)	(0.803)		(1.756)	(1.071)		
Employability Premium	5.811	7.766	-1.955*	3.068	4.233	-1.165	-0.79
	(7.969)	(6.750)		(5.560)	(7.538)		
Unemployment Rate	30.82	32.09	-1.27	23.42	25.06	-1.64	0.37
	(20.85)	(21.09)		(14.07)	(16.19)		
log GDP per capita*	9.714	9.649	0.065*	9.931	9.868	0.063*	0.002
	(0.283)	(0.266)		(0.256)	(0.260)		

* Source: Istat (2010b).
  Standard Deviations in parentheses.

Table 2: Rates of Enrolment within three years from high school graduation

	1998 Graduates			2001 Graduates			2004 Graduates		
	Males	Females	Total	Males	Females	Total	Males	Females	Total
North-West	47.42	51.10	49.38	57.46	64.08	60.98	61.29	69.70	65.73
North-East	44.41	49.36	47.05	59.15	60.95	60.12	58.25	66.35	62.55
Centre	52.09	60.01	56.36	59.32	67.70	63.65	61.25	69.80	65.61
South	47.67	59.21	53.72	55.22	68.80	62.07	54.42	71.55	62.92
Islands	44.69	52.66	49.00	55.57	66.48	61.22	55.02	71.24	63.45
Italy	47.59	55.27	51.68	57.12	66.01	61.74	57.77	69.96	64.03

Table 3: Rates of Enrolment within same year of high school graduation

	1998 Graduates			2001 Graduates			2004 Graduates		
	Males	Females	Total	Males	Females	Total	Males	Females	Total
North-West	36.52	40.00	38.37	37.39	44.78	41.32	41.13	56.32	49.14
North-East	32.25	37.34	34.96	39.81	43.11	41.58	42.76	53.66	48.56
Centre	40.79	44.07	42.56	40.62	50.74	45.85	41.74	54.44	48.21
South	37.30	44.37	41.01	39.27	52.08	45.73	36.82	55.45	46.06
Islands	34.06	39.85	37.19	36.29	46.66	41.66	36.16	52.88	44.85
Italy	36.62	41.70	39.33	38.83	48.10	43.64	39.42	54.79	47.32

Table 4: Regional Mobility Rates by Gender and Geographical Area

| | Attended University in a region different from that of high school | | | | | | | | |
| | 1998 Graduates | | | 2001 Graduates | | | 2004 Graduates | | |
	Males	Females	M-F	Males	Females	M-F	Males	Females	M-F
North-West	15.16	14.07	1.09	9.95	11.15	-1.2	11.21	15.32	-4.11***
North-East	19.45	18.07	1.38	16.35	15.99	0.36	18.5	17.44	1.06
Centre	15.21	7.56	7.65***	13.3	11.19	2.11	12.41	12.91	-0.5
South	21.8	17.83	3.97***	24.62	24.09	0.53	24.64	24.84	-0.2
Islands	8.51	8.46	0.05	16.15	10.9	5.25**	14.96	8.52	6.44***
Total	17.08	13.73	3.35***	16.95	15.9	1.05***	17.07	17.12	-0.05

Table 5: Inter-province Mobility Rates by Gender and Geographical Area

| | Attended University in a province different from that of high school | | | | | | | | |
| | 1998 Graduates | | | 2001 Graduates | | | 2004 Graduates | | |
	Males	Females	M-F	Males	Females	M-F	Males	Females	M-F
North-West	40.58	40.74	-0.16	46.33	41.07	5.26**	42.85	46.97	-4.12**
North-East	66.11	61.62	4.49	53.33	55.84	-2.51	57.77	61.86	-4.09***
Centre	41.89	36.58	5.31**	37.38	43.14	-5.76***	44.43	41.9	2.53
South	48.19	45.09	3.10	48.87	50.65	-1.78	46.91	48.06	-1.15***
Islands	35.98	39.96	-3.98	46.31	39.91	6.4**	40.3	42.88	-2.58
Total	46.29	44.01	2.28**	46.47	46.53	-0.06	46.26	47.95	-1.69**

Table 6: Effect of the increase in the variety of courses supplied. Probit diff-in-diff estimation.

	Probability of Enrolment Within Three Years					
	(1)	(2)	(3)	(4)	(5)	(6)
	All	Males	Females	All	Males	Females
$T_p \times Post_t$	0.030	-0.008	0.054**	0.024	-0.013	0.048**
	(0.020)	(0.028)	(0.022)	(0.017)	(0.024)	(0.021)
$Post_t$	0.112***	0.115***	0.112***	0.159***	0.183***	0.124*
	(0.013)	(0.018)	(0.016)	(0.040)	(0.046)	(0.066)
T_p	-0.020	0.013	-0.042**			
	(0.017)	(0.023)	(0.021)			
Controls*	yes	yes	yes	yes	yes	yes
Province F.E.				yes	yes	yes
Observations	48,248	22,112	26,136	48,248	22,112	26,136
Pseudo R^2	0.331	0.342	0.315	0.337	0.351	0.324

Estimated Marginal Effects at the mean reported.

Standard Errors Robust to Province Clustering in parentheses.

* Controls: Type of High School, Grade High School, Father's and Mother's Education, Mother Housewife, Number of Universities in Province, log GDP in Province, Employability Premium for College Graduates, Youth Unemployment Rate.

Table 7: Effect of the increase in the variety of courses supplied. Probit diff-in-diff estimation.

	Probability of Enrolment Within Same Year					
	(1)	(2)	(3)	(4)	(5)	(6)
	All	Males	Females	All	Males	Females
$T_p \times Post_t$	0.055*	0.026	0.078***	0.042*	0.011	0.062**
	(0.028)	(0.040)	(0.029)	(0.022)	(0.035)	(0.026)
$Post_t$	0.034***	0.000	0.069***	0.186***	0.198***	0.157**
	(0.013)	(0.015)	(0.017)	(0.056)	(0.057)	(0.065)
T_p	-0.025	-0.010	-0.040			
	(0.021)	(0.024)	(0.025)			
Controls*	yes	yes	yes	yes	yes	yes
Province F.E.				yes	yes	yes
Observations	48,248	22,112	26,136	48,248	22,112	26,136
Pseudo R^2	0.310	0.331	0.287	0.316	0.341	0.297

Estimated Marginal Effects at the mean reported.

Standard Errors Robust to Province Clustering in parentheses.

* Controls: Type of High School, Grade High School, Father's and Mother's Education, Mother Housewife, Number of Universities in Province, log GDP in Province, Employability Premium for College Graduates, Youth Unemployment Rate.

Table 8: Effect of the increase in the variety of courses supplied. Probit diff-in-diff estimation.

	Probability of Attending University					
	in a Province different from that of High School					
	(1)	(2)	(3)	(4)	(5)	(6)
	All	Males	Females	All	Males	Females
$T_p \times Post_t$	-0.028	-0.060	-0.013	-0.039	-0.077**	-0.025
	(0.029)	(0.037)	(0.040)	(0.027)	(0.032)	(0.038)
$Post_t$	0.253**	0.276**	0.259**	0.048	-0.011	0.063*
	(0.100)	(0.119)	(0.113)	(0.035)	(0.060)	(0.037)
Controls*	yes	yes	yes	yes	yes	yes
Labour Market Controls, absolute values	yes	yes	yes			
Labour Market Controls, relative values* *				yes	yes	yes
Province F.E.	yes	yes	yes	yes	yes	yes
Observations	18,592	7,396	11,196	18,592	7,396	11,196
Pseudo R^2	0.330	0.333	0.340	0.329	0.332	0.339

Estimated Marginal Effects at the mean reported.

Standard Errors Robust to Province Clustering in parentheses.

* Controls: Type of High School, Grade High School, Father's and Mother's Education, Mother Housewife, Number of Universities in Province, log GDP in Province, Employability Premium for College Graduates, Youth Unemployment Rate.

** Labour Market Controls, Absolute Values: log GDP in Province, Employability Premium for College Graduates, Youth Unemployment Rate;
Relative values: difference to highest quartile.

Table 9: Effect of the increase in the variety of courses supplied. Heckman 2-Step diff-in-diff estimation.

	Probability of Attending University in a Province different from that of High School					
	(1)	(2)	(3)	(4)	(5)	(6)
	All	Males	Females	All	Males	Females
$T_p \times Post_t$	-0.013	-0.032	-0.006	-0.017	-0.043*	-0.011
	(0.016)	(0.025)	(0.023)	(0.016)	(0.025)	(0.022)
$Post_t$	0.113**	0.127**	0.111**	0.020	-0.021	0.030*
	(0.047)	(0.059)	(0.051)	(0.018)	(0.035)	(0.018)
Controls*	yes	yes	yes	yes	yes	yes
Labour Market Controls, absolute values	yes	yes	yes			
Labour Market Controls, relative values**				yes	yes	yes
Province F.E.	yes	yes	yes	yes	yes	yes
Observations	47,107	21,588	25,519	47,107	21,588	25,519
Wald test of indep. eqns. ($\rho = 0$)	16.83	10.81	10.90	16.19	9.901	10.96
$Prob > \chi^2$ ***	4.10e-05	0.00101	0.000963	5.74e-05	0.00165	0.000930

Standard Errors Robust to Province Clustering in parentheses.

* Controls: Grade High School, Father's and Mother's Education, Mother Housewife, Number of Universities in Province.

** Labour Market Controls, Absolute Values: log GDP in Province, Employability Premium for College Graduates, Youth Unemployment Rate;
Relative values: difference to highest quartile.

*** Excluded variable: type of high school attended is *Liceo*.

Table 10: Correlation Coefficients

	Mother Housewife	Mother with College Degree	Father Manager	Father Blue Collar
Mother Housewife	1			
Mother with College Degree	-0.2135*	1		
Father Manager	-0.0138*	0.002	1	
Father Blue Collar	0.0245*	-0.0036	-0.4061*	1

* Statistically Significant at 1% level.

Table 11: The mechanisms: Enrolment Decisions. Probit diff-in-diff estimation.

	Probability of Enrolment within three years		
	(1)	(2)	(3)
	All	Males	Females
A. The role of the maternal model			
Mother with College degree $\times T_p \times Post_t$	-0.021	0.094	-0.148
	(0.094)	(0.106)	(0.154)
$T_p \times Post_t$	0.024	-0.017	0.051**
	(0.017)	(0.024)	(0.021)
Observations	48,248	22,112	26,136
Pseudo R^2	0.337	0.351	0.325
B. The role of father's income			
Father manager $\times T_p \times Post_t$	0.038	0.124	-0.032
	(0.057)	(0.077)	(0.077)
$T_p \times Post_t$	0.020	-0.026	0.052**
	(0.017)	(0.025)	(0.024)
Observations	46,789	21,408	25,381
Pseudo R^2	0.335	0.349	0.324

Estimated Marginal Effects at the mean reported.
Standard Errors Robust to Province Clustering in parentheses.
Controls and Province Fixed Effects included.
* Controls: Type of High School, Grade High School, Father's and Mother's Education, Mother Housewife, Number of Universities in Province, log GDP in Province, Employability Premium for College Graduates, Youth Unemployment Rate.

Table 12: The mechanisms: Mobility Decisions. Heckman 2-step diff-in-diff estimation.

	Probability of Attending University in a Province different from that of High School		
	(1)	(2)	(3)
	All	Males	Females
A. The role of the maternal model			
Mother with College degree $\times T_p \times Post_t$	-0.010	-0.002	-0.008
	(0.043)	(0.068)	(0.054)
$T_p \times Post_t$	-0.012	-0.031	-0.007
	(0.027)	(0.028)	(0.025)
Observations	47,107	21,588	25,519
Wald test of indep. eqns. ($\rho = 0$)	16.94	10.8	10.98
$Prob > \chi^2$	3.86e-05	0.00102	0.00092
B. The role of father's income			
Father manager $\times T_p \times Post_t$	-0.086	-0.032	-0.115***
	(0.041)	(0.085)	(0.041)
$T_p \times Post_t$	0.000	-0.028	0.012
	(0.019)	(0.028)	(0.027)
Observations	46,429	21,297	25,132
Wald test of indep. eqns. ($\rho = 0$)	16.14	10.99	10.65
$Prob > \chi^2$	5.89e-05	0.000917	0.00110

Standard Errors Robust to Province Clustering in parentheses.
Controls and Province Fixed Effects included.
* Controls: Type of High School, Grade High School, Father's and Mother's Education, Mother Housewife, Number of Universities in Province, log GDP in Province, Employability Premium for College Graduates, Youth Unemployment Rate.
Labour Market Controls Absolute Values

Table 13: Placebo Test: Effect of the increase in the variety of courses supplied between 1995 and 1999. Probit diff-in-diff estimation.

	Probability of Enrolment Within Three Years					
	(1)	(2)	(3)	(4)	(5)	(6)
	All	Males	Females	All	Males	Females
$T_p \times Post_t$	-0.005	0.002	-0.010	0.004	-0.002	0.014
	(0.023)	(0.032)	(0.028)	(0.022)	(0.032)	(0.027)
$Post_t$	0.081***	0.075***	0.088***	0.055	0.050	0.086
	(0.013)	(0.014)	(0.018)	(0.043)	(0.055)	(0.067)
T_p	-0.020	0.005	-0.043**			
	(0.016)	(0.019)	(0.021)			
Controls*	yes	yes	yes	yes	yes	yes
Province F.E.				yes	yes	yes
Observations	40,541	18,382	22,159	40,541	18,382	22,159
Pseudo R^2	0.336	0.358	0.316	0.342	0.366	0.327

Estimated Marginal Effects at the mean reported.
Standard Errors Robust to Province Clustering in parentheses.
* Controls: Type of High School, Grade High School, Father's and Mother's
Education, Mother Housewife, log GDP in Province, Employability
Premium for College Graduates, Youth Unemployment Rate.

Table 14: Placebo Test: Effect of the increase in the variety of courses supplied between 1995 and 1999. Probit diff-in-diff estimation.

	Probability of Enrolment Within Same Year					
	(1)	(2)	(3)	(4)	(5)	(6)
	All	Males	Females	All	Males	Females
$T_p \times Post_t$	0.003	-0.007	0.011	0.006	-0.005	0.017
	(0.021)	(0.033)	(0.024)	(0.021)	(0.035)	(0.025)
$Post_t$	-0.030**	-0.022	-0.034**	-0.055	-0.094	-0.014
	(0.014)	(0.017)	(0.016)	(0.047)	(0.064)	(0.069)
T_p	-0.027*	-0.009	-0.045**			
	(0.016)	(0.020)	(0.020)			
Controls*	yes	yes	yes	yes	yes	yes
Province F.E.				yes	yes	yes
Observations	40,639	18,406	22,233	40,639	18,396	22,233
Pseudo R^2	0.337	0.363	0.315	0.343	0.372	0.326

Estimated Marginal Effects at the mean reported.
Standard Errors Robust to Province Clustering in parentheses.
* Controls: Type of High School, Grade High School, Father's and Mother's
Education, Mother Housewife, log GDP in Province, Employability
Premium for College Graduates, Youth Unemployment Rate.

Table 15: Placebo Test. Effect of the increase in the variety of courses supplied between 1995 and 2001.

	(1)	(2)	(3)	(4)	(5)	(6)
	All	Males	Females	All	Males	Females
A. Probability of Attending University away from home - Probit						
$T_p \times Post_t$	-0.060	-0.060	-0.048	-0.114***	-0.122***	-0.110***
	(0.048)	(0.073)	(0.051)	(0.035)	(0.041)	(0.041)
$Post_t$	0.083**	0.104**	0.087**	-0.038	-0.015	-0.027
	(0.038)	(0.049)	(0.037)	(0.034)	(0.047)	(0.044)
Controls*	yes	yes	yes	yes	yes	yes
Labour Market Controls, absolute values	yes	yes	yes			
Labour Market Controls, relative values* *				yes	yes	yes
Province F.E.	yes	yes	yes	yes	yes	yes
Observations	15,210	5,997	9,213	12,706	4,910	7,746
Pseudo R^2	0.227	0.252	0.224	0.383	0.399	0.383
B. Probability of Attending University away from home - Heckman						
$T_p \times Post_t$	-0.054**	-0.051*	-0.052*	-0.061**	-0.059**	-0.055*
	(0.024)	(0.027)	(0.028)	(0.024)	(0.028)	(0.029)
$Post_t$	0.005	-0.023	0.027	-0.018	-0.011	-0.026
	(0.045)	(0.058)	(0.054)	(0.018)	(0.025)	(0.024)
Controls*	yes	yes	yes	yes	yes	yes
Labour Market Controls, absolute values	yes	yes	yes			
Labour Market Controls, relative values* *				yes	yes	yes
Province F.E.	yes	yes	yes	yes	yes	yes
Observations	39,833	18,076	21,757	39,833	18,076	21,757
Wald test of indep. eqns. ($\rho = 0$)	15.25	10.73	8.360	15.18	11.55	8.290
$Prob > \chi^2$	9.43e-05	0.00106	0.00384	9.75e-05	0.000677	0.00399

For Probit Estimated Marginal Effects at the mean reported.

Standard Errors Robust to Province Clustering in parentheses.

 * Controls: Type of High School, Grade High School, Father's and Mother's Education, Mother Housewife, Number of Universities in Province.

** Labour Market Controls, Absolute Values: log GDP in Province, Employability Premium for College Graduates, Youth Unemployment Rate;
Relative values: difference to highest quartile.

Table 16: Instrumental Variables Estimates

	Enrolment			Mobility[†]		
	(1)	(2)	(3)	(4)	(5)	(6)
	All	Males	Females	All	Males	Females
T_p	0.016	-0.020	0.045	0.407*	0.278	0.476*
	(0.034)	(0.049)	(0.032)	(0.241)	(0.226)	(0.262)
Controls*	yes	yes	yes	yes	yes	yes
Labour Market Controls,						
absolute values	yes	yes	yes			
Labour Market Controls,						
relative values**				yes	yes	yes
Province F.E.	no	no	no	no	no	no
Observations	25,880	11,841	14,039	15,009	6,079	8,930
R^2	0.342	0.347	0.321	0.239	0.261	0.232
F Statistic of excluded instrument	7.607	8.247	6.731	6.621	6.665	6.105
p-value	0.0069	0.005	0.0109	0.0115	0.0113	0.0151
	First Stage					
Elections in 2001 or 2002	0.379***	0.393***	0.360**	0.376***	0.392***	0.353**
	(0.137)	(0.137)	(0.139)	(0.137)	(0.137)	(0.139)
R^2	0.149	0.152	0.157	0.148	0.151	0.155

Sample is only 2004 high school graduates.
Standard Errors Robust to Province Clustering in parentheses.
[†] IV estimation combined with Heckman selection.
* Controls: Type of High School, Grade High School, Father's and Mother's Education, Mother Housewife, Number of Universities in Province.
** Labour Market Controls, Absolute Values: log GDP in Province, Employability Premium for College Graduates, Youth Unemployment Rate;
Relative values: difference to highest quartile.

Table 17: Robustness Checks: Excluding Big Cities. *ATET*.

	(1)	(2)	(3)	(4)	(5)	(6)
	All	Males	Females	All	Males	Females
A. Probability of Enroling to University within three years - Probit						
$T_p \times Post_t$	0.035*	-0.001	0.058***	0.033*	0.003	0.054**
	(0.020)	(0.029)	(0.022)	(0.019)	(0.024)	(0.022)
Controls	yes	yes	yes	yes	yes	yes
Province F.E.	yes	yes	yes	yes	yes	yes
Observations	42,349	19,481	22,868	42,349	19,481	22,868
Pseudo R^2	0.325	0.335	0.310	0.331	0.346	0.320
B. Probability of Enroling to University within same year - Probit						
$T_p \times Post_t$	0.053*	0.024	0.075***	0.041*	0.012	0.062**
	(0.027)	(0.039)	(0.028)	(0.023)	(0.036)	(0.026)
Controls	yes	yes	yes	yes	yes	yes
Province F.E.	yes	yes	yes	yes	yes	yes
Observations	42,349	19,481	22,868	42,349	19,481	22,868
Pseudo R^2	0.307	0.325	0.286	0.313	0.336	0.297
C. Probability of Attending University away from home - Probit						
$T_p \times Post_t$	-0.003	-0.038	0.013	-0.017	-0.058	0.003
	(0.036)	(0.045)	(0.049)	(0.032)	(0.039)	(0.045)
Controls	yes	yes	yes	yes	yes	yes
Labour Market Controls, absolute values	yes	yes	yes			
Labour Market Controls, relative values				yes	yes	yes
Province F.E.	yes	yes	yes	yes	yes	yes
Observations	15,814	6,291	9,523	15,814	6,291	9,523
Pseudo R^2	0.304	0.301	0.321	0.303	0.300	0.320
D. Probability of Attending University away from home - Heckman						
$T_p \times Post_t$	-0.001	-0.018	0.002	-0.004	-0.026	-0.000
	(0.017)	(0.027)	(0.025)	(0.017)	(0.025)	(0.025)
Controls	yes	yes	yes	yes	yes	yes
Labour Market Controls, absolute values	yes	yes	yes			
Labour Market Controls, relative values				yes	yes	yes
Province F.E.	yes	yes	yes	yes	yes	yes
Observations	41,296	18,990	22,306	41,296	18,990	22,306
Wald test of indep. eqns. ($\rho = 0$)	16.70	10.78	8.833	15.77	10.03	8.663
$Prob > \chi^2$	4.37e-05	0.00103	0.00296	7.16e-05	0.00154	0.00325

For Probit Estimated Marginal Effects at the mean reported.
Standard Errors Robust to Province Clustering in parentheses.

Table 18: Sensitivity to threshold. Enrolment Decisions. Probit diff-in-diff estimation. *ATET.*

	Enrolment within three years			Enrolment within same year		
	(1)	(2)	(3)	(4)	(5)	(6)
	All	Males	Females	All	Males	Females
Breakpoint at Median	0.010	-0.021	0.032	0.030	0.002	0.058**
	(0.020)	(0.029)	(0.023)	(0.019)	(0.028)	(0.023)
Breakpoint at 63rd percentile*	0.024	-0.013	0.048**	0.042*	0.011	0.062**
	(0.017)	(0.024)	(0.021)	(0.022)	(0.035)	(0.026)
Breakpoint at 75th percentile	0.036**	0.002	0.056***	0.038	-0.009	0.077**
	(0.017)	(0.027)	(0.021)	(0.029)	(0.045)	(0.031)

Estimated Marginal Effects at the mean reported.

Standard Errors Robust to Province Clustering in parentheses.

* Breakpoint at 63rd percentile is the main definition of treatment as in Tables 6 and 7.

Table 19: Sensitivity to threshold. Mobility Decisions. *ATET.*

	(1)	(2)	(3)	(4)	(5)	(6)
	All	Males	Females	All	Males	Females
A. Probability of Attending University away from home - Probit						
Breakpoint at Median	-0.016	-0.069*	0.025	-0.019	-0.076**	0.019
	(0.030)	(0.040)	(0.039)	(0.031)	(0.038)	(0.040)
Breakpoint at 63rd percentile*	-0.028	-0.060	-0.013	-0.039	-0.077**	-0.025
	(0.029)	(0.037)	(0.040)	(0.027)	(0.032)	(0.038)
Breakpoint at 75th percentile	-0.010	-0.055	0.003	-0.047	-0.097***	-0.027
	(0.039)	(0.045)	(0.046)	(0.031)	(0.030)	(0.042)
B. Probability of Attending University away from home - Heckman						
Breakpoint at Median	-0.005	-0.047	0.026	-0.011	-0.060*	0.019
	(0.019)	(0.030)	(0.025)	(0.018)	(0.030)	(0.024)
Breakpoint at 63rd percentile*	-0.013	-0.032	-0.006	-0.017	-0.043*	-0.011
	(0.016)	(0.025)	(0.023)	(0.016)	(0.025)	(0.022)
Breakpoint at 75th percentile	-0.012	-0.033	-0.008	-0.020	-0.049*	-0.015
	(0.016)	(0.026)	(0.021)	(0.016)	(0.026)	(0.022)

For Probit Estimated Marginal Effects at the mean reported.

Standard Errors Robust to Province Clustering in parentheses.

* Breakpoint at 63rd percentile is the main definition of treatment as in Tables 6 and 7.

Table 20: Results under different definitions of Treatment. Probit diff-in-diff estimation. *ATET*.

	Enrolment within three years			Enrolment within same year		
	(1)	(2)	(3)	(4)	(5)	(6)
	All	Males	Females	All	Males	Females
Variety Treatment	0.024	-0.013	0.048**	0.042*	0.011	0.062**
	(0.017)	(0.024)	(0.021)	(0.022)	(0.035)	(0.026)
Universities Treatment	-0.004	-0.030	0.019	0.085*	0.035	0.117**
	(0.047)	(0.060)	(0.049)	(0.044)	(0.059)	(0.046)
Departments Treatment	0.037	0.020	0.048*	0.081***	0.081*	0.079**
	(0.025)	(0.035)	(0.029)	(0.031)	(0.046)	(0.036)
Degrees Treatment	0.000	-0.005	0.005	-0.028	-0.018	-0.038
	(0.025)	(0.035)	(0.029)	(0.020)	(0.027)	(0.027)

Estimated Marginal Effects at the mean reported.
Standard Errors Robust to Province Clustering in parentheses.
Controls and Province fixed effects included in all regressions.

Table 21: Results under different definitions of Treatment. *ATET*.

	(1)	(2)	(3)	(4)	(5)	(6)
	All	Males	Females	All	Males	Females
A. Probability of Attending University away from home - Probit						
Variety Treatment	-0.028	-0.059	-0.013	-0.039	-0.077**	-0.026
	(0.030)	(0.037)	(0.040)	(0.027)	(0.032)	(0.038)
Universities Treatment	0.018	-0.059	0.063	0.002	-0.095	0.042
	(0.062)	(0.086)	(0.082)	(0.061)	(0.085)	(0.075)
Departments Treatment	-0.014	-0.061	0.016	0.000	-0.059	0.013
	(0.031)	(0.042)	(0.040)	(0.034)	(0.048)	(0.046)
Degrees Treatment	-0.025	-0.036	-0.031	-0.031	-0.052	-0.040
	(0.034)	(0.054)	(0.046)	(0.034)	(0.059)	(0.046)
B. Probability of Attending University away from home - Heckman						
Variety Treatment	-0.013	-0.032	-0.006	-0.017	-0.043*	-0.011
	(0.016)	(0.025)	(0.023)	(0.016)	(0.025)	(0.022)
Universities Treatment	0.003	-0.063	0.041	-0.001	-0.082	0.032
	(0.038)	(0.065)	(0.051)	(0.039)	(0.069)	(0.050)
Departments Treatment	0.006	-0.001	0.002	0.004	-0.008	-0.004
	(0.014)	(0.021)	(0.017)	(0.014)	(0.021)	(0.019)
Degrees Treatment	-0.010	-0.019	-0.010	-0.012	-0.024	-0.013
	(0.020)	(0.033)	(0.027)	(0.020)	(0.035)	(0.027)

For Probit Estimated Marginal Effects at the mean reported.
Standard Errors Robust to Province Clustering in parentheses.
Controls included; Labour Market Controls: Absolute Values in columns (1)-(3) and Relative Values in columns (4)-(6).

Appendices

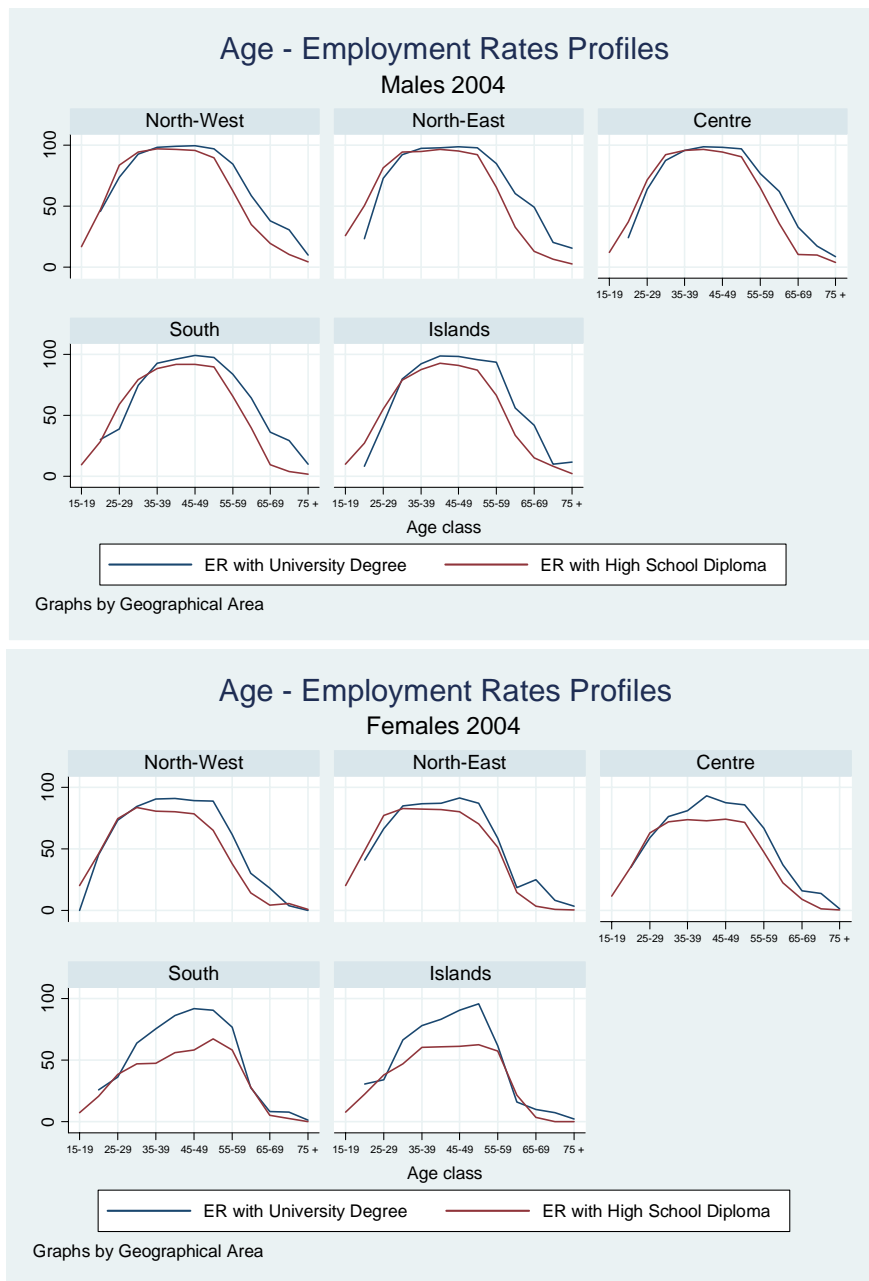## A   Labour Market Characteristics

Figure 10: Employment Rates by gender and educational attainment. Source: Istat, Labour Force Survey, 2004.

B Partition of Provinces

Table 22: Treated Provinces according to different definitions of treatment.

Variety		Departments	Universities	Degrees	
Agrigento	Varese	Ascoli Piceno	Aosta	Agrigento	Padova
Aosta	Verbania	Asti	Arezzo	Alessandria	Palermo
Ascoli Piceno	Vercelli	Avellino	Ascoli Piceno	Aosta	Parma
Asti	Vicenza	Bergamo	Asti	Ascoli Piceno	Perugia
Avellino		Bolzano/Bozen	Avellino	Asti	Pesaro e Urbino
Bergamo		Brindisi	Benevento	Avellino	Pescara
Bolzano/Bozen		Campobasso	Bergamo	Bari	Piacenza
Brindisi		Chieti	Biella	Belluno	Pistoia
Caltanissetta		Cuneo	Bologna	Bergamo	Potenza
Campobasso		Enna	Bolzano/Bozen	Bologna	Prato
Catanzaro		Grosseto	Campobasso	Bolzano/Bozen	Ragusa
Como		Livorno	Chieti	Brescia	Ravenna
Cuneo		Lodi	Cuneo	Brindisi	Reggio di Calabria
Enna		Massa-Carrara	Enna	Cagliari	Reggio nell'Emilia
Foggia		Pistoia	L'Aquila	Campobasso	Rimini
Grosseto		Prato	La Spezia	Caserta	Roma
L'Aquila		Ragusa	Lecce	Chieti	Rovigo
Livorno		Rimini	Lodi	Como	Sassari
Lodi		Rovigo	Matera	Cosenza	Siena
Massa-Carrara		Sondrio	Pesaro e Urbino	Cremona	Siracusa
Matera		Terni	Potenza	Enna	Sondrio
Novara		Treviso	Roma	Ferrara	Taranto
Pistoia		Verbania	Rovigo	Firenze	Teramo
Potenza			Salerno	Foggia	Terni
Prato			Treviso	Gorizia	Trapani
Ragusa			Venezia	Grosseto	Trento
Ravenna			Verbania	Isernia	Treviso
Reggio di Calabria			Vercelli	Latina	Udine
Rimini				Lecce	Varese
Rovigo				Livorno	Venezia
Sondrio				Lodi	Verbania
Taranto				Macerata	Vercelli
Teramo				Massa-Carrara	Verona
Terni				Matera	Vicenza
Trapani				Messina	Viterbo
Treviso				Milano	
Udine				Novara	

C Effects on older cohorts

Figure 11: Share of new entrants to university aged above 30
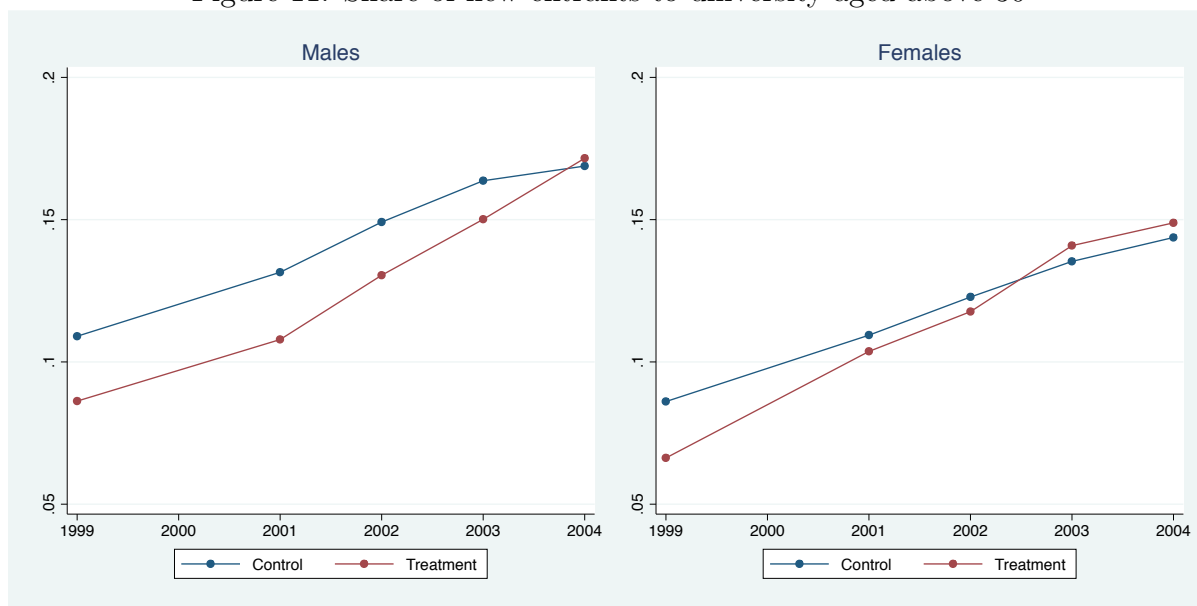
D Effects on the quality of students

Table 23: Educational Achievements. *ATET.*

	No Province F.E.			With Province F.E.		
	(1)	(2)	(3)	(4)	(5)	(6)
	All	Males	Females	All	Males	Females
Drop Out	-0.016	-0.027	-0.006	-0.013	-0.017	0.003
	(0.015)	(0.018)	(0.021)	(0.014)	(0.018)	(0.018)
Attendance	0.007	-0.021	0.031*	0.004	-0.006	0.027
	(0.017)	(0.028)	(0.018)	(0.016)	(0.024)	(0.018)
Number of Exams	0.525	0.749	0.205	-0.225	0.239	-1.046
	(0.650)	(0.623)	(0.833)	(0.440)	(0.451)	(0.680)

Drop Out, Attendance: Probit Estimates, marginal effects at the mean reported. Number of Exams: Ordered Probit Estimates.
Sample includes only students who enrolled immediately after high school degree.
Standard Errors robust to province clustering in parenthesis.

References

Orley C Ashenfelter. Estimating the effect of training programs on earnings. *The Review of Economics and Statistics*, 60(1):47–57, February 1978.

G. S. Becker. *Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education, 2nd ed.* Number beck75-1 in NBER Books. National Bureau of Economic Research, Inc, May 1975.

Richard Blundell and Monica Costa-Dias. Alternative approaches to evaluation in empirical microeconomics. *Journal of Human Resources*, 44(3), 2009.

G. Bosio and M. Leonardi. The effect of 3+2 on the graduate labor market: demand and supply. Paper presented at the SIE 2010 Conference, 2010.

M. Bratti, C. Broccolini, and S. Staffolani. Is '3+2' equal to 4? university reform and student academic performance in italy. Working Paper 251, Universita' Politecnica delle Marche I, Dipartimento di Economia, February 2006.

P. Brunori, V. Peragine, and L. Serlenga. Fairness in education: The italian university before and after the reform. Working Paper 175, ECINEQ Society for the Study of Economic Inequality, 2010.

L. Cappellari and C. Lucifora. The 'bologna process' and college enrollment decisions. *Labour Economics*, 16(6):638–647, December 2009.

G. Di Pietro and A. Cutillo. The impact of supply side policies on university drop-out: The italian experience. Paper presented at the EALE 2006 Conference, 2006.

E. Duflo. Schooling and labor market consequences of school construction in indonesia: Evidence from an unusual policy experiment. *American Economic Review*, 91(4):795–813, September 2001.

Claudia Goldin, Lawrence F. Katz, and Ilyana Kuziemko. The homecoming of american college women: The reversal of the college gender gap. *Journal of Economic Perspectives*, 20(4):133–156, Fall 2006.

James J Heckman. Sample selection bias as a specification error. *Econometrica*, 47(1):153–61, January 1979.

James J. Heckman and Richard Jr. Robb. Alternative methods for evaluating the impact of interventions : An overview. *Journal of Econometrics*, 30(1-2):239–267, 1985.

S. Holzer. The expansion of higher education in sweden and the issue of equality of opportunity. CAFO Working Papers 2007:5, Centre for Labour Market Policy Research (CAFO), School of Business and Economics, Linnaeus University, September 2007.

Caroline M. Hoxby. *College Choices: The Economics of Where to Go, When to Go, and How to Pay For It*. NBER Books. National Bureau of Economic Research, Inc, June 2004.

Istat. Indagine sui percorsi di studio e di lavoro dei diplomati 2001. Collana informazioni, Italian National Institute for Statistics, 2004.

Istat. Indagine sui percorsi di studio e di lavoro dei diplomati 2004. Collana informazioni, Italian National Institute for Statistics, 2007a.

Istat. Indagine multiscopo sulle famiglie "uso del tempo" - anni 2002-2003. Collana Informazioni 2007:2, Italian National Institute for Statistics, September 2007b.

Istat. Rilevazione sulle forze di lavoro 1995-2007. Collana informazioni, Italian National Institute for Statistics, 2008.

Istat. Indagine sui percorsi di studio e di lavoro dei diplomati 2007. Collana informazioni, Italian National Institute for Statistics, 2010a.

Istat. Occupazione e valore aggiunto nelle province' - anni 1995-2007. Conti nazionali, Italian National Institute for Statistics, January 2010b.

Steven D Levitt. Using electoral cycles in police hiring to estimate the effect of police on crime. *American Economic Review*, 87(3):270–90, June 1997.

J. O. Martins, R. Boarini, H. Strauss, C. de la Maisonneuve, and C. Saadi. The policy determinants of investment in tertiary education. OECD Economics Department Working Papers 576, OECD Publishing, September 2007.

C. Meghir and M. Palme. Educational reform, ability, and family background. *American Economic Review*, 95(1):414–424, March 2005.

C. Noè. Family background and females choice of males subjects: evidence from italy. ChilD Working Paper 01/2010, Centre for Household, Income, Labour and Demographic economics, 2010.

OECD. Education at a glance 2009. Oecd indicators, OECD Publishing, 2009.

OECD. Education at a glance 2010. Oecd indicators, OECD Publishing, 2010.

Patrizia Ordine and Claudio Lupi. Family income and students' mobility. *Giornale degli Economisti*, 68(1):1–23, April 2009.

Jeffrey M. Wooldridge. *Econometric Analysis of Cross Section and Panel Data*. The MIT Press, 2001.