Returns to Education Quality for Low-Skilled Students: Evidence from a Discontinuity

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Abstract

This paper studies the labor market returns to quality of higher education for low-skilled students. Using a regression discontinuity design, we compare students who marginally pass and marginally fail the French high school exit exam from the first attempt. Threshold crossing leads to an improvement in the quality, but has no effect on the quantity, of higher education pursued. Specifically, students who marginally pass are more likely to enroll in STEM majors and universities with better peers. Further, marginally passing increases earnings by 13.6 percent at the age of 27 to 29. Our findings show that low-skilled students experience large gains from having the opportunity to access higher quality postsecondary education.

JEL Classification: H52, I21, I28, J24

Keywords: Quality of education, returns to education, regression discontinuity design

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1 Introduction

Over the past few decades, access to postsecondary education has become more prevalent. In the United States, the percentage of 18 to 24 year olds enrolled in postsecondary institutions increased from 25.7% in 1970 to 41% in 2012.[1] With college becoming more attainable, students are now encouraged to seek higher quality postsecondary education, as it is associated with significant gains in the labor market. In fact, parents in the United States spend a large amount of resources to help their children gain access to "better" universities. Furthermore, governments have been increasingly encouraging students to pursue degrees in the fields of science, technology, engineering and mathematics (STEM). From a policy perspective, these fields are perceived to be the basis for innovation, and recent reports suggest the presence of a persistent and growing wage premium for STEM jobs. This raises an important question about whether *all* students benefit from changes in field of study and college quality.

Recent studies have documented large labor market returns to attending the most selective institutions and degrees.[2] Nonetheless, it is unclear whether students who are at the low end of the skill distribution can benefit from an increase in quality of higher education. Knowing whether labor market gains exist for low-skilled students is important to inform student choice, especially since the returns can be quite heterogeneous and may be driven by high-skilled students (Andrews, Li and Lovenheim, 2012). With soaring tuition costs, it is essential to understand what the right education for each type of student is, not just whether higher education is right for everyone.

This paper studies the labor market returns to quality of postsecondary education for low-skilled students. In our context, quality of higher education refers to both the quality of university attended and field of study pursued—where university quality is proxied by peer ability. This matters as students in most settings in the world decide on an institution and a field of study simultaneously.

To investigate this question, we exploit the fact that students in France have to sit for a series of national written exams in their last year of high school. Those who pass the "high stakes" exam are awarded the Baccalauréat Général or the General Baccalaureate, a degree which is required to graduate from high school and enroll in a postsecondary institution. Students are generally given two attempts to pass the exam within the same year. However, the standards for passing are significantly higher in the first round. We use a regression dis-

[1] Source: `http://nces.ed.gov/programs/digest/d13/tables/dt13_302.60.asp`

[2] For examples, see: Hoekstra, 2009; Saavedra, 2009; Hastings, Neilson and Zimmerman, 2013. A notable exception to this literature is Dale & Krueger (2004) who document no significant earnings premium to attending an elite university.

continuity design, which leverages the fact that barely passing versus barely failing the exam from the first attempt leads to a significant increase in quality of higher education—without affecting the quantity of education pursued. Our RD design allows us to overcome selection bias arising from the fact that postsecondary educational choices are likely correlated with unobservable factors that may also affect future earnings, such as ability and motivation.

Using administrative test score data linked to three detailed surveys, we find that marginally passing on the first attempt causes a significant increase in the quality of higher education pursued. Specifically, threshold crossing leads to an improvement in the average peer quality that students are exposed to in college, to the order of 0.11 standard deviations in Baccalaureate scores. We also find that marginally passing causes a 15.9 percentage point increase in the likelihood of pursuing a STEM degree in any university. As detailed in section 6.2, this increase in quality at the threshold is most likely driven by the fact that universities enroll students on a "first come, first serve" basis as well as discouragement effects on the part of students.

We then explore the effects of this variation in college quality on labor market outcomes. Results indicate that marginally passing leads to a 13.6 percent increase in earnings at the age of 27 to 29, with no significant employment effects. We rule out other possible channels through which threshold crossing may affect earnings. Specifically, we find no significant effect on years of postsecondary education or on the probability of having a postsecondary degree. Moreover, we find no discontinuity in high school graduation rates. This rules out the direct signaling value of the General Baccalaureate degree as a potential channel that could be driving the documented increase in earnings. Accordingly, we conclude that having the option to access higher quality postsecondary education – defined along two separate dimensions – raises earnings by 13.6 percent for low-skilled students.

Our paper is closest to an emerging body of literature, which uses regression discontinuity designs to identify the economic returns to quality of higher education.[3] Previous studies uncover a significant earnings premium from attending the most selective pubic university in a U.S. state (Hoekstra, 2009) and the most selective universities in Colombia (Saavedra, 2009). Other studies look at the gains from accessing 4-year public universities versus 2-year community colleges in the U.S. (Zimmerman, 2014; Goodman, Hurwitz and Smith, 2015). Recent papers also document large returns to different fields of study (Hastings, Neilson and Zimmerman, 2013; Kirkbøen, Leuven and Mogstad, 2014).

We add to this literature in several ways. First, our focus is on low-skilled students who

[3]Our study is also linked to previous work on the returns to quality of higher education, most of which focused on high-skilled students who attend the most selective institutions. For examples, see Brewer, Eide and Ehrenberg (1999), Dale and Krueger (2002), Black and Smith (2006), Hamermesh and Donald (2008).

do not attend the most selective institutions. Specifically, scoring at the passing threshold on the first round of the General Baccalaureate exam puts a student near the 28th percentile of the skill distribution. Zimmerman (2014) also looks at the labor market returns for students with low academic abilities. The main difference with our study is that the author estimates the returns to attending different types of postsecondary institutions (4-year versus 2-year colleges), which ultimately leads to variation in the number of years spent in postsecondary education. In our study, time to completion for degrees does not vary across institutions, and the earnings gains are driven by differences in peer quality and access to STEM degrees, holding quantity of education constant.

Second, we examine the labor market returns to quality of postsecondary education using an entire national university system. This is in contrast to previous studies, which usually focus on the returns to attending a single institution or a subset of institutions within a country (Hoekstra, 2009; Saavedra, 2009; Zimmerman, 2014). A potential drawback of some of these studies is that they cannot observe the postsecondary educational outcomes for students who are not enrolled at that specific institution. One advantage of our data is that it contains the institution and field of study for every student in our sample, allowing for a clear interpretation of the counterfactual. Similar to our paper, Goodman, Smith and Hurwitz (2015) also look at low skilled students and have the advantage of being able to track all students, within the Georgia university system. However, their paper differs from ours in that they focus on BA completion rates and do not analyze any subsequent labor market outcomes.

Our study is also related to another strand of literature, which explores the causes and effects of academic "mismatch". Recent papers show that high-skilled students from low-income families tend to "undermatch", i.e. select universities where the average peer ability is lower than their own (Hoxby and Avery, 2014). In our case, the students around the threshold are low-skilled and enroll in universities where the average peer ability is higher than their own, i.e. "overmatch". In that sense, part of the documented labor market gains for our population of interest are driven by an increase in "overmatching". These findings complement the Goodman, Hurwitz and Smith (2015) study, which documents gains from "overmatching" for low-skilled students in the form of increased BA completion rates.

Finally, this paper also contributes to the literature on educational accountability programs and student outcomes. Recent studies find that the introduction of test-based accountability, like exit exams, can increase high school dropout rates (Ou, 2010; Papay, Murnane and Willett, 2010) and even reduce postsecondary educational attainment (Martorell, 2004). Our results indicate that exit exams can have unintended consequences that have not been considered in the literature. Specifically, we document that exit exams may also lead to variation in the quality of education pursued.

Section two presents detailed information on the French educational setting. Section three describes the data we use. Section four reviews our identification strategy. Section five presents the main empirical results as well as robustness checks. Finally, in section six, we discuss our results and we conclude in section seven.

2 Institutional Background

2.1 The General Baccalaureate

The Baccalauréat Général (or the General Baccalaureate) is a French national degree awarded to students in their last year of high school. It marks the completion of secondary education and is also required for enrollment in postsecondary institutions. Within the General Baccalaureate, students can choose one of three specializations: economics & sociology, literature or sciences. Specializations differ in terms of the subject matter that the curricula focus on. For instance, students specializing in literature have a curriculum predominately focused on subjects such as French literature and philosophy even though they are still required to take all subjects.[4] The percentage of students awarded the General Baccalaureate increased from 67.2% in 1975 to 80.3% in 2002 and 92% in 2013.

In order to be awarded the degree, students must pass a series of national written exams. The exams cover all subjects taken throughout the last academic year and are common to all students within the same specialization. Written and oral exams for the French literature section of the Baccalaureate are administered a year prior to all other tests. Each subject has a different weight depending on student specialization. The weighted average of all subjects is then used to compute the final score on the Baccalaureate exam.

After the exams are administered, they are randomly assigned to preselected secondary school teachers for grading. Two committees supervise the process to guarantee uniform grading. Juries across France then meet to decide whether a degree is conferred. Importantly, students' identities remain anonymous throughout this whole process. In order to be awarded the degree, a student's total weighted score must be greater than or equal to 10 out of 20 possible points. The student is also granted an *Assez Bien* (fairly good), *Bien* (good) or *Très Bien* (very good) distinction if he/she scores above a mark of 12, 14 and 16 respectively.

Students generally have two attempts to pass the exam in a given year. A student who fails the initial attempt can opt to retake the exam in the second round, conditional on scoring at least 8 points on the first try. With a total score below 8, the student has to wait

[4] In the results section, we control for exam specialization fixed effects, and the results remain unchanged.

an additional year to retake the exam. Students select two failing subjects to be retested on in the second round of exams. As a result, they vary from one student to the other. The new grades on these two subjects are then added back to the remaining grades from the first round to calculate a new total score. The student is granted the degree if his/her new average score is greater than or equal to 10. The second round exams of the Baccalaureate are often criticized for being unchallenging and unreliable. This is mainly because they are conducted orally and administered by only one teacher. This allows students to negotiate a passing score with their respective teacher (Buchaillat et al., 2011).

2.2 The jury

Following the grading of the first round exams, juries consisting of secondary school teachers decide on the conferral of the degree. A key part of the jury's role is to determine whether a person who is marginally below a certain cutoff should be given extra points to reach that threshold. If students are awarded the extra points, their final score will be pushed to somewhere between X and X.1 points, where X represents a significant threshold.[5]

Students are usually awarded extra points on the subjects for which they obtain the lowest scores. The jury member who specializes in the corresponding subject has to consent to giving the extra points. Decisions are made in a short period of time as juries need to go through hundreds of applications on a given day. Further, the juries tend to be fairly heterogeneous in their specializations. As a result, two classmates who both marginally fail the Baccalaureate because of their scores on the mathematics portion of the exam may be passed by one jury and not the other just because the former had a teacher in mathematics, while the latter did not. Students are not allowed to interact with jury members, nor do they know that their files are being reviewed until after the results are announced. Furthermore, students' names are hidden from the jury throughout the whole process, as to hinder any cheating or bribing.

The jury members observe students' Baccalaureate exams in all subject matter. They also have the option to access an academic report which contains teachers' evaluations of the student's performance in school. While this may raise concerns over strategic jury behavior in the allocation of extra points, anecdotal evidence suggests that this option is not always exercised. Furthermore, previous studies show that the presence of test-based accountability distorts teacher behavior. For example, Jacob and Levitt (2003) provide evidence of teacher cheating on the Iowa Test of Basic Skills in Chicago elementary schools. Dee, Jacob, Rockoff and McCrary (2011) also show that teachers wanting to help their students, tend to inflate

[5]For example, if a student initially has a score of 9.95 and is deemed worthy of a pass, his/her final posted grade will be between 10 and 10.1. In our dataset, we can only observe this final heaped grade.

test scores on New York's high school assessment exams. In our case, it is possible that teachers' desire to help students might cause them to be more lenient in their evaluations. Thus, even if jury members take into consideration the teachers' evaluations, they may still be basing their decision on an unreliable assessment of the student's performance in school.

In section 5.1, we provide evidence of non-strategic jury behavior. Specifically, we show the smoothness of baseline characteristics at the passing threshold. Further, in section 5.6, we also show that excluding the small part of the sample whose scores could have been manipulated does not change the main results.

2.3 The higher education system in France

There are many academic routes that a student can take upon graduating from high school. In general, students can apply to universities, higher vocational institutes or the "Grandes Ecoles" – the most prestigious and selective institutions in France. Back in 2002, there was no national centralized system that students could use to apply to higher education establishments.[6] Further, students applied to an institution and major simultaneously.

The majority of universities in France are public and offer a variety of different majors. Time to completion for most degrees is three years.[7] By law, the only requirement for admission is holding the Baccalaureate degree. However, in practice, universities are capacity constrained and a student can be denied admission to the university and major of his choice. Priority is usually given to students who reside in the same area as the university. Other students are admitted on a "first come, first serve basis". Although public universities are not normally selective, in a recent report, the National Union of Students in France (L'Union Nationale des Etudiants de France (UNEF)) found that some universities have been using the results of the Baccalaureate exam as a screening device to select more successful applicants.[8]

Students need to have proof of Baccalaureate receipt in order to enroll in universities. They can apply for admission well after the results of the first and second rounds of the

[6]Although no national centralized system was in place, students from the Île-de-France region applied to higher education establishments via a centralized system called RAVEL. (Source: http://www.lemonde.fr/orientation-scolaire/article/2012/03/08/apb-ou-le-passage-oblige-pour-acceder-au-superieur_1652943_1473696.html)

[7]Students received an intermediate degree, the "Diplôme d'études universitaires générales" (or DEUG), after two years in universities. The "Licence" (or the equivalent of the Bachelor's degree) was awarded after an extra year. Starting 2003, the DEUG was gradually phased out. However, only 13 universities had partially eliminated the degree by 2003. We are not too concerned about the effects of this reform on our sample as more than 90% of the students who failed the first round of the 2002 exams had obtained their Baccalaureate degree by 2003.

Source: http://www.mesr.public.lu/enssup/dossiers/bologne/processus_bologne.pdf

[8]Sources: http://lajeunepolitique.com/2013/07/29/27-french-universities-denounced-for-illegal-selecti and http://unef.fr/wp-content/uploads/2013/07/DOSSIER-DE-PRESSE-UNEF-2013-FII-11.pdf

General Baccalaureate are announced. Specifically, for the academic year 2001-2002, the first round exams took place from June 13 to June 20. Students received the results of the first round on July 5. The second round oral exams were administered from July 8 to July 11. The final results were announced on July 11. Admissions to universities are usually open until the beginning of the academic year in September.

The "Grandes Ecoles" are the most prestigious and selective post-baccalaureate institutions in France. They offer degrees in a multitude of fields including engineering, business and political sciences. Time to completion for these degrees is usually five years. Students can enroll in the "Grandes Ecoles" either immediately after high school or after attending two years of preparatory classes in lyceums. Admission to both these routes is based on the students' academic results in the last two years of secondary education, their scores on the French literature portion of the baccalaureate exams and tests that are specific to each institution. Admissions decisions are made before students sit for the first round of baccalaureate exams. Further, the low-skilled students that we look at do not attend these institutions. Appendix A.3 offers a more detailed description of the traditional higher education system.

Admissions to vocational and professional institutes are considered competitive. Most degrees require three years to complete. Students are in general admitted based on their academic results in the last two years of secondary education or upon obtaining a distinction on the baccalaureate exams. Appendix A.4 provides an overview of the vocational higher education system.

3 Data

Our data links individual-level information on secondary and post-secondary education to labor market outcomes and are taken from three surveys, the "Panel d'élèves du second degré, recrutement 1995", administered by the French statistical office (INSEE). The data contains student demographics, detailed scores on the baccalaureate exams taken from administrative records, post-secondary field of study, institution attended and graduated, earnings information and employment status.

Data on post-secondary education are available on a semiannual basis for up to 9 years after receiving the General Baccalaureate degree. Labor market outcomes are reported yearly from 2005 to 2012, up to 10 years after the General Baccalaureate exams. Thus, one advantage of our dataset is that we are able to observe detailed long-term outcomes. A potential drawback of the data is that it does not include outcomes for individuals working abroad. Also, some individuals do not report their earnings or drop out of the sample because they could not be followed by the interviewers. This could potentially cause problems insofar as it is correlated with treatment. We address these issues in section 5.1 by showing that there is no discontinuity in the probability of being observed in the labor market portion of the survey.

The initial sample consists of 17,830 students who were enrolled in grade 6 (6ème) in the academic year 1995-1996. We restrict our data to students who sat for the first round of the General Baccalaureate exam in the academic year 2001-2002. We do not use the results from the second round because retaking the exam can induce differences between students who are marginally below and above the threshold (Martorell and McFarlin Jr., 2011). Further, the second round exams can be strategically manipulated as they are conducted orally and administered by only one teacher. We also exclude students who attended vocational secondary schooling as their post Baccalaureate academic options are limited.

The main labor market outcome of interest is the natural log of average monthly net earnings, stacked for the years 2011 and 2012. This results in up to two observations for each individual. Since earnings of individuals in their early twenties are not usually considered a good predictor of future income, we use earnings reported approximately 9 to 10 years after taking the baccalaureate exam, when the students are aged between 27 and 29.

In our analysis of the quality of post-Baccalaureate institutions, the main measure used is the average Baccalaureate score of all students in our sample attending a certain institution, i.e average peer performance.[9] Thus, we consider a university to be of "better quality" if it has higher performing peers. Concerning field of study, the main outcome of interest is a dummy variable that is equal to 1 if the student is enrolled in a STEM designated degree or an advanced business degree. Advanced business degrees are classified as STEM because they usually require good quantitative skills. A complete account of the majors we designate as STEM versus non-STEM can be found in Appendix Table A.5.

Finally, we use father's occupation as a proxy for students' socioeconomic status. The occupation of the father is stratified into 42 different positions that are represented by two digit identifiers. The first digit of each identifier represents one of four main skill levels. These skill levels are the official French socioeconomic classification as represented by the "Nomenclature des professions et categories socioprofessionelles" (PCS) and are used as a reference in all official collective agreements. Our definition of high skilled workers includes the first two skills levels, while low skilled workers are represented by the last two.

Descriptive statistics for students who sat for the first round of the 2002 General Baccalaureate are reported in Table 1. 38 percent of the students are male and 57 percent are from a high socioeconomic background.[10] The average score on the Baccalaureate exam

[9]Data on out of sample average Baccalaureate score by institution is not available.

[10]51.61 percent of the students in our initial sample are male. This number is reduced to 38 percent after

is 11.17 points, with approximately 75 percent of students passing from the first round. Further, 98 percent of the students in our sample eventually graduate high school (i.e. eventually pass the Baccalaureate). Respondents have an average of 3.2 years of postsecondary education and 28 percent of students are enrolled in a STEM major in their first year of postsecondary education. As for labor market outcomes, the average monthly net earnings for individuals in the sample are 1,625 and 1,725 Euros for 2011 and 2012 respectively, with an employment rate of 93 percent for both years.

4 Identification Strategy

We use a standard regression discontinuity framework (Lee and Lemieux, 2010; Imbens and Lemieux, 2008) to estimate the effects of passing the Baccalaureate exam from the first try on educational attainment, quality of education and future labor market outcomes. The key identifying assumption underlying an RD design is that all determinants of future outcomes vary smoothly across the threshold. In that sense, any observed discontinuity at the threshold can be attributed to the causal effect of scoring above a 10 on the Baccalaureate exam, i.e. passing on the first attempt.

Formally, we estimate the following reduced form equation:

$$Y_i = \alpha + g(S_i) + \tau D_i + \delta X_i + \epsilon_i$$

where the dependent variable Y is the outcome of interest, representing earnings and educational outcomes for individual i. D is a dummy variable indicating whether a person passed or failed the French Baccalaureate exam on the first try. S is the running variable and represents an individual's score on the first attempt of the exam. It is defined as grade points relative to the threshold passing grade of 10. The function g(.) captures the underlying relationship between the running variable and the dependent variable. We allow the slopes of our fitted lines to differ on either side of the passing threshold by interacting g(.) with treatment D in order to control for differential trends in grades. X is a vector of controls that should improve precision by reducing residual variation in the outcome variable, but should not significantly alter the treatment estimates. The term ϵ represents the error term. The parameter of interest is τ which gives us the local average treatment effect for each regression.

excluding students who were in vocational secondary schooling. However, this does not pose any threat to identification, as we observe no discontinuity in the likelihood of being of a certain sex at the threshold (See Section 5.1).

In all regressions, we use population survey weights to estimate treatment effects for the various outcomes of interest.[11] Further, heteroskedastic adjusted errors are used in all regressions.[12] There are two ways to estimate the parameter τ in an RD design. First, one can impose a specific parametric function for g(.), using all the available grade data, to estimate the above equation via ordinary least squares —typically referred to as the global polynomial approach. Alternatively, one can specify g(.) to be a linear function of S and estimate the equation over a narrower range of data, using a local linear regression. In this paper, the preferred specifications are drawn from local linear regressions within 1.5 grade points on either side of the cutoff using uniform kernel weights. This avoids the problem of identifying local effects using variation too far away from the passing threshold. Our choice of bandwidth is motivated by graphical fit, data driven optimal bandwidth selectors and the existence of other cutoff grades. Specifically, we use a robust data driven procedure, outlined in Calonico, Cattaneo and Titiunik (2014), to predict the optimal bandwidths (Henceforth CCT).[13] This bandwidth selector improves upon previous selectors that yield large bandwidths. Specifically, it accounts for bias-correction stemming from large initial bandwidth choice, while also correcting for the poor finite sample performance attributed to this bias correction. While our preferred specifications are drawn from local linear regressions, we still present results for a variety of bandwidths and functional forms, as has become standard in the RD literature (Lee and Lemieux, 2010). The results are robust to these varying specifications leading us to conclude that passing the Baccalaureate exam from the first attempt results in significant differences in quality of schooling and subsequent labor market outcomes.

5 Results

5.1 Tests of the Validity of the RD design

A standard concern with any RD design is the ability for individuals to precisely control the assignment variable. In our context, this can occur if students and/or graders manipulate scores in such a way that the distribution of unobservable determinants of education and earnings are discontinuous at the cutoff. The first concern is if students themselves are able to precisely sort to either side of the cutoff, especially given that the cutoff score is known beforehand. However, the Baccalaureate exam comprises all subject matter taken during

[11] Results remain unchanged when using un-weighted regressions.

[12] Our running variable is fairly continuous as it is reported to the nearest one hundredth of a decimal point (i.e 9.91, 9.92, etc...). Accordingly, we are not too concerned about random specification error resulting from a discrete running variable as reported in Lee and Card (2008).

[13] The optimal local linear bandwidth for most of our specifications ranges from 1.2 to 1.5 score points.

the year, most of which is in essay format, making it highly unlikely for any student to be able to precisely control their grade. A potentially more worrying concern is whether graders are sorting students to either side of the passing threshold in a non random way. Indeed, if borderline students with better future prospects are marginally passed at a higher rate than those with worse prospects, then our education and earnings estimates would most likely be upward biased.

In addressing these concerns, we consider a few tests that have become standard in the RD literature. The first informative test would be to check for any discontinuity in the density of grades at the cutoff point (McCrary, 2008). The rationale behind this test is that if individuals are manipulating grades around the cutoff, then the grade distribution will be discontinuously uneven for grades just below and above the cutoff. However, a running variable with a continuous density is neither necessary nor sufficient for identification. Specifically, this test may not be as helpful if discontinuities in the grade distribution can be attributed to other exogenous factors such as grade rounding.[14] As mentioned in Section 2.2, after the initial grading of the exams, jury members decide whether they should award extra points to individuals just short of an important cutoff. The empirical distribution in Panel A of Figure 1 is consistent with this idea. At each representative grade cutoff, we observe a dip in the number of students who are just short of said cutoff combined with a spike in the number of students who are just above it.[15] This heaping is consistent with a priori expectations that jury members are bunching grades at important cutoffs. These distributional discontinuities could be the result of strategic cutoff crossing, or an alternative random sorting process. While, the first case is obviously problematic, the latter poses no threat to identification. As highlighted in McCrary (2008): "If teachers select at random which students receive bonus points, then an ATE would still be identified." In what follows, we provide evidence against strategic cutoff crossing.

In the presence of a running variable that is discontinuously distributed for exogenous reasons, an informative visual test for grade manipulation is to verify the smoothness of baseline characteristics. This test has become standard in the RD literature as an alternative and often preferred approach for testing the validity of the RD design (Lee and Lemieux, 2010). The intuition here is that if we observe discontinuities in exogenous variables, then the treatment is not randomly assigned and an average treatment effect is not identified. Further, as part of this exercise, we also check for the presence of a discontinuity in the probability of being observed in the follow-up labor force segment of the survey. Specifically, if probability

[14]See Zimmerman (2014) for such a case.

[15]Recall, that the cutoff grades of 8 ,10 ,12 ,14 and 16 all serve a specific purpose in terms of awarded degree.

of survey response is correlated with treatment, then the standard interpretation of our treatment effect would be problematic.

All panels in Figure 2 present estimates of the effects of threshold crossing on baseline characteristics. These figures take the same form as those after them in that circles represent local averages over a 0.25 score range. All figures represent local linear regressions within 1.5 score points of the cutoff. Further, estimates are computed using population weights with robust standard errors reported in parentheses.

We first check for the presence of a discontinuity in the averaged score of the oral and written French literature portion of the Baccalaureate exam. There are two advantages to looking at this variable. First, these exams are administered in grade 11, one year before all other Baccalaureate tests. In that sense, it is a very recent indicator of student ability. Second, jury members cannot award extra points on this particular component of the Baccalaureate exam. Panel A of Figure 2 reveals an insignificant treatment effect (0.0196) on the average score of the French literature exam. We further test for a discontinuity in the Brevet national exam test scores. This high stakes exam is taken in grade 9 and is required for entry into high school, with the grading scale also being from 0-20. We have the averaged score for the three major components of the Brevet exam (Mathematics, French and foreign language). We also look at another national exam taken at the beginning of grade 6. The goal of this exam is to evaluate the level of students in mathematics and its grading scale is from 0 to 78. In Panel B of Figure 2, we find an insignificant treatment estimate (0.158) on Brevet scores. Panel C of Figure 2 also shows an insignificant treatment effect (-0.847) on the mathematics exam scores in grade 6. This eases concerns that jury members might be sorting students around the cutoff, based on their academic ability.

In Panel D, we check for the presence of a discontinuity in the likelihood of being from a high socioeconomic status (S.E.S). We also find no significant effect (0.022). Further, in Panels E through G, we check for the smoothness of covariates that are known to affect education and wages, but that should be independent of treatment. Estimates on gender (0.0029), order of birth (-0.098) and number of siblings (0.138) are all statistically insignificant. To alleviate any concerns over bandwidth and/or functional form chosen, we present the baseline characteristics over varying functional forms and bandwidths in Table 2. All estimates remain statistically insignificant. Finally, we show that the predicted Baccalaureate score, as a function of the above covariates, is continuous at the cutoff. Both panels in Figure 3 highlight these results using a local linear and global polynomial fit respectively.

These results reject the hypothesis of strategic threshold crossing in favor of a non strategic sorting hypothesis.[16] They are also consistent with the fact that students' identities are

[16]In Table A1, we also show that the baseline characteristics are smooth around all other important

never disclosed to neither graders nor jury members.

As highlighted in Barreca, Lindo and Waddell (Forthcoming), heaping in the running variable can have serious consequences if it is associated with determinants of the outcome variables. However, this will only bias the estimates to the extent that it creates imbalances in outcome determinants around the cutoff. Therefore, as a complement to our balanced characteristics test, we implement additional checks to further investigate the existence of strategic sorting. Specifically, we run 'Donut type' RDs that deal with the heaped data at each cutoff. Panel B of Figure 1 highlights the new distribution of grades resulting from Donut type RD regressions, which essentially involves cutting out all potentially manipulable data points. We implement these regressions in Section 5.6 with the main results remaining unchanged.

Finally, if marginally failing students were more likely to leave the country in order to have access to higher quality universities or if they endogenously chose not to respond to the follow up survey as a result of failing, then the interpretation of our results would be problematic. As an important RD validity check, we show that there is no significant threshold crossing effect on the likelihood of being observed in the follow-up wage survey. These results are reported in Panel H of Figure 2 and Table 2. The absence of any differential selection into the earnings sample alleviates any concerns attributed to leaving the sample due to barely failing the French Baccalaureate exam.

5.2 Is the Baccalaureate cutoff rule binding in practice?

In this paper, we estimate the impact of passing the French Baccalaureate from the first try on future educational and labor market outcomes. Before proceeding with the results, we first show that there is a discontinuity in the first round pass rate at the threshold. Figure 4 is a graphical representation of the probability of being awarded the Baccalaureate degree on the first round, conditional on first round exam scores. The figure shows a clear discontinuity at the cutoff, with a sharp 100 percentage point jump in the probability of passing at the threshold. This indicates that the Baccalaureate cutoff rule was fully binding in practice and subsequently rules out any non-compliance issues.

thresholds. Indeed, if juries were strategically manipulating results, then this phenomenon should occur at all important cutoffs. We find no evidence of significant discontinuities at any of these cutoffs for our above baseline covariates.

5.3 Impact on Quantity of Education

In this section, we investigate whether marginally passing the Baccalaureate exam on the first round affects the quantity of education pursued.

We first check whether barely passing from the first attempt affects the likelihood of ever graduating from high school. In Panel A of Figure 5, we plot the probability of ever passing the French Baccalaureate exam as a function of the first exam score.[17] Panel A shows an insignificant treatment effect (0.003) on the probability of ever graduating from high school. Estimates for varying bandwidths and functional forms are reported in Panel A of Table 3, with the results remaining statistically insignificant.

Next, we look at whether there is a treatment effect on the likelihood of receiving a post-baccalaureate degree. Panel B of Figure 5 shows no significant effect of threshold crossing on the probability of having a post-baccalaureate degree. The results remain insignificant over varying bandwidths and functional forms as is evident from Panel B of Table 3.

We then look at whether threshold crossing leads to variation in the number of years of postsecondary education pursued. In Panel C of Figure 5, we plot the years of post baccalaureate education as a function of the first round exam scores. We also find no significant treatment effect. Corresponding regression estimates are reported in Panel C of Table 3. The estimates are consistent with the figure and rule out any significant effects.

Finally, we investigate whether threshold crossing affects the age of post-secondary graduation. In Panel D of Figure 5, we plot the age at graduation as a function of first round exam scores. We find a significant treatment effect (0.39 years) when using a local linear regression over a bandwidth of 1.5 points. However, as shown in Panel D of Table 3, this estimate is not robust to different bandwidths and functional forms.

All results remain unchanged with the addition of controls. These controls include exam specialization fixed effects, date of birth, number of siblings, birth order, socioeconomic status, scores on the Brevet examination, scores on the French portion of the Baccalaureate taken in grade 11 and scores in the grade 6 national assessment exam in Mathematics.

In summary, we rule out that passing the General Baccalaureate on the first attempt affects the quantity of education pursued.

5.4 Impact on Quality of Education

In this section, we explore whether passing the Baccalaureate exam on the first attempt affects quality of postsecondary education pursued. Specifically, we look at the impact of

[17] Global polynomial figures for all "Quantity of education" variables can be found in Appendix Figure A1.

threshold crossing on the quality of institution attended and the likelihood of enrolling in a STEM major.

We rely on in-sample institution average Baccalaureate score, i.e peer performance, as a proxy for institution quality.[18] In Panel A of Figure 6, we plot the mean student Baccalaureate score for each university as a function of first round exam scores. As in previous figures, circles represent local averages over a 0.25 score range. All figures represent a population weighted local linear regression using data within 1.5 points on either side of the threshold, which has again been chosen by the CCT bandwidth selector.[19]

We find a significant threshold crossing effect to the order of 0.26 Baccalaureate points. This indicates that the average peer quality that students experience in college increases significantly and discontinuously—to the order of 0.11 of a standard deviation in Baccalaureate scores—as a result of passing from the first attempt. To put things into perspective, this would be comparable to attending a US college whose student body averaged 1024 SAT points off of a base college whose students averaged 1000 SAT points.[20] Since our study deals with marginal public universities on either side of the threshold, as opposed to elite versus non-elite type universities, the order of magnitude seems reasonable and economically significant. For example, Hoekstra (2009) finds that attending the most selective in-state university, whose peers average 65 SAT points higher than the next university, results in a 20 percent earnings premium for males.

Panel A of Table 4 depicts discontinuity estimates using different bandwidths and functional forms. The estimates range from 0.21 to 0.29 Baccalaureate points, equivalent to 0.097 to 0.138 of a S.D. in Baccalaureate test scores as illustrated in Panel B of Table 4. Further, all estimates are statistically significant at the 5% level. Additionally, the inclusion of controls does not significantly change the estimates, which is consistent with the identifying assumption.

[18]A potential drawback to this approach is that the relatively small number of observations within each institution could lead to inference problems. Specifically, all individuals within the same institution share a common measurement error component. We correct for this by clustering at the institution level thus allowing for a grouped error structure.

[19]The negative slope on the left hand side of the cutoff is consistent with a first come, first served admissions mechanism (See Sections 2.3 and 6.2 for details). Specifically, students scoring just shy of a cutoff are more likely to pass on the second round than those farther to the left of the cutoff, who are more likely to pass on the first round of the following year. The unintended consequence of this is that students farther to the left of the cutoff have a better pick of universities the following year. However, we must also note that the negative slope is not statistically significant. In Appendix A2, we also present global polynomial figures that reveal the entire fit.

[20]We arrive at this comparison in the following way: The average institution Baccalaureate score just to the left of the cutoff is 10.82 points. In our data, this corresponds to ranking in the 45th percentile of all students. We then compare this number to the 45th percentile score of SAT National Percentile Ranks, which is equivalent to 1000 (We use the Verbal + Mathematics percentile rank).

Students in France simultaneously enroll in a postsecondary institution and field of study. Consequently, we check whether there is a discontinuity in the likelihood of being enrolled in a STEM versus non-STEM major. Panel B of Figure 6 plots the probability of being enrolled in a STEM major as a function of first exam score. Threshold crossing induces a 15.9 percentage point increase in the probability of being in a STEM major. Panel C of Table 4 reports the discontinuity estimates using different bandwidths and functional forms and with the inclusion of controls. All estimates remain statistically significant at the 5% level.

The data allows us to observe whether an individual graduates from a certain institution rather than just being admitted to an institution. This is potentially important as completion rates are sometimes low and vary across institutions, which would in turn complicate the interpretation of the results. Consequently, we present local linear estimates on the quality of institutions that students graduate from as well as the likelihood of graduating with a STEM-designated major in Appendix Figures A3. All figures show a clear discontinuity at the threshold, similar to the initial attendance figures. This lead us to conclude that any potential labor market effects should be the result of both attending and graduating with higher quality schooling.

5.5 Impact on Labor Market Outcomes

We now turn to whether the documented variation in quality of education is associated with positive labor market returns. Figure 7 graphically depicts the relationship between labor market outcomes and the distance from the first round exam cutoff. All panels report estimates from local linear regressions using a bandwidth of 1.5 points, with standard errors clustered at the individual level.[21] We first check whether threshold crossing generates any significant changes in the likelihood of employment. In Panel A of Figure 7, we find an insignificant -0.008 percentage point change in the likelihood of employment at the threshold. As shown in Panel A of Table 5, all regression estimates remain statistically insignificant over varying bandwidths and functional forms. Further, the addition of controls does not significantly affect estimates.

We then explore whether threshold crossing affects earnings. Specifically, we focus on the average monthly net earnings for the years 2011 and 2012. The earnings from both years are stacked, resulting in up to two observations per individual. Accordingly, standard errors are clustered at the individual level. We look at net monthly earnings as a function of exam score in Panel B of Figure 7. We find that first round passing is associated with

[21]Global polynomial figures for all "Labor market" variables can be found in Appendix Figure A4.

a €252 monthly premium. Additionally, in Panel C, we look at logged monthly earnings. We find that threshold crossing leads to a 12.8 log point (13.6 percent) increase in earnings. Corresponding regression estimates are shown in Panels B and C of Table 5. These estimates are robust to different bandwidths and functional forms. For instance, the estimates for logged earnings vary from 12.6 to 18 log points and are all statistically significant at the 1% level. Further, the addition of controls does not significantly alter the estimates for earnings, which is consistent with the identifying assumption. We conclude that while passing the Baccalaureate exam on the first try does not affect the likelihood of employment, it does significantly alter future earnings.

5.6 Robustness Checks

Before interpreting our results, we run additional robustness checks. Primarily, we address concerns that heaping in the running variable could lead to bias—even in the presence of balanced covariates. To alleviate such concerns, we run 'Donut type' RD regressions that involve dropping all potentially manipulable data points around the threshold (See Dahl, Løken and Mogstad, 2014 and Zimmerman, 2014 for similar applications of Donut RDs). In our setting, scoring within 0.25 points to the left of a cutoff generally allows for a student's grade to be reconsidered. Further, grades are pushed to anywhere between X to X.1 points, with X representing a respective cutoff. As a result, we drop all individuals whose first exam grade lies anywhere between 7.75-8.1, 9.75-10.1, 11.75-12.1, 13.75-14.1 and 15.75-16.1 points. The new distribution of grades is highlighted in Panel B of Figure 1. Regression estimates from these 'Donut' type RD specifications can be found in Tables 6, 7 and 8, where we report modified treatment estimates for quantity of education, quality of education and labor market outcomes respectively. We report all outcome variables over the same bandwidths and functional forms previously analyzed. Precision is reduced in most specifications, which is to be expected given the reduced data. However, all previously significant treatment effects remain so. Further, point estimates slightly increase for most specifications, which is at odds with a strategic sorting story. If jury members were endogenously sorting students, then we would expect our new point estimates to be significantly reduced.

Generally, jury members give special attention to grades that are within 0.25 points short of a cutoff. However, we cannot rule out the possibility of certain jury members awarding extra points for scores that are even further away from the threshold. To further investigate this issue, we take a closer look at the distribution of Baccalaureate test scores within a 9 to 11 grade window in Figure 8. Noticeably, the distribution of test scores drops sharply and linearly in the range of 9.65 to 9.99 Baccalaureate points. This sudden drop in the distribution is consistent with the potential for manipulation of test scores as reported in Dee, Jacob, Rockoff and McCrary (2011). As a result, we further exclude from our 'Donut RD' analysis all individuals scoring between 9.65 and 9.75 points which effectively takes care of all test scores that could potentially be manipulated. We then reestimate all treatment effects. These results are also reported in Tables 6, 7 and 8. Precision is further reduced in most specifications. Nonetheless, all previously significant effects remain so. Altogether, the results from both Donut RD specifications reject a strategic sorting hypothesis and are in line with our main results and conclusions.

Finally, we check for earnings discontinuities at pseudo cutoff scores around the passing threshold score. To do so, we gradually estimate treatment effects for 50 fake cutoff scores on either side of the original passing threshold. We use logged monthly earnings as the outcome variable in this placebo test. Results indicate that the cutoff score of 10 provides for the largest and most significant discontinuity. Figure A5 of the appendix summarizes these findings by graphing t-statistics for these various placebo cutoff scores. The estimated t-statistic at the zero cutoff score represents the original one, with all others being placebo statistics for fake cutoff treatments relative to the original.[22] All significant estimates are highlighted in the graph with a large red filled circle. We observe only 2 significant treatment effects out of a possible 100. We conclude that no other important cutoff value (8 ,12, 14, 16) has a significant effect on earnings except for the original high stakes passing cutoff of 10. These results also provide further evidence on the importance of passing the Baccalaureate exam from the first round and the significant earnings premium that this induced variation leads to.

6 Discussion

6.1 Interpreting the documented labor market premium

We interpret our results as "intent to treat" effects whereby increased access to higher quality schooling results in a 13.6 percent earnings premium for the low skilled student. In fact, our "first stage" results show that a significant proportion of students who pass from the first round attend a university with higher performing peers and/or are more likely to pursue a STEM major. This allows us to measure the effect of increased access to higher quality education on later lifetime outcomes, but not the effect of any specific change in higher education quality.

[22] Each open circle represents the t-statistic from a local linear regression of bandwidth = 1.5 Baccalaureate points.

Our interpretation hinges on the fact that only quality of education dimensions vary at the cutoff. As a result, we rule out other potential channels through which marginally passing the Baccalaureate exam on the first round could affect earnings. First, we show that there is no impact on the likelihood of ever being awarded the Baccalaureate degree. This is not surprising as students are required to hold the degree if they wish to enroll in post-secondary education. Furthermore, students who want to enter the labor force immediately after high school could use the baccalaureate degree as a signal of their ability to potential employers. Therefore, students are incentivized to retake the exam until they are awarded the degree. This is in line with recent evidence which finds that exit exams don't cause increased high school dropout rates (Clark and See, 2011). Second, we find that threshold-crossing has no impact on the likelihood of obtaining a post-baccalaureate degree nor on the years of postsecondary education. These results are expected given the vast number of non selective universities and majors in France whose only requirement for admission is holding the Baccalaureate degree.

Another factor that could affect the interpretation of our estimates is that the documented increase in earnings could be driven by employers who use passing on the first round as a signal of productivity. To alleviate such concerns, we focus on a segment of the population who have chosen not to attend college.[23] If employers are using the first round of the Baccalaureate exam as a signal of productivity, then we would expect the signal to be most pronounced for this segment of the population. Appendix Figure A6 shows that there is no threshold crossing effect on earnings for this subpopulation. While the estimate is not precise due to small sample issues, it is still comforting to see that there is no discernible discontinuity at the cutoff.[24] Furthermore, it is unlikely that employers are able to distinguish students who marginally passed and marginally failed the first round exams.

A final concern is that age of Baccalaureate or post Baccalaureate graduation is lower for marginal passers. In this case, at least part of the observed earnings premium might be explained by work experience. While we cannot reject the existence of a threshold crossing effect on age of post baccalaureate graduation, the results indicate that marginally passing from the first attempt potentially increases the age at graduation. This would cause us to understate the earnings estimate, in so far as work experience is positively correlated with earnings. The results are not surprising given that some STEM majors require more time to complete in France. For example, engineering degrees are awarded after five years in higher education, as opposed to three years for most other degrees. Finally, for age at Baccalaureate

[23] We have previously shown that there is no discontinuity in college attendance which is why we are not too wary about conditioning on non-college attendance.

[24] We use a quadratic polynomial regression because there is insufficient data to run meaningful local linear regressions.

receipt, Appendix figure A7 reveals no significant treatment effect.

6.2 First time passing and variation in quality of higher education

In this paper, we argue that marginally passing the General Baccalaureate exam from the first attempt raises earnings through an improvement in the quality of higher education. We present three possible mechanisms for the observed increase in education quality.

First, students who marginally fail from the first attempt have to sit for a second round of exams. The second round results are announced a week after the first round scores. Further, universities generally enroll students on a "first come, first serve" basis and students need to have proof of Baccalaureate receipt in order to enroll in universities. As a result, this extra week may constitute an important advantage for those who wish to enroll in university/major combinations that are in high demand. Indeed, data from one of our surveys lends support to this channel. Specifically, students were asked whether they were satisfied with the university and major they were enrolled in. For those who expressed discontent, the survey also asked for the reason they did not enroll in the university/major of their choice. Amongst those who failed the first round, 11.9% answered that they were too late in enrolling in their first choice of university/major. This number decreases to 4.9% for those who passed on the first round.

Second, the documented variation in higher education quality could be due to a discouragement effect. This would be in line with previous evidence which shows that exit exams can discourage students by increasing high school dropout rates and lowering higher educational attainment (Martorell, 2004; Ou, 2010; Papay, Murnane and Willett, 2010). In our case, the exit exam does not affect the quantity of education pursued, since most students pass on the second round and universities are generally not selective. Nonetheless, marginally failing students may still be discouraged by their first round results making them more susceptible to enrolling in non STEM majors or universities with lower skilled peers.

Third, universities could perceive the timing of degree receipt as a signal of student ability, which would then factor into admissions decisions. This is reinforced by the fact that the second round of exams have lower standards for passing and are often deemed unreliable (see Buchaillat et al., 2011). By law, universities in France cannot be selective, but they are capacity constrained. Back in 2002, they were required to give priority in their admissions to students residing in the same area. Other students usually enrolled on a "first come, first serve" basis. However, in a recent report, the National Union of Students in France (L'Union Nationale des Etudiants de France) found that some universities had been using the results from the Baccalaureate exam to select students into majors that were in high demand. Thus, we cannot completely rule out selection by universities as a channel through which marginally failing the first round affects the quality of higher education.

6.3 Returns to STEM education?

Although it would be interesting to examine the effects for different subgroups of students, our sample size does not allow us to run a thorough heterogeneity analysis.

We do however investigate the impacts for students from lower socioeconomic backgrounds, with the caveat of reduced precision. This allows us to present suggestive evidence on the earnings premium of pursuing a STEM degree, holding quality of university constant. To do so, we look at a subpopulation of students whose quality of schooling is likely to differ in only one dimension. Specifically, students from lower socioeconomic backgrounds may be less likely to attend higher quality institutions. In fact, there is clear evidence that low-income students tend to undermatch and not attend the highest quality colleges available to them (Roderick et al., 2008; Bowen et al., 2009; Smith et al., 2013). This seems highly plausible in our context as the default choice of education in France is to attend the public university that is closest to the area of residence. These universities are not always of the highest quality and are a less expensive option for lower earning families, in terms of housing and transportation. Further, the possibility of pursuing a STEM degree at a lower quality university is higher than it would be at a better quality one. The results from Table 9 are consistent with this idea. Our preferred specification in column 3 suggests that students from low socioeconomic backgrounds are not attending better universities. However, they are 26.4 percentage point more likely to pursue a STEM degree.[25] We also estimate an 11.4 percent earnings premium for this subgroup of students. If we were to believe that no other changes were occurring at the threshold, then rescaling the reduced form wage estimate by the documented increase in the likelihood of pursuing a STEM major suggests a 43 percent return to pursuing a STEM designated major for students of low socioeconomic backgrounds.[26]

6.4 How does quality of higher education affect earnings?

The two classical channels through which quality of higher education can affect earnings are human capital formation and signaling. Our measures of quality of education are average peer ability and enrollment in STEM majors, which can affect future earnings through both signaling (i.e. better peers attend better institutions) and human capital accumulation. One

[25]We do not provide any figures for these results as the smaller samples leads to the under-smoothing of mean plots.

[26]It should be noted that this is only suggestive evidence as the threshold crossing effect on quality of university is not very precise.

test of the signaling channel would be to look at whether the earnings effect decreases with age (Hoekstra, 2009). Our data only allows us to observe detailed labor market outcomes between the ages of 27 to 29.[27] Thus, we are unable to perform this test.

Another possible explanation for the earnings effect, that would favor the human capital channel, is that students who are marginally above the cutoff attend university/major combinations that have more resources. The vast majority of universities in France are public and receive most of their funding from the government.[28] Unfortunately, detailed data on spending per university is not available for the period of our study.[29] Therefore, we are unable to test whether universities and majors affect earnings through providing students with better resources.

7 Conclusion

This paper looks at whether low-skilled students gain from an increase in quality of higher education. We exploit the fact that students in France have to pass a national exam to graduate from high school and enroll in universities. Using a regression discontinuity design, we compare the education and labor market outcomes of students who marginally pass and marginally fail the exam from the first attempt. We find that marginally passing has no effect on the quantity of education pursued. It does however improve the quality of peers that a student is exposed to in his postsecondary institution and increases the likelihood of enrolling in a STEM major. Marginally passing also leads to a 13.6 percent increase in earnings at the age of 27 to 29. We interpret our findings as intent to treat effects whereby having the opportunity to access higher quality postsecondary education results in a significant earnings premium for low-skilled students.

We believe that this paper contributes to the understanding of how education affects different types of individuals. Our results can be seen as complementing recent findings which indicate that low-skilled students realize labor market and educational gains from accessing 4-year colleges in the U.S. (Zimmerman, 2014; Goodman, Hurwitz and Smith, 2015). Specifically, we show that these gains are not restricted to increasing low skilled students' access to college, but are also realized by increasing their access to better quality colleges and majors. To the extent that our results can be extended to other settings, these

[27]Even though we observe labor market outcomes on a yearly basis, detailed earnings data is only available for the last two years of the survey.

[28]Funding was allocated based on the number of students enrolled, the number of university employees and the areas that were used for teaching.

[29]This data was made available starting 2009. However, the algorithm used to allocate resources to universities also changed. As a result, it would misleading to use recent data on spending per university.

findings are important in light of the fact that there is a growing need to inform student choice, given soaring tuition costs coupled with the fact that governments around the world have been setting goals of increasing the number of STEM graduates.

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Panel d'élèves du second degré, recrutement 1995 - 1995-2011 - (2006) [fichier électronique], DEPP — INSEE [producteur], Centre Maurice Halbwachs (CMH) [diffuseur].

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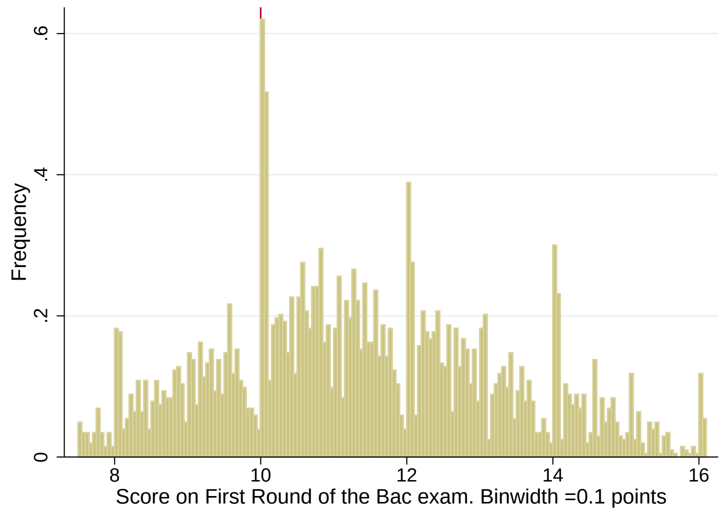
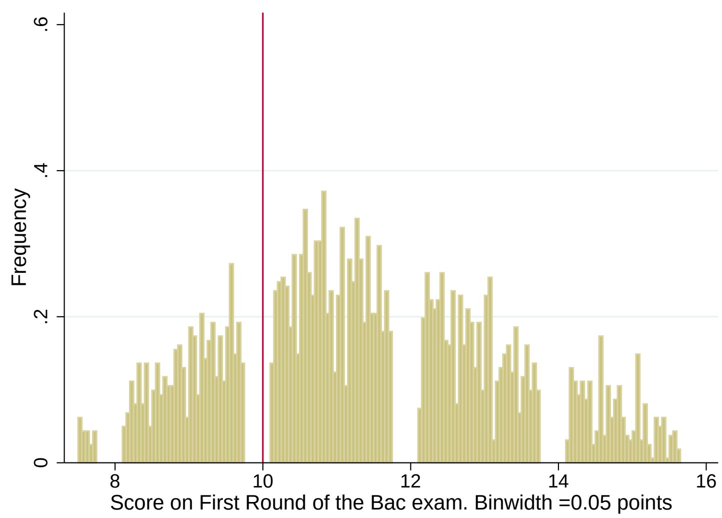
A Figures

Figure 1: Distribution of scores on the first round of the French Baccalaureate in the year 2002.



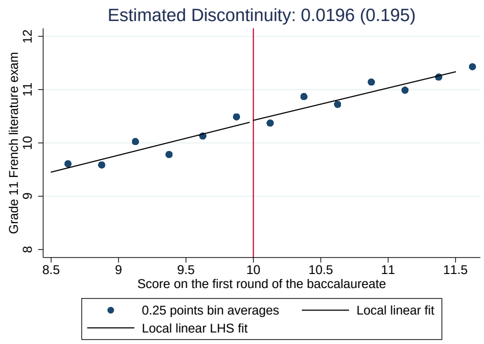
(a) Distribution of all students taking the exam.



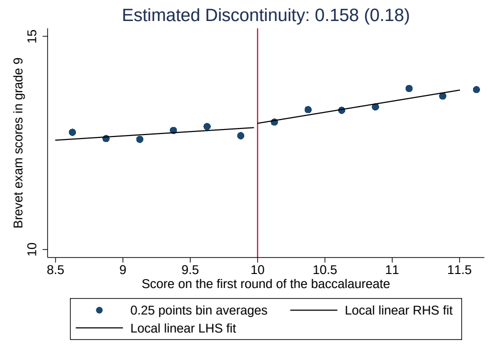
(b) Distribution of remaining students after cutting all heaped data)

Notes: Sample includes students who took the exam in the first round of the year 2002. Histograms reported with bin width of 0.05 points. Panel B drops all individuals scoring within 0.25 points to the left and 0.1 points to the right of each significant cutoff

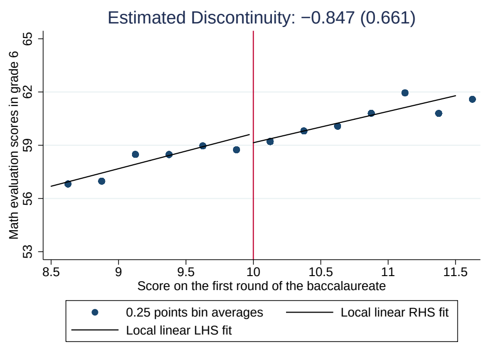
Figure 2: Testing for the smoothness of baseline characteristics



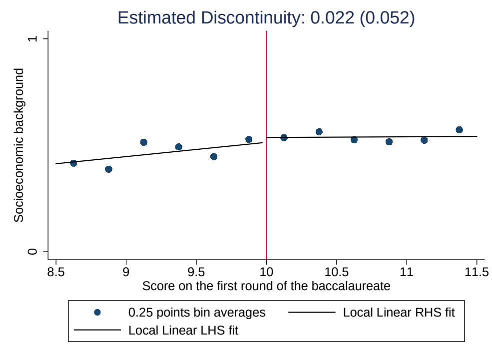
(a) National exam scores in French in grade 11



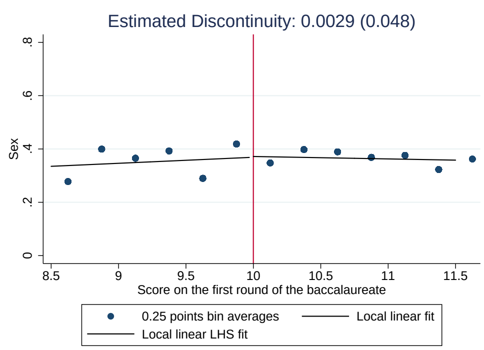
(b) Brevet exam scores in grade 9



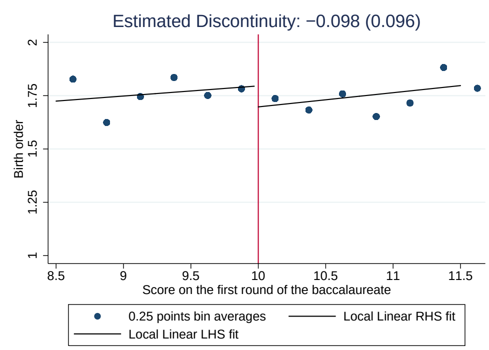
(c) Mathematics exam scores in grade 6



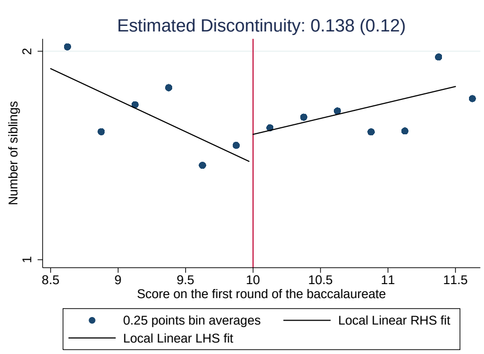
(d) Socioeconomic Status



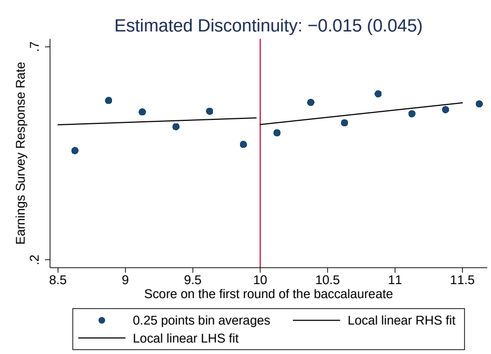
(e) Gender



(f) Birth order



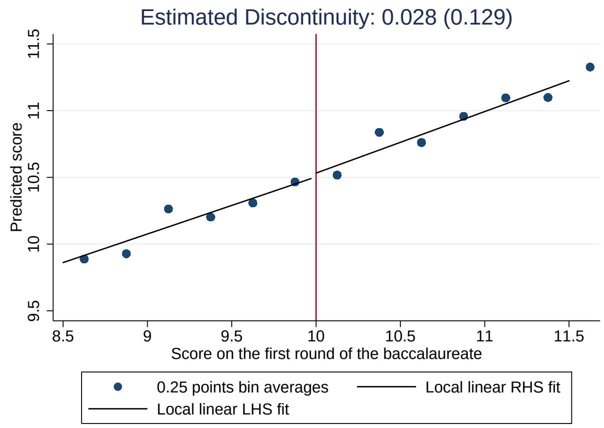
(g) Number of siblings



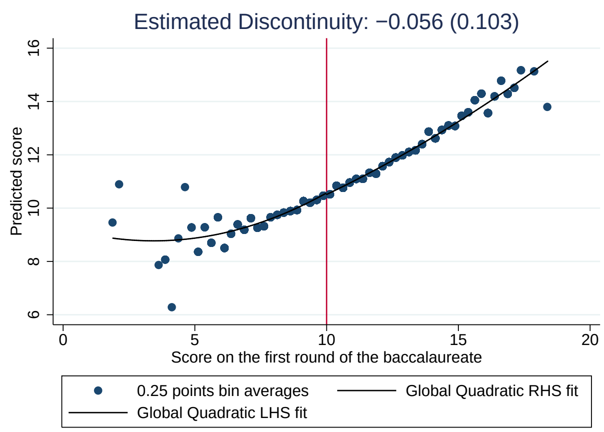
(h) Earnings Survey response rate

Notes: Sample includes students who took the exam in the first round of the year 2002. Robust standard errors reported in parentheses.

Figure 3: Predicted score based on baseline characteristics



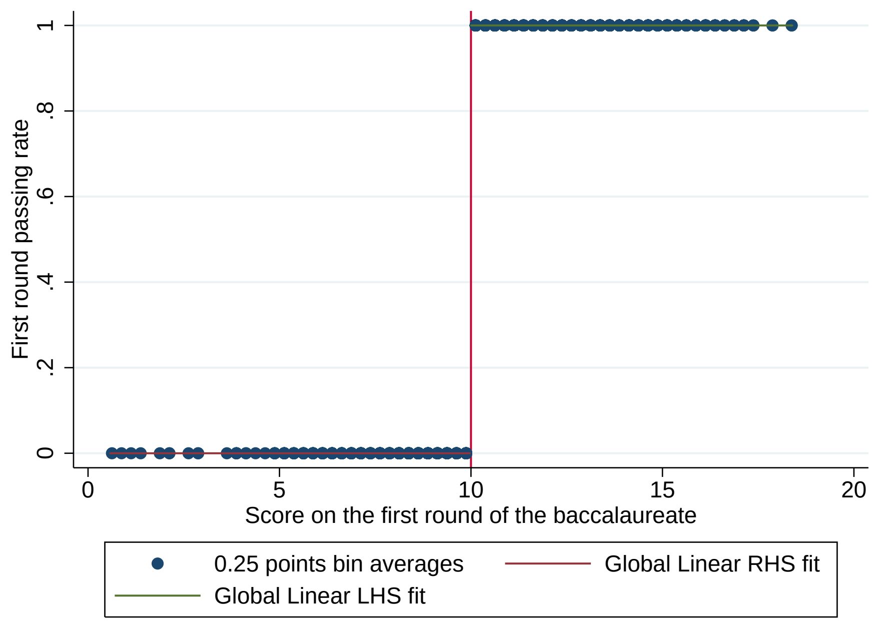
(a) Local linear



(b) Global Quadratic

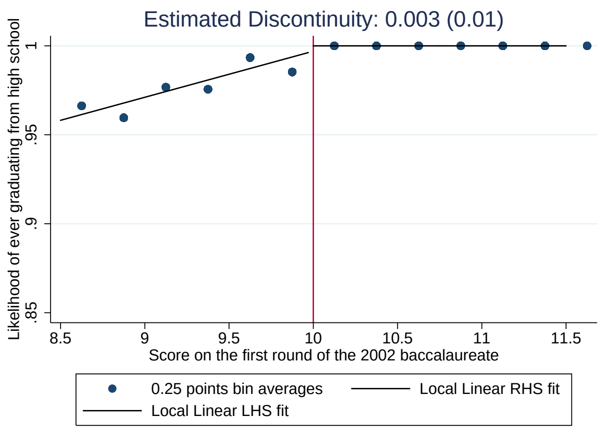
Notes: Sample includes students who took the exam in the first round of the year 2002. Robust standard errors reported in parentheses. Covariates include: Scores on the oral and written portion of the Grade 11 national French exam, Score on the Brevet exam in grade 9, mathematics scores on the grade 6 exam, socioeconomics status, number of siblings, birth order, place of residence and gender.

Figure 4: Likelihood of passing in the first round based on first round scores of the French Baccalaureate exam (Global linear graph)

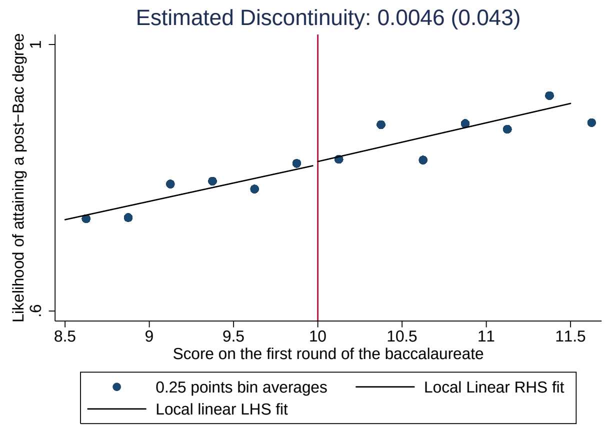


Notes: Sample includes students who took the exam in the first round of the year 2002. Robust standard errors reported in parentheses.

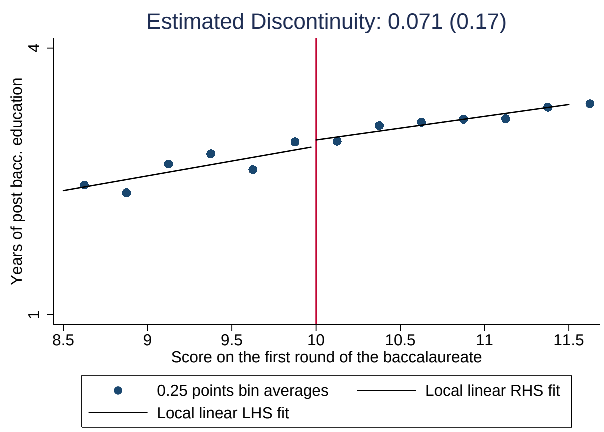
Figure 5: Quantity of education effects based on first round scores of the French Baccalaureate exam



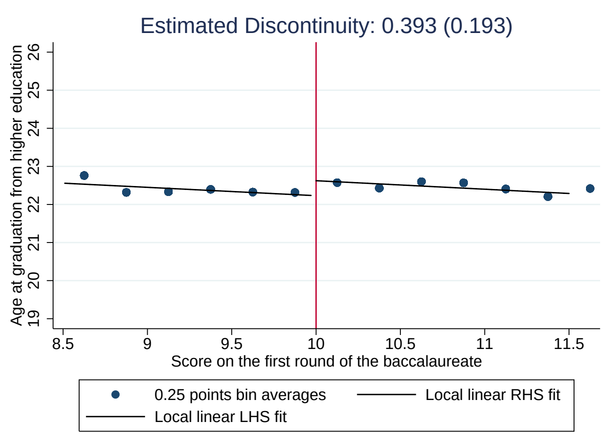
(a) Likelihood of attaining a high school degree



(b) Likelihood of attaining a Post-Baccalaureate degree



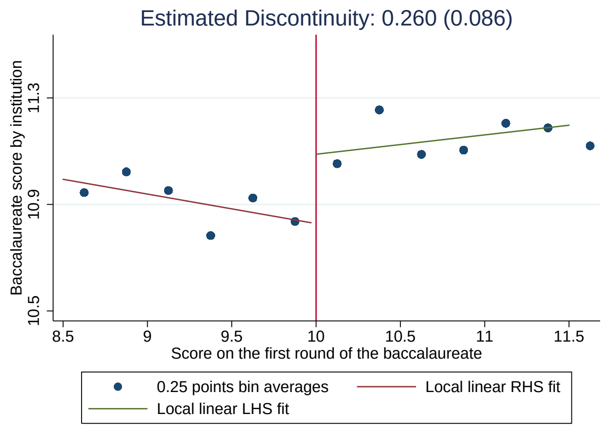
(c) Years of Post-Baccalaureate education



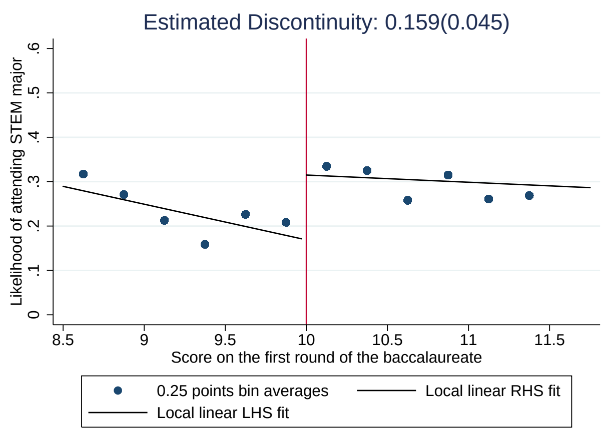
(d) Age at Post-Baccalaureate graduation

Notes: Sample includes students who took the French Baccalaureate in the first round of the year 2002. Robust standard errors reported in parentheses.

Figure 6: Quality of education effects based on first round scores of the French Baccalaureate exam



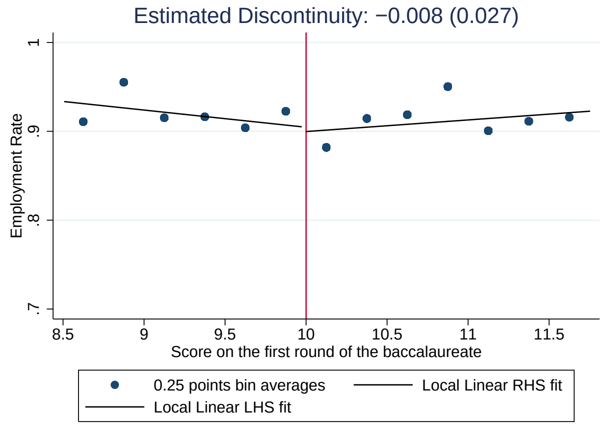
(a) Average Baccalaureate score by attended institution



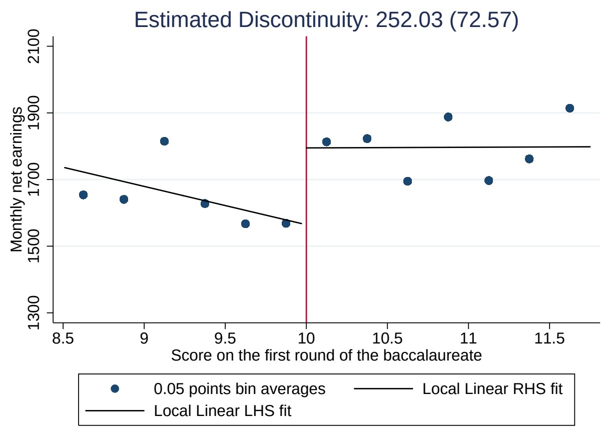
(b) Likelihood of attending STEM major

Notes: Sample includes students who took the French Baccalaureate in the first round of the year 2002. One standard deviation of a Baccalaureate test score is equivalent to 2.24 points. Standard errors clustered by university and reported in parentheses (Robust standard errors used for STEM estimates).

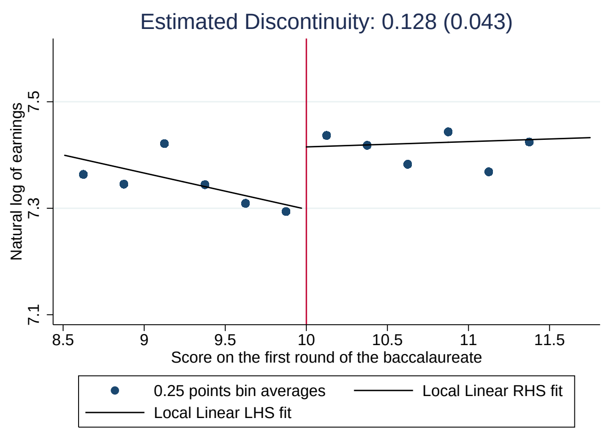
Figure 7: Labor market effects based on first round scores of the French Baccalaureate exam



(a) Likelihood of employment



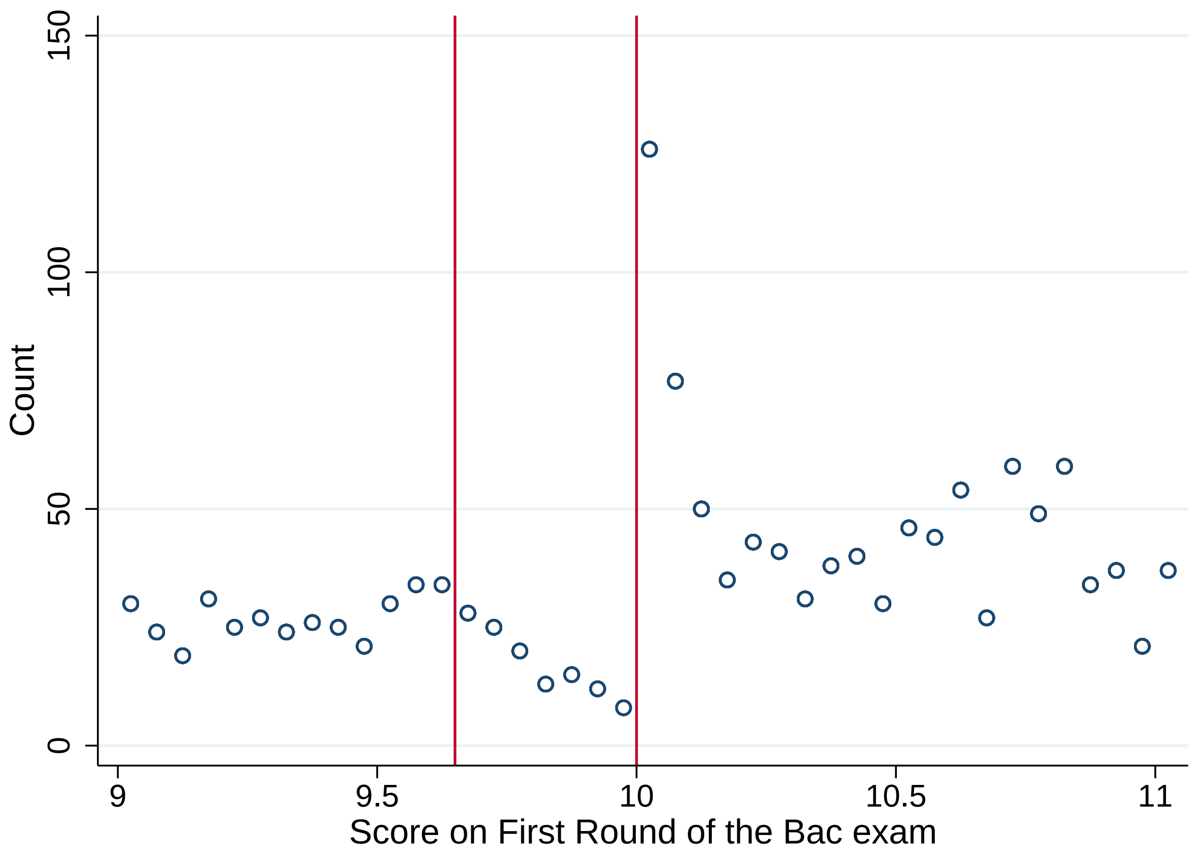
(b) Monthly earnings(in Euros)



(c) Monthly logged earnings

Notes: Sample includes students who took the French Baccalaureate in the first round of the year 2002. Wages are stacked for the two most recent years provided(2010-2011). Standard errors clustered at the individual level and reported in parentheses.

Figure 8: Distribution of scores on the first round of the French Baccalaureate in the year 2002 within a 9 to 11 Baccalaureate test score grade window.



Notes: Sample includes students who took the exam in the first round of the year 2002. Histogram reported with bin width of 0.05 points.

B Tables

Table 1: Summary statistics for students who sat for the first round of the 2002 General Baccalaureate exam

Variable	**Mean**
Male	**0.38**
	(0.48)
Birth order	**1.74**
	(0.95)
Number of siblings	**1.68**
	(1.17)
High S.E.S.	**0.57**
	(0.49)
Score on the Grade 6 Mathematics exam	**61.3**
	(8.62)
Score on the Brevet exam	**13.7**
	(1.95)
Score on the French oral exam	**12.2**
	(2.93)
Score on the French written exam	**10.2**
	(2.94)
Score on the Baccalaureate exam	**11.17**
	(2.24)
Percentage of first time passers	**0.75**
	(0.43)
High school graduation rate	**0.98**
	(0.14)
Years of Post-Baccalaureate education	**3.2**
	(1.63)
STEM enrollment rate	**0.28**
	(0.45)
Employment rate in 2011 and 2012	**0.93**
	(0.25)
Monthly earnings in 2011 (in Euros)	**1625**
	(818)
Monthly earnings in 2012 (in Euros)	**1725**
	(881)
Observations	4337

mean coefficients; sd in parentheses

The number of observations represents students with reported grades on the first round of the 2002 General Baccalaureate exam.

High S.E.S. is a dummy variable that represents father's occupation where 1 denotes higher skilled jobs and 0 denotes manual labor/ lower skilled jobs.

Table 2: Regression Discontinuity estimates for baseline covariates.

Bandwidth	0.25 points (1)	1 points (2)	1.5 points (3)	2 points (4)	2.5 points (5)	5 points (6)
Panel A: Discontinuity in Grade 11 French exam [Oral+ Written]	−.119	−.098	.020	−.260	−.044	.042
	(.26)	(.24)	(.20)	(.26)	(.24)	(.24)
Panel B: Discontinuity in Brevet exam in grade 9	.250	.131	.158	.193	.160	.101
	(.24)	(.23)	(.19)	(.25)	(.23)	(.23)
Panel C: Discontinuity in National Maths exam in grade 6	.424	.034	−.516	−1.323	−.352	−.786
	(1.06)	(1.09)	(.88)	(1.18)	(1.10)	(1.05)
Panel D: Discontinuity in S.E.S	.011	.094	.023	.037	.049	.049
	(.07)	(.07)	(.05)	(.07)	(.06)	(.06)
Panel E: Discontinuity in Gender	−.057	.002	.003	−.019	−.025	−.030
	(.07)	(.06)	(.05)	(.07)	(.06)	(.06)
Panel F: Discontinuity in birth order	.001	−.021	−.098	−.019	−.088	−.154
	(.13)	(.13)	(.10)	(.13)	(.12)	(.12)
Panel G:: Discontinuity in number of siblings	.080	.205	.138	.228	.103	.098
	(.14)	(.14)	(.12)	(.15)	(.14)	(.14)
Panel H:: Discontinuity in probability of being in earnings survey	.045	−.020	−.016	−.010	−.011	.018
	(.05)	(.04)	(.04)	(.05)	(.04)	(.04)
Score Polynomial	Zero	One	One	Two	Two	Three
Observations	401	1310	1855	2314	2717	3802

Notes: Sample includes students who took the French Baccalaureate in the first round of 2002.
Each cell represents a separate regression with baseline covariates as the dependent variable and the treatment variable ‘scoring above 10 points’.
All specifications control for a flexible polynomial of score in which the slope is allowed to vary on either side of the cutoff.
Robust standard errors reported in parentheses. Socioeconomic status proxied by father’s occupation.
Brevet exam graded from 0 to 20. Grade 6 exam graded from 0 to 78.
*** p <0.01 ** p <0.05 * p <0.1

Table 3: Regression discontinuity estimates for quantity of education measures

Bandwidth	0.5 points (1)	1 points (2)	1.5 points (3)	2 points (4)	2.5 points (5)	5 points (6)
Panel A: Discontinuity in likelihood of ever graduating secondary school	.010	.003	.003	–.005	–.008	.045**
	(.01)	(.01)	(.01)	(.01)	(.01)	(.02)
With Controls	.012	.003	.009	–.000	–.003	.045**
	(.01)	(.01)	(.01)	(.02)	(.01)	(.02)
Panel B: Discontinuity in likelihood of having a post Baccalaureate degree	.050	.019	.005	–.018	.016	.023
	(.04)	(.05)	(.04)	(.06)	(.05)	(.05)
With Controls	.051	.007	.003	–.016	.013	.003
	(.04)	(.06)	(.05)	(.06)	(.06)	(.06)
Panel C: Discontinuity in years of Post-Baccalaureate education	.304**	.125	.071	.051	.070	.065
	(.14)	(.21)	(.17)	(.23)	(.21)	(.21)
With Controls	.355**	.185	.151	.172	.139	.079
	(.16)	(.23)	(.18)	(.24)	(.22)	(.22)
Panel D: Discontinuity in age at Post-Baccalaureate graduation	0.201	0.191	0.393**	0.361	0.332	0.317
	(0.15)	(0.23)	(0.19)	(0.23)	(0.21)	(0.21)
With Controls	.273	.229	.450**	.396	.355	.288
	(.18)	(.26)	(.21)	(.28)	(.25)	(.25)
Score Polynomial	Zero	One	One	Two	Two	Three
Observations	679	1310	1855	2316	2720	3807

Notes: Sample includes students who took the French Baccalaureate in the first round of 2002.
Each cell represents a separate regression with educational outcomes as the dependent variable and the treatment variable 'scoring above 10 points'.
All specifications control for a flexible polynomial of score in which the slope is allowed to vary on either side of the cutoff.
Controls include exam specialization fixed effects, date of birth, number of siblings,birth order, socioeconomic status, scores on the Brevet examination, score on the grade 11 national French exam and scores in grade 6 national assessment exam in mathematics. Number of observations reduced slightly with the addition of controls.
*** p <0.01 ** p <0.05 * p <0.1. Robust standard errors reported in parentheses.

Table 4: Regression discontinuity estimates for education quality measures using different bandwidths and specifications

Bandwidth	0.5 points (1)	1 points (2)	1.5 points (3)	2 points (4)	2.5 points (5)	5 points (6)
Panel A: Discontinuity in average institution Baccalaureate score (i.e. Average peer quality)	.217***	.246**	.261***	.307**	.260***	.292**
	(.07)	(.10)	(.09)	(.12)	(.10)	(.12)
With Controls	.222***	.233**	.257***	.293***	.234***	.259***
	(.07)	(.09)	(.07)	(.10)	(.08)	(.09)
Panel B: Average peer quality measured in one Standard Deviation of a Baccalaureate score	.097***	.110**	.117***	.138**	.117***	.131**
	(.03)	(.05)	(.04)	(.05)	(.04)	(.05)
With Controls	.099***	.105**	.115***	.131***	.105***	.116***
	(.03)	(.04)	(.03)	(.05)	(.03)	(.04)
Panel C: Discontinuity in likelihood of being in STEM major	.107***	.124**	.159***	.151**	.160***	.170***
	(.04)	(.06)	(.05)	(.06)	(.06)	(.05)
With Controls	.116***	.115**	.161***	.157***	.167***	.163***
	(.04)	(.05)	(.04)	(.06)	(.05)	(.05)
Score Polynomial	Zero	One	One	Two	Two	Three
Observations	630	1254	1793	2245	2641	3715

Notes: Sample includes students who took the French Baccalaureate in the first round of 2002.
Each cell represents a separate regression with educational outcome as the dependent variable and the treatment variable 'scoring above 10 points'.
All specifications control for a flexible polynomial of score in which the slope varies on either side of the cutoff.
Our preferred specification for earnings is the local linear regression of bandwidth 1.5 points, which has been computed using the method proposed in Calocino et. al (2014).
Controls include exam specialization fixed effects, date of birth, number of siblings,birth order, socioeconomic status, scores on the Brevet examination, score on the grade 11 national French exam and scores in grade 6 national assessment exam in Mathematics. Number of observations reduced slightly with the addition of controls.
*** p <0.01 ** p <0.05 * p <0.1. Standard errors clustered by university and reported in parentheses.

Table 5: Regression discontinuity estimates for labor market outcomes using different bandwidths and specifications

Bandwidth	0.5 points (1)	1 points (2)	1.5 points (3)	2 points (4)	2.5 points (5)	5 points (6)
Panel A: Discontinuity in						
Employment rates	–.019	–.029	–.008	–.015	.009	.002
	(.02)	(.03)	(.03)	(.04)	(.03)	(.03)
With Controls	–.033	–.035	–.020	–.024	.006	–.003
	(.02)	(.04)	(.03)	(.04)	(.04)	(.04)
Panel B: Discontinuity in net						
monthly earnings (Euros)	250.29***	343.57***	252.03***	340.58***	279.5***	255.40***
	(62.59)	(92.57)	(72.57)	(96.56)	(87.96)	(88.00)
With Controls	218.58***	275.13***	242.72***	313.47***	243.42***	222.49**
	(63.15)	(93.95)	(72.07)	(97.41)	(87.24)	(87.18)
Panel C: Discontinuity in						
monthly logged earnings	.126***	.180***	.128***	.176***	.142***	.147***
	(.04)	(.06)	(.04)	(.06)	(.05)	(.06)
With Controls	.120***	.140**	.129***	.172***	.132**	.144**
	(.04)	(.06)	(.05)	(.06)	(.06)	(.06)
Score Polynomial	Zero	One	One	Two	Two	Three
Observations	711	1404	1991	2532	3003	4296

Notes: Sample includes students who took the French Baccalaureate in the first round of 2002.
Each cell represents a separate regression with labor market outcomes as the dependent variable and the treatment variable 'scoring above 10 points'.
All specifications control for a flexible polynomial of score in which the slope is allowed to vary on either side of the cutoff.
Standard errors are clustered at the individual level and reported in parentheses.
Our preferred specification for earnings is the local linear regression of bandwidth 1.5 points, which has been computed using the method proposed in Calocino et. al (2014).
Controls include exam specialization fixed effects, date of birth, number of siblings,birth order, socioeconomic status, scores on the Brevet examination, score on the grade 11 national French exam, scores in grade 6 national assessment exam in Mathematics. Number of observations reduced slightly with the addition of controls.
Standard errors are clustered at the individual level and reported in parentheses.
*** p <0.01 ** p <0.05 * p <0.1

Table 6: ‘Donut’ type Regression discontinuity estimates for quantity of education variables

Bandwidth	0.5 points (1)	1 points (2)	1.5 points (3)	2 points (4)	2.5 points (5)
Panel A: Discontinuity in likelihood of ever graduating secondary school					
(Excluding [**9.75-10.1**] region)	.007	−.006	−.002	−.023	−.024
	(.01)	(.01)	(.01)	(.02)	(.02)
(Excluding [**9.65-10.1**] region)	.011	−.000	.002	−.022	−.024
	(.01)	(.02)	(.02)	(.03)	(.02)
Panel B: Discontinuity in likelihood of having a post Baccalaureate degree					
(Excluding [**9.75-10.1**] region)	.010	.078	.068	.019	.003
	(.06)	(.08)	(.06)	(.09)	(.08)
(Excluding [**9.65-10.1**] region)	.085	.074	.017	−.009	.061
	(.05)	(.10)	(.06)	(.11)	(.09)
Panel C: Discontinuity in years of Post-Baccalaureate education					
(Excluding [**9.75-10.1**] region)	.443**	.318	.145	.226	.211
	(.17)	(.31)	(.22)	(.34)	(.30)
(Excluding [**9.65-10.1**] region)	.406**	.172	.039	.030	.059
	(.20)	(.37)	(.25)	(.41)	(.35)
Score Polynomial	Zero	One	One	Two	Two
Observations (excluding 9.75-10.1)	411	1042	1587	2048	2452
Observations (excluding 9.65-10.1)	361	992	1537	1998	2402

Notes: Sample includes students who took the French Baccalaureate in the first round of 2002.
Each cell represents a separate regression with educational outcomes as the dependent variable and the treatment variable 'scoring above 10 points'.
All specifications control for a flexible polynomial of score in which the slope is allowed to vary on either side of the cutoff.
*** p <0.01 ** p <0.05 * p <0.1. Robust standard errors reported in parentheses.

Table 7: 'Donut' type Regression discontinuity estimates for quality of education variables

Bandwidth	0.5 points	1 points	1.5 points	2 points	2.5 points
	(1)	(2)	(3)	(4)	(5)
Panel A: Discontinuity in average institution Baccalaureate score					
(Excluding [**9.75-10.1**] region)	.291***	.377***	.337***	.455***	.387***
	(.08)	(.13)	(.09)	(.17)	(.12)
(Excluding [**9.65-10.1**] region)	.286***	.425***	.362***	.530***	.414***
	(.09)	(.15)	(.11)	(.19)	(.13)
Panel B: Discontinuity in likelihood of being in STEM major					
(Excluding [**9.75-10.1**] region)	.111**	.150*	.187***	.209**	.209***
	(.05)	(.08)	(.06)	(.09)	(.08)
(Excluding [**9.65-10.1**] region)	.127**	.207**	.231***	.286***	.270***
	(.05)	(.10)	(.07)	(.11)	(.09)
Score Polynomial	Zero	One	One	Two	Two
Observations (excluding 9.75-10.1)	403	1027	1566	2018	2414
Observations (excluding 9.65-10.1)	358	982	1521	1973	2369

Notes: Sample includes students who took the French Baccalaureate in the first round of 2002.
Sample includes students who took the French Baccalaureate in the first round of 2002.
Each cell represents a separate regression with labor market outcomes as the dependent variable and the treatment variable 'scoring above 10 points'.
All specifications control for a flexible polynomial of score in which the slope is allowed to vary on either side of the cutoff.
Standard errors are clustered at the individual level and reported in parentheses.
*** p <0.01 ** p <0.05 * p <0.1. Standard errors clustered by university and reported in parentheses (Robust standard errors used for STEM estimates).

Table 8: 'Donut' type Regression discontinuity estimates for labor market variables

Bandwidth	0.5 points (1)	1 points (2)	1.5 points (3)	2 points (4)	2.5 points (5)
Panel A: Discontinuity in likelihood of employment					
(Excluding [**9.75-10.1**] region)	−.011	−.021	.012	.020	.050
	(.03)	(.05)	(.04)	(.06)	(.05)
(Excluding [**9.65-10.1**] region)	−.032	−.061	−.008	−.022	.031
	(.03)	(.06)	(.04)	(.07)	(.06)
Panel B: Discontinuity in net monthly earnings					
(Excluding [**9.75-10.1**] region)	276.763***	439.358***	275.388***	457.806***	321.402***
	(81.43)	(138.75)	(94.90)	(145.81)	(124.27)
(Excluding [**9.65-10.1**] region)	236.559***	401.969**	211.524**	367.397**	224.037
	(89.70)	(162.32)	(105.61)	(168.49)	(141.90)
Score Polynomial	Zero	One	One	Two	Two
Observations (excluding 9.75-10.1)	433	1128	1715	2256	2727
Observations (excluding 9.65-10.1)	375	1070	1657	2198	2669

Notes: Sample includes students who took the French Baccalaureate in the first round of 2002.
Sample includes students who took the French Baccalaureate in the first round of 2002.
Each cell represents a separate regression with labor market outcomes as the dependent variable and the treatment variable 'scoring above 10 points'.
All specifications control for a flexible polynomial of score in which the slope is allowed to vary on either side of the cutoff.
Standard errors are clustered at the individual level and reported in parentheses.
*** p <0.01 ** p <0.05 * p <0.1. Standard errors clustered at the individual level and reported in parentheses.

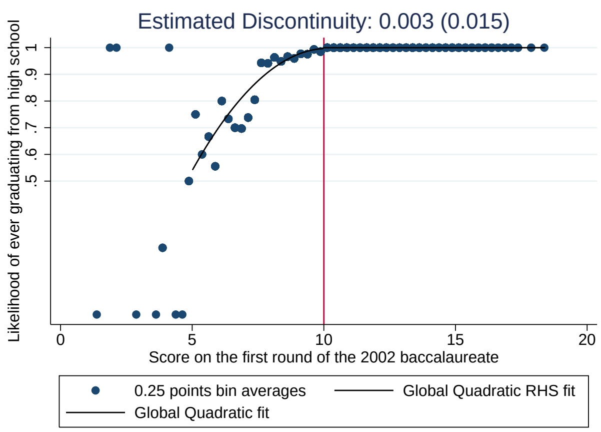
Table 9: Regression discontinuity estimates for individuals from low socioeconomic backgrounds

Bandwidth	0.5 points	1 points	1.5 points	2 points	2.5 points	5 points
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Averaged institution						
Baccalaureate score	.149	.107	.173	.235	.159	.059
	(.10)	(.17)	(.12)	(.18)	(.17)	(.10)
Panel B: Likelihood of being in						
STEM major	.178***	.234***	.264***	.296***	.304***	.317***
	(.05)	(.07)	(.06)	(.08)	(.07)	(.07)
Panel C: Monthly logged earnings	.138***	.187***	.108**	.188***	.126**	.129**
	(.04)	(.06)	(.05)	(.06)	(.06)	(.06)
Score Polynomial	Zero	One	One	Two	Two	Three
Observations	327	674	959	1181	1369	1795

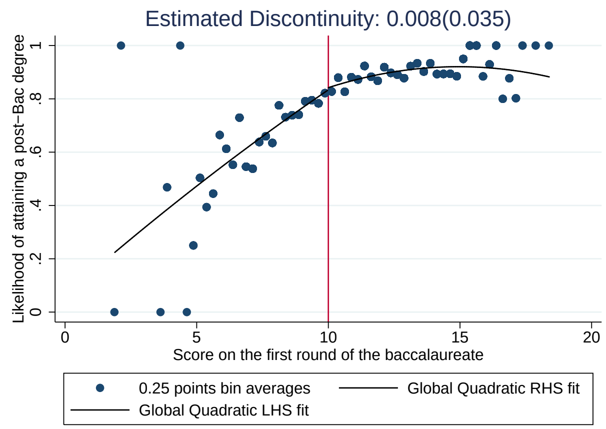
Notes: Number of observations corresponds to the earnings measures. This number is smaller for the quality outcome measures. Sample includes students who took the French Baccalaureate in the first round of 2002.
Each cell represents a separate regression with previously significant outcome variables as the dependent variable and the treatment variable ‘scoring above 10 points’.
All specifications control for a flexible polynomial of score in which the slope is allowed to vary on either side of the cutoff.
Standard errors are clustered at the individual level and reported in parentheses.
*** p <0.01 ** p <0.05 * p <0.1

C Appendix Figures

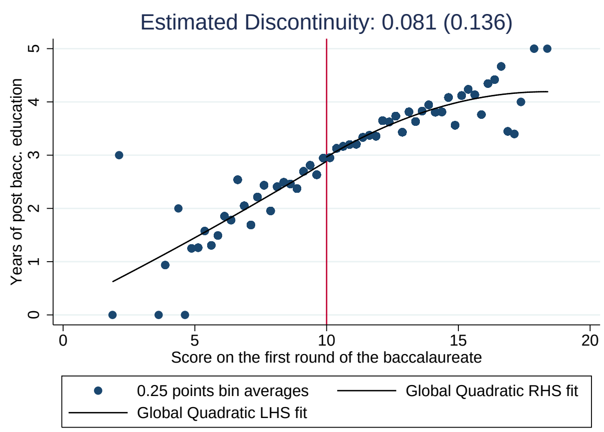
Figure A1: Quantity of education effects based on first round scores of the French Baccalaureate exam (Global Polynomial Graphs).



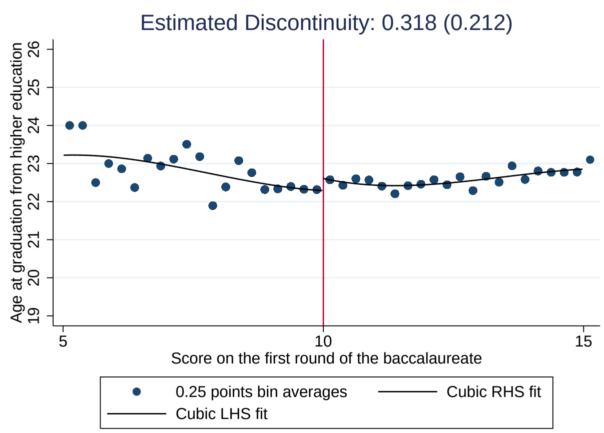
(a) Likelihood of attaining a high school degree



(b) Likelihood of attaining a Post-Baccalaureate degree



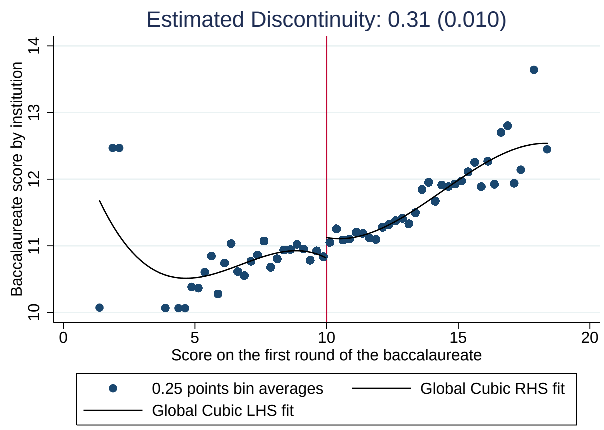
(c) Years of Post-Baccalaureate education



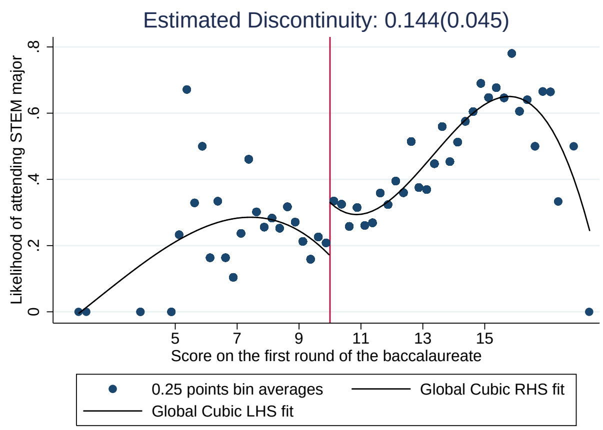
(d) Age at Post-Baccalaureate graduation

Notes: Sample includes students who took the French Baccalaureate in the first round of the year 2002. Robust standard errors reported in parentheses.

Figure A2: Quality of education effects based on first round scores of the French Baccalaureate exam (Global polynomial graphs)



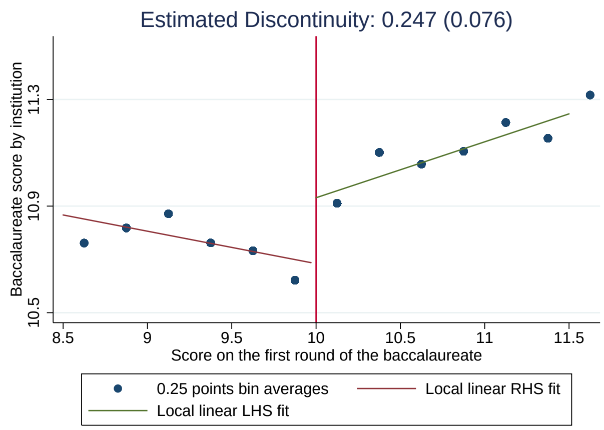
(a) Average Baccalaureate score by attended institution



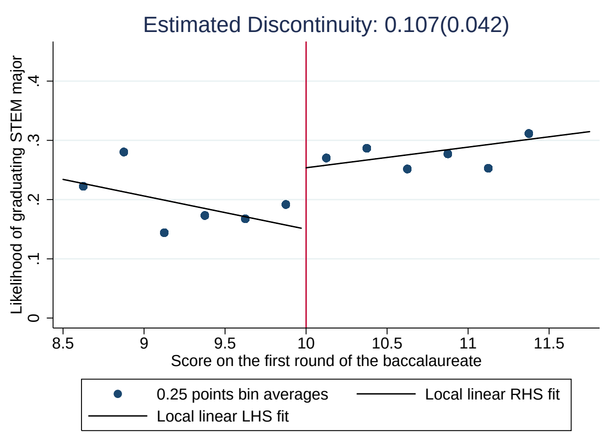
(b) Likelihood of attending STEM major

Notes: Sample includes students who took the French Baccalaureate in the first round of the year 2002. Robust standard errors reported in parentheses.

Figure A3: Quality of education 'graduation' effects based on first round scores of the French Baccalaureate exam



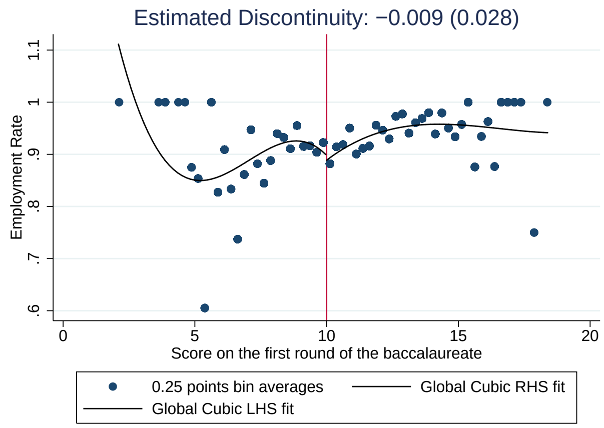
(a) Average Baccalaureate score by graduated institution



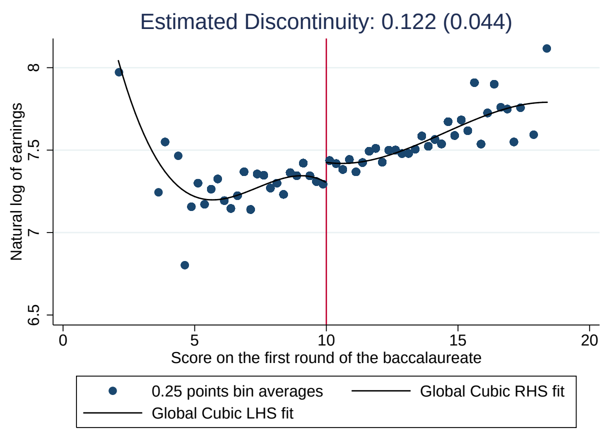
(b) Likelihood of graduating STEM major

Notes: Sample includes students who took the French Baccalaureate in the first round of the year 2002. Robust standard errors reported in parentheses.

Figure A4: Labor market effects based on first round scores of the French Baccalaureate exam (Global Polynomial Graphs)



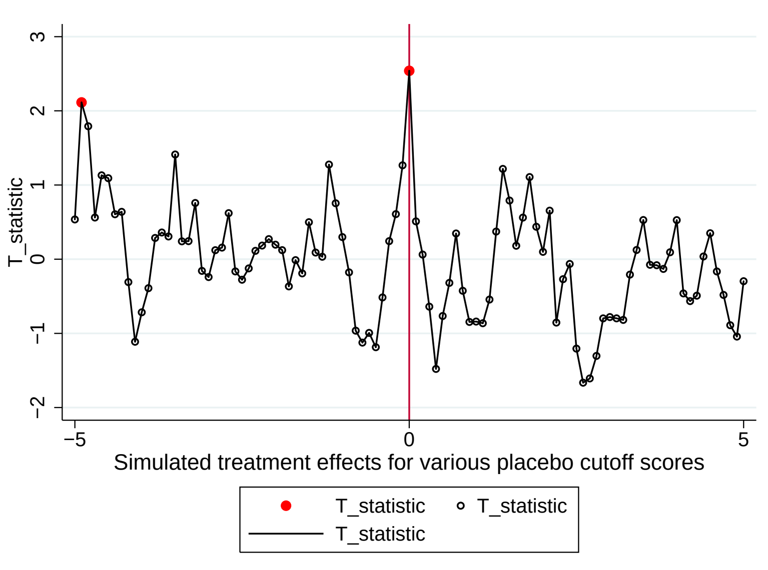
(a) Likelihood of employment



(b) Monthly logged earnings

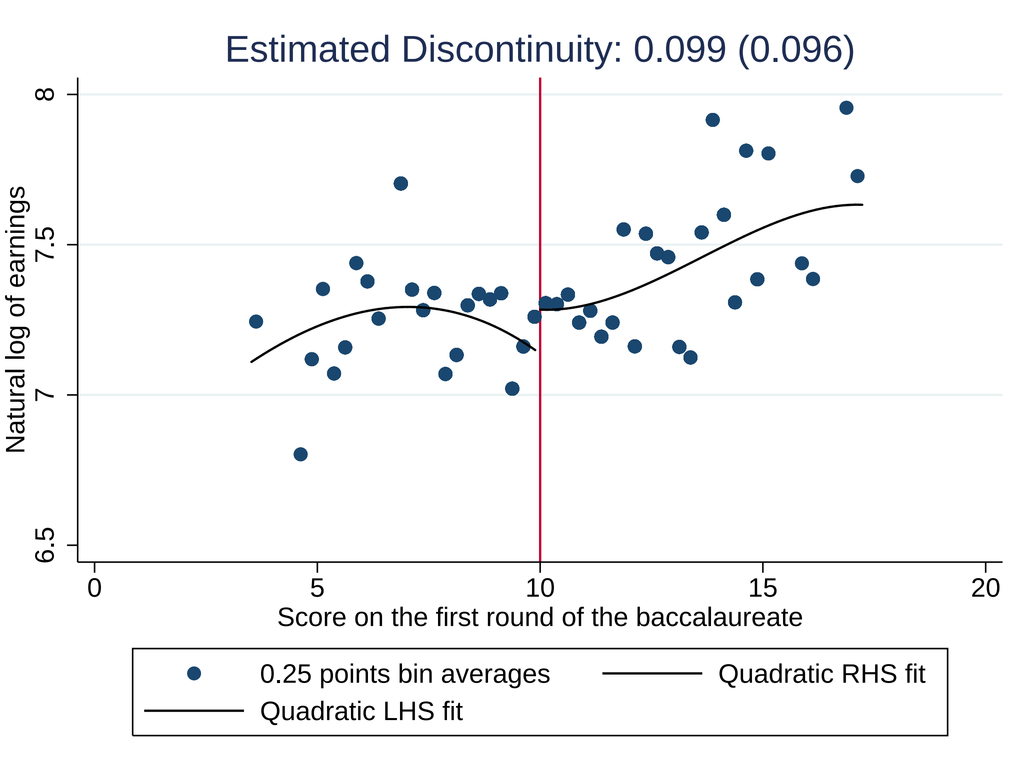
Notes: Sample includes students who took the French Baccalaureate in the first round of the year 2002. Wages are stacked for the two most recent years provided(2010-2011). Standard errors clustered at the individual level and reported in parentheses.

Figure A5: Placebo test - T-statistics for reduced form effects on logged monthly wages using various fake cutoff scores



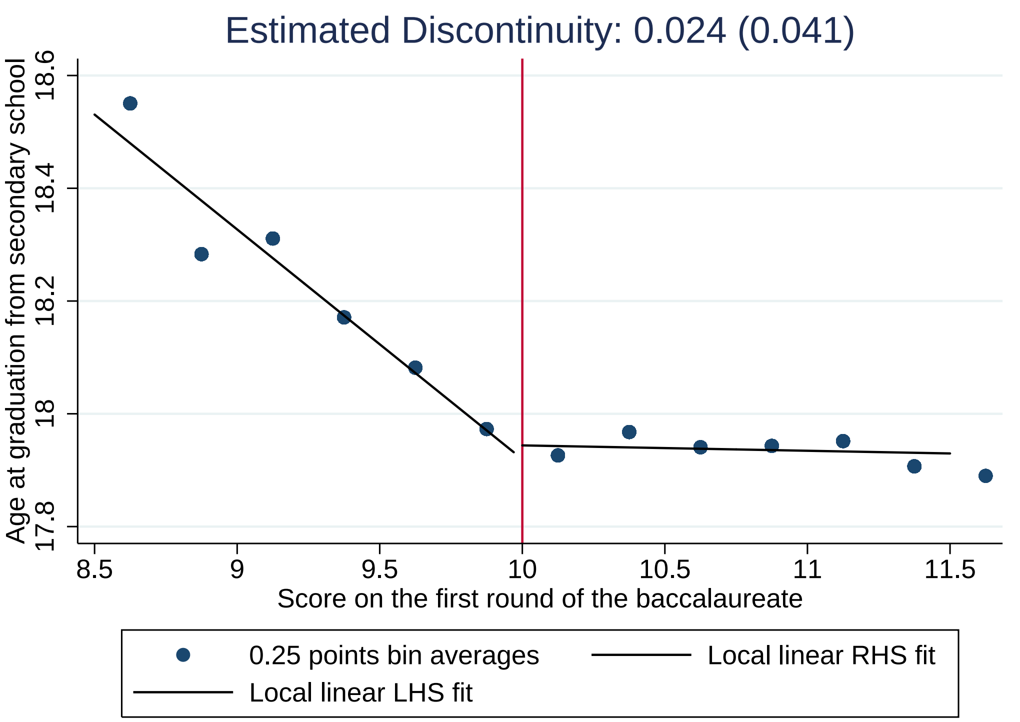
Notes: Sample includes students who took the French Baccalaureate in the first round of the year 2002. Each open circle represents the t-statistic from a local linear regression of bandwidth = 1.5 Baccalaureate points, using logged monthly wages as the dependent variable. A grade of zero on the x-axis represents the original passing threshold grade of 10, and we simulate 50 fake cutoff treatment effects to the right and left of that point within intervals of 0.1 score points. Clustered standard errors are used for computation of t-stats.

Figure A6: Discontinuity in earnings for individuals who never attended college (Global Polynomial Graph)



Notes: Sample includes students who took the French Baccalaureate in the first round of the year 2002. Wages are stacked for the two most recent years provided(2010-2011). Standard errors clustered at the individual level and reported in parentheses.

Figure A7: Discontinuity in age at graduation from secondary school



Notes: Sample includes students who took the French Baccalaureate in the first round of the year 2002. Robust standard errors reported in parentheses.

D Appendix Tables

Table A1: Regression discontinuity estimates for baseline characteristics at all important cutoffs

	cutoff = 8	cutoff = 12	cutoff = 14	cutoff = 16
Panel A: Disc. in French lit. exam	.403	.056	–.033	–.579
	(.33)	(.18)	(.25)	(0.43)
Panel B: Disc. in Brevet exam in grade 9	.032	.109	–.227	–.458
	(.29)	(.17)	(.24)	(0.41)
Panel C: Disc. in Grade 6 math exam	2.090	1.164	–.086	–1.071
	(1.62)	(.76)	(.86)	(1.74)
Panel D: Disc. in S.E.S	.02	–.024	–.069	–.183
	(.07)	(.05)	(.06)	(.13)
Panel E: Disc. in Gender	–.158**	.042	–.044	–.084
	(.08)	(.05)	(.06)	(.12)
Panel F: Disc in birth order	–.038	–.120	.053	.173
	(.15)	(.08)	(.11)	(.19)
Panel G: Disc in no. of siblings	–.241	–.206*	–.377***	.279
	(.25)	(.11)	(.14)	(.23)
Observations	694	1648	880	258

Notes: Sample includes students who took the French Baccalaureate in the first round of 2002.
Each cell represents a separate regression with baseline covariates as the dependent variable
and the treatment variable 'scoring above cutoff'. All estimates represent local linear regressions of bandwidth 1.5 points
All specifications control for a flexible polynomial of score in which the slope is allowed to
vary on either side of the cutoff.
Robust standard errors reported in parentheses.
*** $p < 0.01$ ** $p < 0.05$ * $p < 0.1$

Table A2: Organization of high school in France

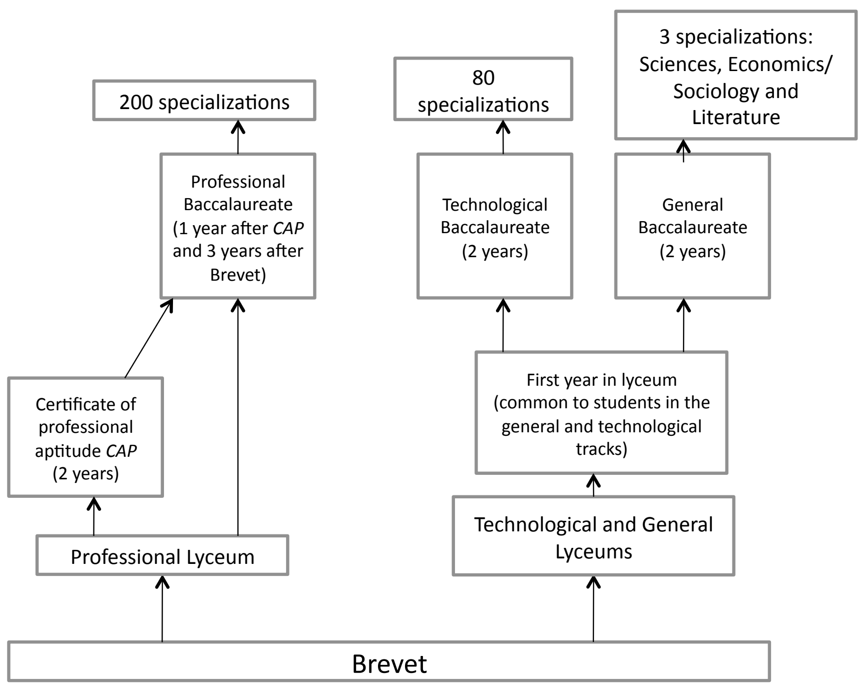


Table A3: Organization of higher education in France

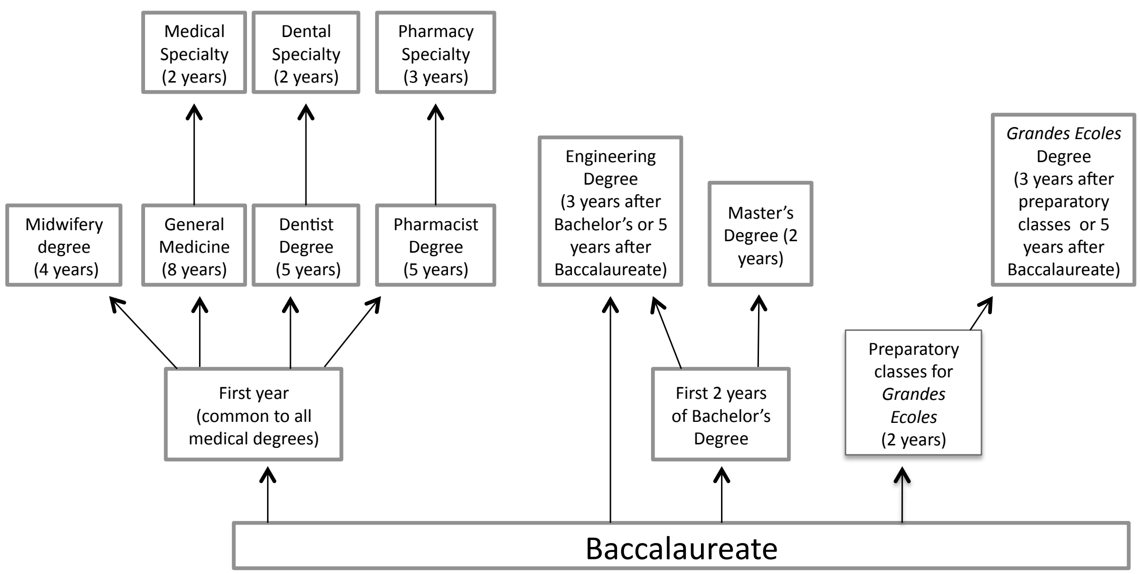


Table A4: Organization of higher vocational system in France

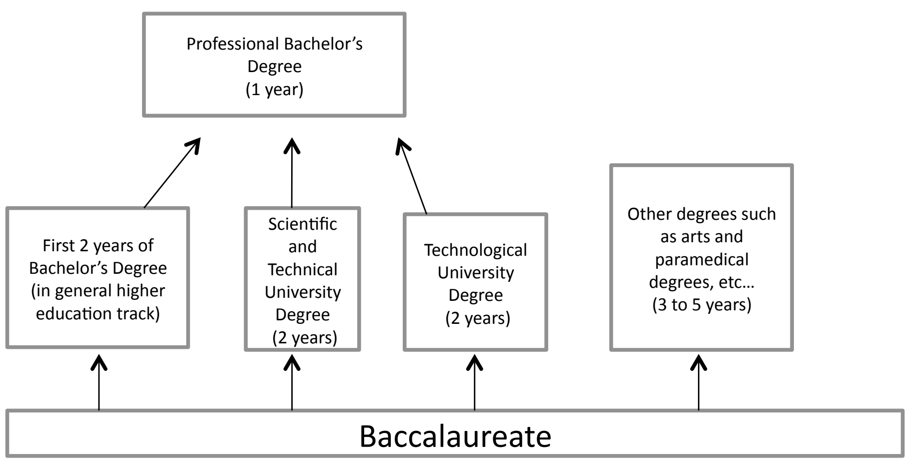


Table A5: Classification of majors into STEM and non-STEM degrees

1. **STEM designated majors**

   Agricultural sciences
   Economic sciences
   Engineering
   Fundamental sciences and applications
   Life sciences, health and earth sciences
   Materials sciences
   Medical degrees
   Pharmacy
   Sciences and technology

2. **Non-STEM majors**

   Accounting degrees
   Arts
   Higher technical certificate of production
   Higher technical certificate of services
   Languages
   Paramedical degrees
   Political Sciences
   Professional degrees
   Social sciences and humanities degrees
   Social work degrees
   Sports
   Technical degrees