

# University Reforms and Human Capital Investments<sup>⊕</sup>

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## **Abstract**

We use survey data on cohorts of high school leavers observed before and after the Italian reform of tertiary education to estimate its impact on the decision to go to college. We find that individuals leaving high school after the reform have a probability of going to college that is 10 percent higher compared to individuals making the choice under the old system. We show that this increase is concentrated among individuals with good high-school performance and low parental (educational) background. We interpret this result as an indication of the existence of constraints (pre-reform) -- for good students from less affluent household -- on the optimal schooling decision. We also find a negative impact of the reform on the likelihood to drop-out from university, and this effect is shown to be stronger for the students who would not have enrolled under the old system.

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## 1. Introduction

In recent years, following the “Bologna process” aimed at the development of an integrated and coherent European Higher Education Area (EHEA), several European countries have undertaken major reforms of the University system<sup>1</sup>. The main changes envisaged by the Bologna process to promote labour mobility among member countries, involved an armonization of the structure of University programmes, as well as the introduction of a credit system to facilitate mutual recognition of degrees. The move to a common structure for university degrees, though, has different implications between countries: for some countries the reform simply meant a mild rescheduling of the existing Higher education programme structure, in other countries the reform involved a major restructuring of the whole University system changing both the structure and duration of the existing programmes. In Italy, for example, the implementation of the reform required to change the existing system moving from a four/five year degree to a three year degree (first cycle, *Laurea breve*) and to introduce an additional two-year cycle (secondary cycle, *Laurea Magistralis*). Both these aspects of the reform have stimulated much controversy between those (favourable) who interpreted the shortening of the first cycle as a mean to increase enrolment, reduce drop-out rates, improve equality of opportunities for access to university and, finally, to allow a faster way to enter the labour market; and those (against) who remained sceptical both about the academic contents a shorter cycle and the market value of graduates of different cycles.

In this paper we use the reform of the first cycle of the Italian university system as an exogenous shock to address the issue of enrolment, equality of opportunities and drop out. Since the changes were unanticipated both by students and their families, the reform provides an ideal experiment to evaluate the impact of length of studies, and of the implied costs, on human capital investment.

We find that individuals leaving high school after the reform have a probability of going to college that is 10 percent higher compared to individuals making the choice under the old system. We show that this increase is concentrated among more able students (i.e. those with higher school performance) and that parental (educational) background matters less after the reform. We interpret this result as an indication of the existence of constraints (pre-reform) on good students from less affluent household, to make their optimal

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<sup>1</sup> The so called “Bologna process” is in fact the result of a series of Conferences, Paris (1998), Bologna (1999), Prague (2001), Berlin (2003) and Bergen (2005).

schooling decision. However, since a higher university enrolment does not necessarily imply a larger share of people with a university degree, we also investigate the impact of the reform on university drop-out rates. We find a negative impact of the reform on the likelihood to drop-out from university, and this effect is shown to be stronger for the students who would not have enrolled under the old system.

The structure of the paper is as follows. In section 2, after briefly describing the institutional context, we review some of the economic implication of the reform. In section 3, we describe the data and provide some descriptive analysis. Section 4 presents the empirical strategy and outlines the model specification. The main set of results are reported in section 5, while the last section concludes.

## **2. University reform in Italy: Institutional features and economic implications**

The reform of the Italian university system has developed along two main routes. The first, has envisaged a major change in the structure of degrees, introducing a two-cycle structure where a first three-year degree (*Laurea breve*) is followed by a two-year degree (*Laurea magistralis*). The second, has been a thorough reform of the fields of study and of university curricula, which brought a considerable increase in the number of fields student could choose and – for most of the degrees -- a substantial reduction in the number of exams and in the complexity of contents. These features replaced the old system characterised by a single cycle of four/five year degree (*Laurea*) and a selected number of fields for student to choose.

Among the reasons to motivate the need to reform the Italian university system those most often reported are the low enrolment rates, the very high drop-out rates, the low number of graduates, the excessive actual length of university studies well above the legal one and not least the relevance of family background on academic performance (rather than ability). Indeed, in the pre-reform system the graduation rate was one of the lowest among the OECD countries, in 2000 only 40 percent of the students enrolled were able to attain a degree and actual graduation length was much higher when compared to other OECD countries (OECD, 2002; Perotti, 2002).

In order to gain a better understanding of the factors influencing students' decisions to enrol in university, we briefly sketch the transition from secondary school to college education. After compulsory education students are given the choice to go in a “generalist” schooling track (*Liceo*) which naturally lead to university studies and is chosen by students

with higher family background, alternatively students may choose to go in a more labour market oriented “technical” schooling track (*Istituto tecnico*) where students from lower family background are over represented. As documented in the literature early school tracking may have a “diversion effect” preventing some individuals from further progressing to the tertiary level thus reinforcing intergenerational correlation in educational attainment (Hanushek and Wößmann, 2006; Brunello and Checchi, 2007)<sup>2</sup>. Hence, in 2001 the reform was introduced (Law 509/1999) mostly to implement the main features of “Bologna agreement”, but also to deal with the problems of the old system – i.e. increase tertiary enrolment and the number of graduates. The routes through which the reform is likely to have had an impact on human capital investments and students’ performance are the reduction in the length of studies (ie. 1-year shortening of the legal duration to get a first cycle degree) and the reduction in the number of exams (and possibly their complexity), both reducing the costs (also implicit costs) of investing in tertiary education (Bagüés, Sylos Labini, and Zinovyeva, 2006). On the other side, the wider menu of degrees available and the possibility to prolong education further to obtain a second cycle degree, by allowing a better choice, might also have increased the expected returns of human capital investment<sup>3</sup>. In other words, the various features of the reform are expected to have had an effect on both the number as well as the characteristics of the individuals who made their higher education choice under the new system. In particular, the larger effects on enrolment rates are likely to come from individuals that were somehow constrained in the old system (Ranieri, 2006).

At the aggregate level, recent data confirm the strong impact that the reform had on enrolment rates. Figure 1, reports the evolution of enrolment into higher education in Italy showing the existence of a declining trend before 2001, and a huge increase (over 10 percent) as a consequence of the reform of the university system. The sharp increase in enrolment rates is a further confirmation that the reform was largely unanticipated by students, thus providing an ideal experiment to investigate individuals’ higher education decisions.

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<sup>2</sup> Completion rates, computed as the number of graduates per 100 students enrolled 6 years before, are highest (62 percent) for students who have attended a generalist secondary school (*Liceo*) and lowest (22.6 percent) for students with a qualification from a technical secondary school (*Istituto tecnico*) (Boero, *et al.* 2005).

<sup>3</sup> An alternative hypothesis is that the labour market, anticipating some of the changes, may value new degrees less than old ones so that individuals may respond investing two additional years, hence facing higher costs compared to old system (ie. a sort of general equilibrium longer term effect)

While the effect of the university reform on enrolment rates is not controversial, its effect on the characteristics of the students who were likely to be constrained in the old system and decided to enrol afterwards are less certain. In general one might expect that the higher inflow of students would come from either less able individuals or those with credit constraints (or both).

In this context, the reform may have also altered the role of family background in affecting the choice to go to university, as well as the probability that an individual would drop out. In the former case, the lower implicit costs may have reduced the influence of parents' income or socio-economic status on the probability to go to university, thus rising equality of opportunity in tertiary education. In the latter case, the shorter duration of studies and the lower (perceived) complexity should reduce drop out rates; alternatively, if the higher inflow of students comes from the lower part of the ability distribution (with unchanged complexity and pass threshold for exams) drop out rates could well increase (Boero, *et al.*, 2005; Di Pietro and Cutillo, 2006).

A number of studies have tried to investigate some of the above issues<sup>4</sup>. Previous work on the effects of family background, in the Italian context, suggests that parental income, education and socio-economic status are generally important determinants of individual educational choices and of the probability of graduation. Empirical evidence on income and occupational mobility suggest that Italy is characterised by a more homogeneous but less mobile society and that university graduates mainly come from higher educated families (Checchi *et al.*, 1999; Checchi and Flabbi, 2006)<sup>5</sup>.

Among the papers that have focused on enrolment rates, Bondonio (2006), using aggregate data from the Ministry of university and research (MIUR) reports a strong impact of the reform on enrolment rates (9 to 14 percent, respectively in the first and second year of the reform), and a positive correlation between the supply of university degrees and enrolment rates (an estimate of 2.5 percentage points increase for any new degree).

Other papers have concentrated on the hypothesis that the reform might have reduced both students' workloads and grading standards in exams. Bratti, Broccolini and Staffolani

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<sup>4</sup> Although, there is an extensive US and UK literature that investigates several issues also considered here (drop-out rates, probability of enrolment and graduation, and the role of family background); in this paper, we focus attention only to the Italian experience. For additional international evidence see, Hanushek, 1986; and Hanushek, and Wößmann, 2006.

<sup>5</sup> Aina (2005), using ECHP data for Italy, shows that family income does not exert a statistically significant impact on student withdrawal from university. This finding is explained considering the low tuition and fees charged, on average, by Italian universities.

(2006), look into the hypothesis that the fast increase in the number of students was accompanied by a reduction in the standard of higher education and investigate the consequences on drop out and graduation rates. They present a case study on the Marche Polytechnic University, reporting a significant reduction in course workloads and an increase in student performance after the reform, which are shown to have significantly reduced the likelihood of student dropping out<sup>6</sup>. Another case study uses administrative data on students of two Italian universities (i.e. Cagliari and Viterbo) to analyse the determinants of drop-out rates and finds that, notwithstanding the reform, students' withdrawal rate is still very high and only a small proportion of students are likely to complete their studies within the institutional time (Boero, et al., 2005). In a companion paper Bratti, Broccolini and Staffolani (2007), develop a theoretical model in which individuals decide whether to enrol in university and, conditional on that, whether to dropout. The theoretical implications suggest that a reduction in higher education standards goes in the direction of increasing the number of students in tertiary education and, by reducing drop-out, also graduation rates. However, the authors warn against the use drop-out or graduation rates as a mean to evaluate university overall efficiency. Di Pietro and Cutillo (2006) also focus on the impact of the reform on drop-out rates and document a marked reduction after the reform. They use a decomposition methodology to assess whether changes in the probability of dropping out are determined by changes in students' observable characteristics or by changes in students' behaviour. Their findings suggest that since students' characteristics decreased after the reform (i.e. lower academic ability which, *ceteris paribus*, should increase drop-out rates), the reduction in drop-out rates can be only explained with a change in student behaviour', such as higher motivation to complete, better focused and more labour market oriented curricula, increased possibilities to combine study and work.

The empirical evidence on the effects of the reform, as documented above, seems rather controversial showing mixed results for what concerns both economic outcomes and their implications. Most findings, due to the specific data used or to the different methodology, appear difficult to compare, which can be explained both by the scarcity of nationally representative micro data -- which motivated the use of specific data and case studies in the literature -- and by the fact that the reform is still rather recent. In this perspective, the present paper contributes to the existing literature by producing the first

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<sup>6</sup> See also, Broccolini (2005).

nationally representative micro-based evidence new evidence on the reform effect on college enrolment and college drop out.

### **3. Data and descriptive statistics**

The data used in this paper originate from the “Survey on the study and work routes of secondary school graduates”, a cross-sectional sample of school leavers interviewed by the National Statistical Office (ISTAT) three years after graduation. The data represent approximately 4 percent of the population of Italian secondary school graduates and contain a wide range of information on the school curriculum and on post-school experiences, either in college and in the labour market. In addition, information on personal characteristics and family background is available.

The two latest waves of interviews were conducted in 1998 and 2001, so that the latter cohort is the first that decided on college enrolment under the new regime. Therefore, comparing data from the two cohorts offers the opportunity to study the effect of the reform on human capital investments. In principle, in order to reduce noise in the estimation of the reform effect, one would like to compare cohorts leaving schools immediately before the reform introduction with cohorts graduating immediately after it, which is not possible given the available data. This may be problematic if, for example, there is an underlying increasing trend in college enrolment so that widening the time interval between the points at which the before/after comparison is made lead to overestimate the impact of the reform. However, Figure 1 shows that this is definitely not the case in Italy, and in the years from 1998 to 2000 college enrolment rates were essentially constant. On the other hand, considering data some year before the reform rather than immediately before reduce the risks of anticipation effects, which, in our case, may induce individuals to delay enrolment in order to join the new regime, inflating the estimated between-cohorts differential.

The ISTAT survey refers to all secondary school leavers in a given year. The Italian school system of secondary education is structured into tracks that, by and large, can be divided between college oriented (Licei) and labour market oriented (Istituti Tecnici – educating for white collar careers-- and Istituti Professionali – focussed on skilled blue collar occupations). While these tracks represent the larger share of the supply of secondary education, there are other schools intended for individuals aiming at specific profession, such as primary school teachers and figurative artists. Given the special nature

of these schools, their students have been excluded from the estimation sample. In particular, for teaching schools the exclusion is also motivated by the fact that in 2001 college degrees became a compulsory requirement for accessing the teaching profession, so that observing larger enrolment rates from these schools may not reflect the impact of college reforms, but rather be a consequence of changing rules in the teaching profession. Excluding these observations belonging to these groups plus others with missing information on key explanatory variables in our analysis yielded a final estimation sample of 36600 observations of which 18800 belong to the 1998 cohort and the rest to the 2001 one.

Summary statistics for the estimation sample are provided in Table 1, showing that the characteristics of the interviewees were rather stable in the two cohorts. The last row of the table shows college enrolment and drop out rates. Since the reform substituted all existing tertiary degrees ('short' degrees and 'full-length' ones) with the new three plus two years system, college enrolment for the 1998 cohort considers students reporting having enrolled in both short and full length courses. Raw data clearly indicate that enrolment was higher after the reform, by approximately 10 percentage points, i.e. by an amount comparable with the administrative data depicted in Figure 1. Note however that the level of administrative figures are some 10 percent larger, and this gap does not seem to vary after the reform. The reason of the gap is that survey data consider enrolment only by students that left secondary school in a specific year, while administrative data record overall enrolment, including individuals that obtained their secondary school degree several years prior to enrolment. Finally, looking at college drop out it appears that the reform did not reduce it, the 2001 figure being 1.5 percent higher than the 1998 one.

#### **4. Modelling the effect of the reform on students behaviour**

Our repeated cross-sectional data enable us to study the impact of the reform by means of a before-after comparison. That is, by pooling survey data for 1998 and 2001 we estimate the differential in some relevant outcomes between the two cohorts. Assuming that between-cohorts differences are exclusively driven by the reform, such a strategy delivers consistent estimates of the effects of interest.

The data consist of observations about individual outcomes  $y_i$  and a set of controls  $x_i$  for secondary school leavers in 1998 and 2001. Our basic estimating equation is therefore:



$$y_i = x_i' \mathbf{b} + \mathbf{d}r_i + u_i$$

where  $r_i$  is a dichotomous indicator for whether the student left secondary school in 2001 (and was therefore exposed to the reform), while  $u_i$  is a zero mean error term independent from the vector of observables  $(x_i' r_i)$ . Given these assumptions

$$\mathbf{d} = E(y_i | x_i, r_i = 1) - E(y_i | x_i, r_i = 0)$$

measures the impact of the reform on outcomes and can be consistently estimated by regressing the outcome on the observables. For example, if the outcome under analysis is college enrolment,  $y_i$  may be thought of as the expected net benefit of enrolling into college, enrolment occurs whenever the net benefit is positive, and  $\mathbf{d}$  can be estimated by probit regression.

There are three arguments that support the validity our estimating strategy. First, administrative data on the population under analysis clearly show that in the years prior to the reform there was no trend in enrolment rates computed as the proportion of college intakes over the flow of secondary school graduates, see Figure 1. Indeed, college enrolment continuously dropped between the mid and late 1990s, hitting a minimum of 61.5% in 1998 and then fluctuating around 62% in the two following years. The first year of the new regime shows a sharp increase in college enrolment, of approximately 10 percentage points. Thence, there not seem to be any underlying increasing trend that, if omitted, could bias upward our estimated effects.

Secondly, the vector of observables includes time-, gender- and region- specific unemployment rate for the age group investigated. Controlling for local unemployment is important in our exercise since labour market conditions influence the expected costs and benefits of college education: Specifically to our case, a set of labour market reforms aimed at reducing rigidity in the youth labour market were introduced by law in July 1998, potentially making the transition to work a more attractive opportunity relative to college enrolment other things being equal. Omitting the controls for local unemployment rate would therefore bias downward the effect of the reform.

Finally, as Table 1 illustrates, observable personal characteristics are rather homogeneous before and after the reform, and to the extent that these similarities carry on

also to unobservables, we may think that the assumption of independence between the error term and the reform dummy is not too restrictive.

The regression framework outlined above can be used not only to quantify the impact of the reform on outcomes, but also to assess what are the personal attributes whose impact on outcomes was affected by the reform, thereby making some step in the direction of identifying the channels through which the reform exerted its effects. This can be done by interacting the reform dummy with the set of relevant attributes. Specifically, human capital theory predicts that schooling decisions are constrained by family background and individual ability. To the extent that the reform lowered the costs for accessing college education, one may expect less able pupils from disadvantaged background to increase their enrolment rates relative to otherwise similar individuals. Assuming a dichotomous distribution of both ability and background, one can estimate the following model:

$$y_i = x_i' \mathbf{b} + \mathbf{d}r_i + \mathbf{g}_1 a_i + \mathbf{g}_2 b_i + \mathbf{g}_3 a_i r_i + \mathbf{g}_4 b_i r_i + \mathbf{e}_i$$

where  $a_i$  indicates high ability individuals,  $b_i$  stands for a favourable background, and the set of controls is the same as before, but excluding background and ability. The crucial parameters that measure how much the reform worked through the ability and background channels are  $\mathbf{g}_3$  and  $\mathbf{g}_4$ , i.e. the variations in the effects of ability and background on outcomes before and after the reform. For example, if outcomes are college enrolment rates, a standard human capital model would predict both parameters to be negative.

## 5. Results

### 5.1 College enrolment

A first set of results is presented in Table 2 which shows probit estimates of the effect of the reform on college enrolment rates. The regression of column (1) includes only a gender dummy and regional dummies, plus the reform dummy, and estimates the reform impact to be positive and in the order of 9 percent. The second column includes the local unemployment rate among regressors and clearly shows the relevance of doing so. The effect of unemployment is positive and precisely estimated, suggesting that high unemployment reduces the opportunity cost of time spent in education, thus increasing enrolment rates. More importantly, the reform impact is now larger by some 3 percentage points. Such change reflects an improvement in labour market conditions between 1998

and 2001, that can be explained by the 1998 reform. Subsequent columns of the table progressively saturate the regression model with the “usual” set of controls for family background and individual ability. Specifically, controls for parental education and occupation, marks in the final exams of junior high school, the secondary school track of graduation, and marks in the final exam of secondary education are progressively added in columns (3), (4), (5) and (6) of the table, respectively. Parental education has an effect on college enrolment which is well above that of parental occupation, and quantitatively the effect appears to be rather similar between father and mother. The other powerful driver of human capital investments is individual ability, whose earlier measurement in the data is at the end of compulsory education, normally at the age of 13. Including controls for the secondary school track of graduation shows that students from the academic oriented tracks (the omitted category) have by far the largest probability of choosing college enrolment after graduation, followed by students from technical schools (training pupils for white collar careers) and professional schools (training for skilled blue collar careers). Also, the school track does not appear to be orthogonal to parental background and pre-track ability. The reduction in the impacts of background and ability occurring after the inclusion of school track among regressors reveals that those two factors are important determinants of track choice. Even after including all this significant shifters of the net benefit of college enrolment, the estimated impact of the reform remains statistically significant and its size quantitatively stable across specifications, another symptom of the fact that the reform can indeed be considered an exogenous event with respect to the college enrolment choice.

Having established that the reform increased enrolment rates, the relevant question becomes why. Did the reduction in the costs of education attracted students from more disadvantaged background, less able pupils, or both? Table 3 provides an answer to such questions by looking at the interactions between the reform and personal characteristics. Column (1) of the table starts by interacting the reforms with school tracks, which we have seen to play a crucial role in streaming students into college. Results show that a relevant part of the effect is concentrated among students from technical schools, which closed their gap relative to academic oriented schools students by 6 percent. On the other hand, no differential increase in enrolment rates can be detected from the professional track. Considering that ability and background play a major role in allocating students into school tracks, this evidence suggests that those who increased college enrolment thanks to the reform should be of intermediate ability and background. In order to look directly at this

issue, the second column of the table considers a model unconditional on school tracks, but including the interaction of parental education and students ability with the reform dummy.<sup>7</sup> The results for parental background show that the advantage –in terms of enrolment rates-- of having a father with college degree was reduced by the reform, consistently with the view that the reform has had an impact on intergenerational correlations in education. The result for ability, instead, does not support the view that the reform increased the access of less able individuals. If anything, it seems that the most able saw their enrolment chances increased by the reform. Re-introducing school tracks into the model does not solve the puzzle, see column 3, in which the interaction between father education and the reform loses significance (picking up the fact that parental education affects track choice) while the interaction between the reform and ability remains significant and gains size compared with column (2).

One reason why more able individuals increased their enrolment rate is that these individuals were somehow constrained in their behaviour before the reform. For example, these may be able children of low educated parents who make a sub-optimal investment in human capital due constraints in the (economic and cultural) resources available for the investment. By lowering investments costs, the reform may therefore have corrected such sub-optimal equilibrium. To test this assertion, the enrolment model was estimated by father education, conditioning on ability. Results are in Table 4, which shows that the gain in enrolment rate accruing to more able individuals is evident only for the children of fathers with an intermediate level of education, supporting our hypothesis.

## ***5.2 College drop out***

The results discussed so far show that part of the effect of the reform worked through a reduction of the impact of parental background on the choice of enrolling onto college. However, this does not necessarily imply an increase in intergenerational mobility in education. To the extent that the additional inflow of college intakes has a large propensity to quit college before completion, changes of intergenerational links at college entry will not translate into analogous changes at college exit, so that the link between educational attainment and family background will remain unaffected. For example, this could be the

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<sup>7</sup> Interactions of the reform with parental occupations were also added to the model, but were found to have no explanatory power.

case if the additional intakes come from the lower tail of the ability distribution, but results previously discussed are not consistent with such a view.

We provide a direct assessment of these issues by studying college drop out rates before and after the reform. The data enable identification of college drop outs thanks to a survey question on the interruption of college studies. Since the question is answered at most three years since enrolment, the observed drop out indicator is subject to right censoring. This hold for all pre-reform students enrolled in four year courses and for students that, before or after the reform, did not enrol at university immediately after leaving school, but with some lag. However, since most drop outs typically occur within the first or second year of graduation, we can expect the bias induce by right censoring to be mild. Moreover, we observe any lag existing between school graduation and college enrolment, and control for it in the regression. Importantly, it should be noted that the relevance of any bias due to censoring is larger before the reform rather than after, and that this can lead to underestimate any reduction in drop outs induced by the reform.

The reduction in course length is a first evident channel through which the reform may reduce drop outs. Individuals quit college when they realize that they may have overestimated the net benefit of college degrees, and by lowering the cost of education the reform can make the overestimation less likely. But in addition, there are other factors at play that may work in the direction of reducing post-reform drop outs. For example, there is evidence that after the reform, teaching standards were lowered (see Bratti et al, 2006) which is an alternative way of reducing the (effort related) costs of education, and thence drop outs. Our analysis is not aimed at disentangling these competing explanations, but estimates the overall change in drop out induced by the reform.

Results are presented in Table 5, which shows results from probit regressions of a drop out indicator on a set of controls. Dummies for the time span separating school leaving and college enrolment control account for the censoring issues discussed above. Parental occupations were found not statistically significant (individually and jointly) and excluded from the specification. Parental occupation can be seen as a proxy for family permanent incomes and it is plausible to assume that college drop out have more to do with transitory income shocks than with permanent income. The field of college studies is not recorded in the survey, and such omission may bias our results if the reform shifted field choice, and fields are characterised by different drop out rates. The first column of the table shows that drop out rates where some 4 percent lower after the reform was

implemented. Considering that the average sample drop out probability is 10 percent, the reform effect seems sizeable. Estimated marginal effects associated with the other controls listed in the first column shows that college drop out is more frequent among males, students with less favourable family background or with lower ability, and students from labour market oriented secondary schools. The dummies for lagged college enrolment attract positive signs, while the size of the effects is lower comparing those enrolled two years after graduation with individuals enrolling one year after leaving school. The positive sign of the coefficients may be interpreted as a selection effect, if more able and motivated individuals enrol right after college, while those waiting to enrol are of lower ability and therefore are more likely to drop out. Within this latter group, the lower drop out probability estimated for individuals just enrolled at university reflect the censoring issues discussed earlier.

The regression of column (1) is estimated on the sample of individuals that actually enrolled at college after leaving secondary school, while those who never enrolled are excluded from the analysis. To the extent that individuals sort into these two groups non randomly, an endogenous sample selection issues emerges, which may bias our estimate of the reform impact. To correct for this issue we therefore use a two equation model in which a selection equation (college enrolment) is added to the drop out equation. To some extent, this modelling strategy should also correct for the omission of fields of college studies, as long as it controls for unobserved heterogeneity in the drop out equation. Column 2 of Table 5 illustrates the results. First we may note that the correlation coefficient between the equations error terms is negative, although not significant at the 5 percent level of confidence, and of small size. Thence, there is evidence of a mild negative selection effect, i.e. the sample of college students has an inherent lower drop out probability relative to individuals never enrolled in college, which may mean that there is an efficient allocation of talents (net of the observed attributes) into college. Considering that field of college studies is omitted, the negative sign may also mean that individuals going to college chose fields characterised by lower drop out rates relative to the fields that would have been chosen by the sub-sample not going to college, had they gone to college. Whatever its reason, the negative error correlation means that the reform effect is estimated on a low drop-out sample, inducing an underestimation of the relevant parameter. Indeed, the new estimate of the reform effect is almost double in size relative to column (1), minus 7 percent. Note that the remark applies also to other drop out shifters: the estimated effects

are now valid in the population of secondary school graduates, which is more heterogeneous than the subpopulation of college students, so that factors affecting drop outs display larger impacts.

The third column in Table 5 considers results from interacting the reform with secondary school tracks, which shows that, beside an impact on students from all schools, the reform had a specific beneficial effect on students from technical school, a result consistent with the view that the reform may have increased intergenerational mobility. To assess this point more directly, in column (4) the reform dummy is interacted with parental education and students ability. While there is no evident interaction effect with ability, results for father education show that the gap in drop out rates between the children of graduate fathers and those of lower educated ones, closed up entirely after the reform. Such evidence is against the view that the additional intakes due to the reform experienced larger drop outs, and is consistent with the possibility that the reform increased intergenerational mobility in education.

### ***5.3 Field of college studies at the interview date***

The two level structure introduced by the reform implies that the number of years required to complete the course of study (first level plus second level degrees) is five, irrespective of the field of study. Before the reform, instead, some type of college courses required four years (e.g. economics, law, politics and sociology, the humanities), while others already required five years or more (engineering, science, medicine). In a sense, therefore, the reform altered the vector of relative costs (measured in terms of course duration) of the various fields, making the formerly four-year courses more expensive in relative terms. It is reasonable to expect that, *ceteris paribus*, this might have had the effect of shifting the demand for college courses away from those subjects whose relative cost increased.

The ISTAT survey collects information on the chosen field of college studies, offering the potential for estimating the impact of the reform on the structure of the demand for college courses. However, such information is collected only for individuals who were in college (or had finished it) at the interview date, while it is not available for those who dropped out, preventing us from studying the impact of the reform on the field chosen after secondary school, since what we observe is the result of both college field choice and college drop out. Observing, for example, that at the interview date enrolment in Engineering increased while Law decreased, is consistent with both a shift in demand or

a change in drop out in the two fields. But since the courses whose relative cost decreased are technical/quantitative and the most effort demanding, we have no reason to think that the reform reduced their drop out rates more than it did in less technical fields, looking at the changes in the field at the interview date before and after the reform may still provide a good proxy for the changes in the demand for college studies by field.

The results of this exercise are reported in Table 6 by looking at the seven broad fields of study that are recorder by ISTAT.<sup>8</sup> We estimate the probability of being in a certain field by multinomial logit regression. We look at the impact of the reform by including among regressor the reform dummy and its interaction with secondary school types. Results indicate that the incidence of fields like Economics and Statistics and especially Law indeed decreased after the reform, and such reduction was the same across students from the different school types. Conversely, the incidence of the Politics and Sociology field (whose length before the reform was also four years) increased. This different behaviour can be explained by noting that, differently from the latter case, both Law and Economics are traditionally required to access professions such as barrister and chartered accountant, and it was probably immediately clear to students that access to profession would have required the full course of studies.

The reform worked in the opposite way in fields whose pre-reform legal duration was five years. Especially, Engineering and Architecture marked a generalised increase of 5 percent. Such increase is more than offset for student from professional schools, but given their limited numerosity, we can conclude that the net impact of the reform was positive. Also we can observe an increase in the incidence of Science studies for students of technical schools. Overall, therefore, the change in behaviour induced by the reform is consistent with the interpretation based on changes in relative opportunity costs.

#### ***5.4 Labour market participation***

The alternative, non mutually exclusive, option available to students after secondary school completion is labour market participation. We build an indicator for it from the ISTAT data by considering individuals that at the interview date are employed in any form of work contract or report being looking for a job. Given what we know about the effects of the reform on college participation, we may expect that, to some extent the reform has reduced the labour market participation of secondary school leavers. Indeed, Table 7 reports the

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<sup>8</sup> An eight field, **Gym**, was excluded from the analysis due to small sample size.



results obtained by regressing such participation indicator on the set of controls used in the previous subsections, and the reform indicator, showing that participation was indeed lower after the reform. Also, the table shows that the participation gap between students of professional schools and academic oriented ones widened after the reform. This may be an effect of the labour market reform of 1998, which was particularly beneficial for this group of students.

Many students combine college studies with some economic activity and it is interesting to see how labour market participation and college participation interact, and how this interaction was affected by the reform. With this aim we build an indicator of activity in the economic and academic front, which can assume the four mutually exclusive values generated by the cross product of the participation and enrolment indicators. Table 8 reports the results from the analysis of such joint indicator. College enrolment as the exclusive option increased after the reform for students of technical schools, whereas joint participation increased uniformly across types of secondary schools, while labour market participation as the exclusive option decreased uniformly.

## **6. Concluding remarks**

In this paper we have used survey data on two cohorts on secondary school leavers to assess the impact of the recent reform of Italian university education on human capital investments. We find that the reform increased the transition to college and that this effect was particularly concentrated among individuals with good schooling ability but unfavourable family background. We interpret this result within a standard human capital investment framework as evidence of liquidity constraints that, pre-reform, prevented a subset of the population from making optimal investment choices.

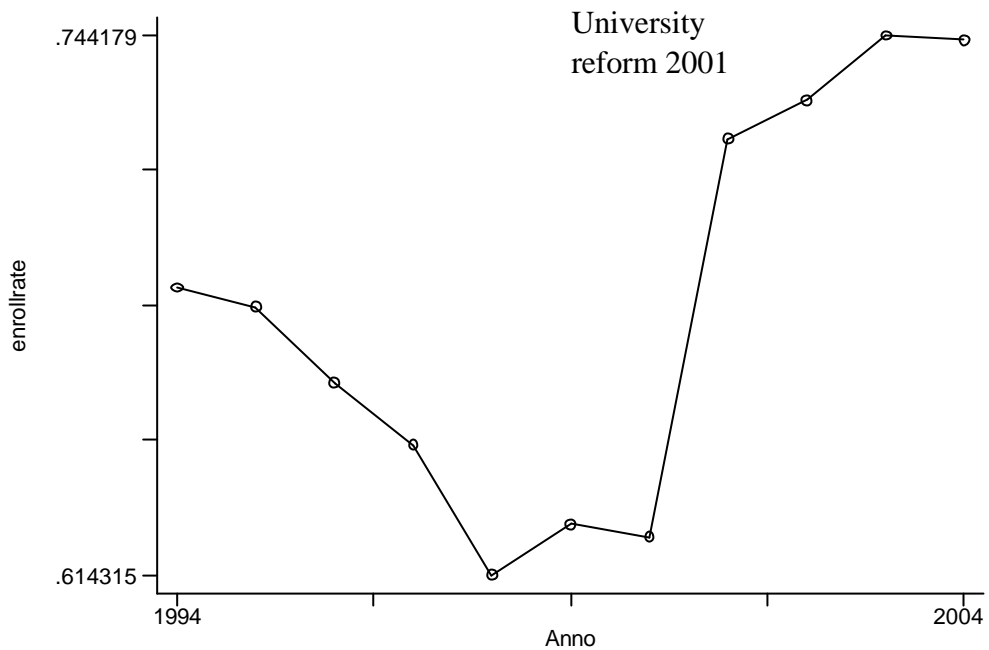
When we look at college drop out, we find a negative impact of the reform on the likelihood to drop-out from university, and this effect is shown to be stronger for the students who would not have enrolled under the old system. Additionally, we find a reduction in labour market participation and a shift towards technical and scientific subjects.

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**Figure 1 - Enrolment rates into higher education in Italy: 1994-2004** (first cycle – laurea breve)



Source: MIUR (2006)

**Table 1: Sample descriptive statistics by survey year**

	<b>1998</b>	<b>2001</b>
Number of observations	18,809	17,803
Father compulsory degree or lower	55.7	51.28
Father secondary degree	34.72	36.61
Father college degree	9.58	12.11
Mother compulsory degree or lower	60.88	54.29
Mother secondary degree	31.47	35.61
Mother college degree	7.65	10.09
Father occupation high	15.07	22.28
Father occupation intermediate	41.49	31.69
Father occupation low	43.44	46.03
Mother occupation high	7	8.48
Mother occupation intermediate	17.99	18.9
Mother occupation low	17.33	20.94
Mother not working	57.68	51.58
Junior school mark D	31.14	24.98
Junior school mark C	26.57	29.39
Junior school mark B	20.06	21.62
Junior school mark A	22.23	24
Ist. Professionali	17.68	17.18
Ist. Tecnici	47.09	46.22
Licei	35.23	36.6
Secondary school mark D	33.96	34.42
Secondary school mark C	29.67	26.69
Secondary school mark B	18.8	17.95
Secondary school mark A	17.57	20.94
College enrollment	52.80	61.76
College drop out	9.94	11.45

Note: statistics computed using survey weights

**Table 2: The effect of the reform on college enrolment rates**

	(1)	(2)	(3)	(4)	(5)	(6)
Female	0.099 (0.008)	0.038 (0.012)	0.059 (0.014)	0.004 (0.015)	-0.004 (0.015)	-0.031 (0.015)
Father secondary degree			0.147 (0.010)	0.127 (0.010)	0.088 (0.010)	0.089 (0.011)
Father college degree			0.300 (0.014)	0.272 (0.015)	0.173 (0.017)	0.166 (0.018)
Mother secondary degree			0.152 (0.009)	0.121 (0.009)	0.073 (0.010)	0.075 (0.010)
Mother college degree			0.299 (0.014)	0.249 (0.018)	0.162 (0.021)	0.157 (0.023)
Father high level occupation			0.089 (0.015)	0.092 (0.016)	0.055 (0.016)	0.058 (0.016)
Father mid level occupation			0.051 (0.012)	0.051 (0.010)	0.036 (0.009)	0.038 (0.010)
Father occupation not reported			0.095 (0.015)	0.109 (0.015)	0.074 (0.018)	0.075 (0.019)
Mother high level occupation			0.093 (0.025)	0.070 (0.028)	0.035 (0.030)	0.029 (0.031)
Mother mid level occupation			0.039 (0.013)	0.029 (0.013)	0.024 (0.015)	0.021 (0.015)
Mother not working			-0.041 (0.012)	-0.051 (0.012)	-0.044 (0.012)	-0.048 (0.012)
Mother occupation not reported			0.039 (0.032)	0.070 (0.034)	0.062 (0.033)	0.060 (0.033)
Junior school mark C				0.144 (0.011)	0.073 (0.012)	0.022 (0.013)
Junior school mark B				0.316 (0.009)	0.177 (0.012)	0.074 (0.013)
Junior school mark A				0.435 (0.009)	0.254 (0.016)	0.096 (0.021)
Professional school					-0.609 (0.012)	-0.665 (0.011)
Technical school					-0.470 (0.013)	-0.509 (0.012)
Secondary school mark C						0.132 (0.011)
Secondary school mark B						0.223 (0.010)
Secondary school mark A						0.306 (0.010)
Unemployment rate		0.006 (0.001)	0.007 (0.001)	0.005 (0.001)	0.004 (0.001)	0.004 (0.001)
Reform	0.090 (0.008)	0.128 (0.009)	0.113 (0.012)	0.101 (0.012)	0.118 (0.011)	0.124 (0.011)

Notes: Regression includes regional dummies and uses survey weights. Asymptotically robust standard error adjusted to account for repeated observations at the gender-region-year level. The omitted category is male, has parents with low education and low level occupation, has the lowest mark in the final exam of junior and secondary school (=D), graduated from the academic oriented school track in 1998. N Obs=36612 . Probit marginal effects evaluated at the sample average of explanatory variables

**Table 3: The interaction between the reform and students' characteristics, college enrolment rates**

	(1)		(2)		(3)	
Female	-0.002	(0.016)	0.003	(0.015)	-0.003	(0.016)
Father secondary degree	0.089	(0.010)	0.140	(0.016)	0.100	(0.015)
Father college degree	0.173	(0.017)	0.300	(0.020)	0.193	(0.020)
Mother secondary degree	0.073	(0.010)	0.120	(0.016)	0.063	(0.018)
Mother college degree	0.162	(0.022)	0.248	(0.028)	0.144	(0.037)
Father secondary degree * Reform			-0.027	(0.020)	-0.022	(0.019)
Father college degree* Reform			-0.089	(0.043)	-0.047	(0.037)
Mother secondary degree* Reform			-0.0004	(0.019)	0.017	(0.020)
Mother college degree* Reform			0.003	(0.046)	0.037	(0.048)
Father high level occupation	0.055	(0.016)	0.092	(0.015)	0.054	(0.015)
Father mid level occupation	0.036	(0.010)	0.051	(0.010)	0.036	(0.009)
Father occupation not reported	0.074	(0.019)	0.111	(0.015)	0.075	(0.018)
Mother high level occupation	0.035	(0.029)	0.069	(0.028)	0.037	(0.030)
Mother mid level occupation	0.024	(0.015)	0.029	(0.013)	0.025	(0.015)
Mother not working	-0.044	(0.012)	-0.051	(0.012)	-0.044	(0.012)
Mother occupation not reported	0.060	(0.033)	0.068	(0.034)	0.058	(0.033)
Junior school mark C	0.073	(0.012)	0.129	(0.017)	0.056	(0.019)
Junior school mark B	0.177	(0.012)	0.319	(0.011)	0.165	(0.015)
Junior school mark A	0.254	(0.016)	0.418	(0.013)	0.216	(0.024)
Junior school mark C* Reform			0.032	(0.023)	0.034	(0.024)
Junior school mark B* Reform			-0.007	(0.026)	0.027	(0.028)
Junior school mark A* Reform			0.064	(0.030)	0.096	(0.034)
Professional school	-0.605	(0.015)			-0.617	(0.016)
Technical school	-0.496	(0.017)			-0.504	(0.017)
Professional school* Reform	-0.002	(0.031)			0.031	(0.031)
Technical school* Reform	0.064	(0.025)			0.082	(0.025)
Unemployment rate	0.004	(0.001)	0.006	(0.001)	0.004	(0.002)
Unemployment rate Reform	0.077	(0.026)	0.097	(0.018)	0.031	(0.032)

Notes: Regression includes regional dummies and uses survey weights. Asymptotically robust standard error adjusted to account for repeated observations at the gender-region-year level. The omitted category is male, has parents with low education and low level occupation, has the lowest mark in the final exam of junior high school (=D), graduated from the academic oriented school track in 1998. N Obs=36612 . Probit marginal effects evaluated at the sample average of explanatory variables

**Table 4: The interaction between the reform and students' ability by father's education, college enrolment rates**

	Father education low		Father education intermediate		Father education high	
Female	-0.008	(0.021)	0.006	(0.024)	0.006	(0.012)
Father high level occupation	0.073	(0.026)	0.103	(0.016)	0.033	(0.021)
Father mid level occupation	0.060	(0.014)	0.052	(0.013)	-0.007	(0.023)
Father occupation not reported	0.070	(0.030)	0.115	(0.017)	0.043	(0.012)
Mother high level occupation	0.229	(0.041)	0.128	(0.021)	0.035	(0.010)
Mother mid level occupation	0.079	(0.022)	0.034	(0.018)	0.023	(0.009)
Mother not working	-0.063	(0.017)	-0.080	(0.018)	0.006	(0.011)
Mother occupation not reported	0.049	(0.046)	0.099	(0.038)	0.033	(0.008)
Junior school mark C	0.139	(0.024)	0.111	(0.024)	0.039	(0.007)
Junior school mark B	0.364	(0.022)	0.279	(0.016)	0.066	(0.009)
Junior school mark A	0.499	(0.022)	0.361	(0.014)	0.125	(0.019)
Junior school mark C*	0.038	(0.027)	0.027	(0.031)	-0.013	(0.022)
Reform						
Junior school mark B*	0.011	(0.035)	-0.026	(0.039)	-0.004	(0.019)
Reform						
Junior school mark A*	0.048	(0.043)	0.088	(0.034)	0.006	(0.020)
Reform						
Unemployment rate	0.006	(0.002)	0.006	(0.002)	0.000	(0.001)
Reform	0.101	(0.022)	0.063	(0.025)	0.002	(0.013)
Number of observations	22235		11675		2702	

Notes: Regression includes regional dummies and uses survey weights. Asymptotically robust standard error adjusted to account for repeated observations at the gender-region-year level. The omitted category is male, has parents with low level occupation, has the lowest mark in the final exam of junior high school (=D), graduated from the academic oriented school track in 1998. N Obs=36612 . Probit marginal effects evaluated at the sample average of explanatory variables



**Table 5: The effect of the reform on college drop out rates**

	(1)		(2)		(3)		(4)	
Enrolled one year after graduation	0.403	(0.052)	0.483	(0.059)	0.491	(0.060)	0.484	(0.065)
Enrolled two years after graduation	0.148	(0.040)	0.207	(0.050)	0.215	(0.052)	0.219	(0.055)
Female	-0.028	(0.007)	-0.047	(0.013)	-0.050	(0.014)	-0.046	(0.013)
Father secondary degree	-0.007	(0.005)	-0.016	(0.007)	-0.018	(0.008)	-0.025	(0.010)
Father college degree	-0.035	(0.007)	-0.065	(0.010)	-0.070	(0.010)	-0.098	(0.014)
Mother secondary degree	0.011	(0.005)	0.013	(0.008)	0.012	(0.009)	-0.005	(0.009)
Mother college degree	-0.008	(0.012)	-0.021	(0.015)	-0.025	(0.015)	-0.043	(0.022)
Father secondary degree * Reform							0.001	(0.012)
Father college degree* Reform							0.104	(0.038)
Mother secondary degree* Reform							0.015	(0.012)
Mother college degree* Reform							0.006	(0.035)
Junior school mark C	-0.012	(0.005)	-0.025	(0.007)	-0.028	(0.008)	-0.048	(0.008)
Junior school mark B	-0.021	(0.007)	-0.044	(0.009)	-0.049	(0.010)	-0.065	(0.009)
Junior school mark A	-0.039	(0.008)	-0.073	(0.009)	-0.079	(0.010)	-0.100	(0.011)
Junior school mark C* Reform							0.023	(0.016)
Junior school mark B* Reform							-0.013	(0.015)
Junior school mark A* Reform							-0.005	(0.018)
Professional school	0.099	(0.016)	0.188	(0.038)	0.224	(0.041)		
Technical school	0.057	(0.009)	0.112	(0.021)	0.146	(0.027)		
Professional school* Reform					-0.018	(0.015)		
Technical school* Reform					-0.038	(0.014)		
Unemployment rate	0.000	(0.001)	-0.002	(0.015)	-0.001	(0.017)	-0.006	(0.013)
Reform	-0.041	(0.007)	-0.074	(0.012)	-0.054	(0.013)	-0.081	(0.021)
Correlation of unobservables			-0.186	(0.105)	-0.239	(0.104)	-0.170	(0.067)

Notes: Regression includes regional dummies and uses survey weights. Asymptotically robust standard error adjusted to account for repeated observations at the gender-region-year level. The omitted category is male, has parents with low education and low level occupation, has the lowest mark in the final exam of junior high school (=D), graduated from the academic oriented school track in 1998 and enrolled into college immediately after leaving secondary school. N Obs=36612 . Probit (column 1) and endogenous sample selection probit (other columns) marginal effects evaluated at the sample average of explanatory variables

**Table 6: The effect of the reform on field of college studies at the interview date**

	Science		Medicine		Engineering and Architecture		Economics and Statistics	
Female	-0.031	(0.015)	0.048	(0.010)	-0.210	(0.015)	-0.015	(0.013)
Father secondary degree	0.016	(0.010)	-0.008	(0.008)	0.005	(0.011)	-0.009	(0.011)
Father college degree	0.011	(0.014)	0.008	(0.012)	-0.004	(0.017)	-0.020	(0.017)
Mother secondary degree	-0.018	(0.010)	-0.001	(0.009)	0.010	(0.010)	-0.008	(0.012)
Mother college degree	-0.037	(0.011)	0.037	(0.016)	0.029	(0.023)	-0.023	(0.019)
Father high level occupation	-0.026	(0.014)	-0.004	(0.010)	-0.018	(0.012)	0.041	(0.015)
Father mid level occupation	0.006	(0.010)	-0.005	(0.008)	-0.001	(0.009)	0.009	(0.013)
Father occupation not reported	-0.026	(0.015)	0.004	(0.010)	-0.013	(0.016)	0.036	(0.020)
Mother high level occupation	0.004	(0.019)	-0.022	(0.012)	0.001	(0.019)	0.005	(0.025)
Mother mid level occupation	0.001	(0.015)	-0.008	(0.010)	0.001	(0.013)	-0.023	(0.014)
Mother not working	-0.004	(0.013)	-0.014	(0.010)	0.007	(0.013)	-0.006	(0.016)
Mother occupation not reported	-0.015	(0.029)	-0.034	(0.016)	0.009	(0.030)	-0.027	(0.030)
Junior school mark C	-0.018	(0.012)	-0.027	(0.009)	0.009	(0.018)	0.068	(0.018)
Junior school mark B	-0.019	(0.012)	-0.019	(0.009)	0.039	(0.016)	0.058	(0.019)
Junior school mark A	-0.017	(0.011)	-0.009	(0.010)	0.089	(0.017)	0.063	(0.021)
Professional school	-0.009	(0.019)	0.081	(0.026)	-0.051	(0.022)	0.058	(0.031)
Technical school	-0.051	(0.020)	-0.014	(0.017)	0.026	(0.015)	0.143	(0.028)
Professional school* Reform	0.037	(0.027)	-0.004	(0.017)	-0.073	(0.023)	0.013	(0.035)
Technical school* Reform	0.051	(0.028)	0.002	(0.021)	-0.021	(0.021)	-0.007	(0.032)
Unemployment rate	0.001	(0.001)	-0.001	(0.001)	0.001	(0.001)	-0.001	(0.001)
Reform	0.011	(0.016)	0.002	(0.014)	0.051	(0.015)	-0.031	(0.019)

Continues on next page

**Table 6 (ctnd.): The effect of the reform on field of college studies at the interview date**

	<b>Politics and Sociology</b>		<b>Law</b>		<b>Humanities</b>	
Female	0.026	(0.015)	0.030	(0.012)	0.152	(0.013)
Father secondary degree	-0.010	(0.008)	0.019	(0.010)	-0.012	(0.012)
Father college degree	-0.026	(0.011)	0.011	(0.013)	0.020	(0.017)
Mother secondary degree	0.009	(0.009)	0.000	(0.009)	0.009	(0.012)
Mother college degree	-0.002	(0.013)	0.005	(0.013)	-0.009	(0.022)
Father high level occupation	0.013	(0.013)	0.029	(0.011)	-0.035	(0.015)
Father mid level occupation	-0.004	(0.011)	-0.003	(0.008)	-0.003	(0.011)
Father occupation not reported	-0.003	(0.014)	0.048	(0.012)	-0.047	(0.017)
Mother high level occupation	0.001	(0.018)	0.015	(0.018)	-0.004	(0.022)
Mother mid level occupation	0.007	(0.013)	0.028	(0.012)	-0.007	(0.015)
Mother not working	-0.011	(0.010)	0.020	(0.010)	0.008	(0.013)
Mother occupation not reported	0.051	(0.034)	0.038	(0.031)	-0.023	(0.035)
Junior school mark C	0.000	(0.013)	-0.043	(0.011)	0.012	(0.015)
Junior school mark B	0.013	(0.014)	-0.039	(0.011)	-0.033	(0.014)
Junior school mark A	-0.025	(0.013)	-0.044	(0.010)	-0.057	(0.010)
Professional school	-0.009	(0.015)	-0.051	(0.014)	-0.020	(0.022)
Technical school	-0.007	(0.012)	-0.011	(0.015)	-0.087	(0.019)
Professional school* Reform	0.024	(0.024)	-0.002	(0.023)	0.005	(0.030)
Technical school* Reform	-0.001	(0.015)	-0.002	(0.017)	-0.022	(0.024)
Unemployment rate	0.001	(0.001)	0.000	(0.001)	0.000	(0.002)
Reform	0.023	(0.011)	-0.061	(0.012)	0.004	(0.017)

Notes: Regression includes regional dummies and uses survey weights. Asymptotically robust standard error adjusted to account for repeated observations at the gender-region-year level. The omitted category is male, has parents with low education and low level occupation, has the lowest mark in the final exam of junior high school (=D), graduated from the academic oriented school track in 1998. N Obs= 13830.

Multinomial logit marginal effects evaluated at the sample average of explanatory variables

**Table 7: The effect of the reform on labour market participation**

Female	0.043	(0.014)
Father secondary degree	-0.033	(0.011)
Father college degree	-0.121	(0.019)
Mother secondary degree	-0.046	(0.011)
Mother college degree	-0.070	(0.022)
Father high level occupation	-0.037	(0.014)
Father mid level occupation	-0.024	(0.009)
Father occupation not reported	-0.062	(0.016)
Mother high level occupation	-0.032	(0.024)
Mother mid level occupation	-0.010	(0.013)
Mother not working	0.001	(0.012)
Mother occupation not reported	-0.003	(0.034)
Junior school mark C	-0.045	(0.014)
Junior school mark B	-0.114	(0.016)
Junior school mark A	-0.200	(0.019)
Professional school	0.265	(0.012)
Technical school	0.214	(0.012)
Professional school* Reform	0.060	(0.020)
Technical school* Reform	0.028	(0.018)
Unemployment rate	-0.004	(0.001)
Reform	-0.109	(0.014)

Notes: Regression includes regional dummies and uses survey weights. Asymptotically robust standard error adjusted to account for repeated observations at the gender-region-year level. The omitted category is male, has parents with low education and low level occupation, has the lowest mark in the final exam of junior high school (=D), graduated from the academic oriented school track in 1998. N Obs=36612 . Probit marginal effects evaluated at the sample average of explanatory variables

**Table 8: The simultaneous effect of the reform on labour market participation and college enrolment**

	Only college		Only labour market		Both		None	
Female	0.019	(0.008)	0.018	(0.036)	-0.021	(0.009)	-0.016	(0.007)
Father secondary degree	0.042	(0.008)	-0.068	(0.022)	0.026	(0.006)	0.000	(0.004)
Father college degree	0.043	(0.018)	-0.147	(0.029)	0.109	(0.021)	-0.005	(0.008)
Mother secondary degree	0.022	(0.008)	-0.057	(0.024)	0.035	(0.006)	0.000	(0.005)
Mother college degree	0.065	(0.019)	-0.149	(0.038)	0.085	(0.025)	-0.001	(0.009)
Father high level occupation	0.006	(0.011)	-0.035	(0.033)	0.033	(0.010)	-0.004	(0.005)
Father mid level occupation	0.003	(0.007)	-0.020	(0.022)	0.024	(0.006)	-0.007	(0.003)
Father occupation not reported	0.014	(0.014)	-0.070	(0.033)	0.047	(0.014)	0.009	(0.007)
Mother high level occupation	0.007	(0.021)	-0.038	(0.053)	0.026	(0.020)	0.004	(0.012)
Mother mid level occupation	0.011	(0.009)	-0.020	(0.032)	0.009	(0.009)	0.001	(0.005)
Mother not working	-0.024	(0.007)	0.025	(0.030)	-0.009	(0.007)	0.008	(0.004)
Mother occupation not reported	0.045	(0.025)	-0.055	(0.070)	0.006	(0.021)	0.005	(0.009)
Junior school mark C	0.012	(0.009)	-0.044	(0.035)	0.043	(0.007)	-0.010	(0.004)
Junior school mark B	0.046	(0.010)	-0.133	(0.031)	0.102	(0.010)	-0.015	(0.003)
Junior school mark A	0.044	(0.012)	-0.224	(0.032)	0.190	(0.018)	-0.010	(0.005)
Professional school	-0.216	(0.013)	0.477	(0.055)	-0.268	(0.015)	0.006	(0.006)
Technical school	-0.143	(0.012)	0.313	(0.036)	-0.180	(0.018)	0.011	(0.004)
Professional school* Reform	0.025	(0.021)	-0.008	(0.067)	-0.015	(0.021)	-0.002	(0.010)
Technical school* Reform	0.051	(0.023)	-0.035	(0.046)	0.000	(0.021)	-0.015	(0.009)
Unemployment rate	0.001	(0.001)	0.010	(0.003)	-0.003	(0.001)	0.002	(0.001)
Reform	-0.014	(0.018)	-0.057	(0.049)	0.068	(0.019)	0.004	(0.011)

Notes: Regression includes regional dummies and uses survey weights. Asymptotically robust standard error adjusted to account for repeated observations at the gender-region-year level. The omitted category is male, has parents with low education and low level occupation, has the lowest mark in the final exam of junior high school (=D), graduated from the academic oriented school track in 1998. N Obs=36612 . Multinomial logit marginal effects evaluated at the sample average of explanatory variables