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France's Almost Public Private Schools

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Abstract

This paper characterizes the determinants and implications of private schooling in a large and detailed set of French data. Empirical models detect negative selection into private schooling on observable and unobservable ability, while State-provided education appears more suitable to students with culturally privileged family backgrounds and high observed ability. The estimated effects are small, as private schools are tightly regulated, but statistically significant and of some interest in a country that supplies abundant public funding to regulated private schools.

JEL-Codes: I220, I240.

Keywords: education financing, family background, school selection.

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Pierre Courtioux located the data sets and supplied information on institutional aspects, references to French literature, and variable and sample selection criteria. The paper benefits from comments by Daniele Checchi and workshop participants at ESSLE and at EDHEC Business School's *Pôle de recherche en économie*.

1. Introduction

Private education typically provides attractive amenities and networking opportunities but the educational achievement of private school students, which depends on their characteristics as well as on available resources, need not be better than that of students attending less expensive schools. Private schools attract better students if the costly resources financed by their fees are complementary to student ability, and the public school system provides only basic education (De Fraja, 2002). When State schools are relatively more demanding, however, then private schools supply remedial services to worse students (Brunello and Rocco, 2008).

Bertola and Checchi (2013) document cross-country differences in the process that sorts across public and private schools students with different PISA cognitive ability test scores, controlling for relevant covariates. Since the test is administered only one or two years after school choice, the private-public differential in PISA scores also analyzed by Vandenberghe and Robin (2004) is plausibly driven by individual ability as well as by school effectiveness. Sorting of low achievers into private schools is correlated across country with the relative prevalence of remedial pedagogies in such schools in the PISA 2009 data set. These data do not identify privately funded and/or operated schools in France, where the State pays the salaries of teachers at private schools that commit to employ only State-certified teachers and to abide by the same academic standards as State school. Nearly all French private schools accept these constraints, and the substantial cost of State funding makes it all the more interesting to characterize how they use their limited degrees of freedom.

This paper exploits national data sources to characterize jointly the process that selects French students into these almost-but-not-quite-public schools and their educational performance. A large and detailed panel survey provides information about students' individual background and educational achievements, and can be geographically matched to the summary statistics of administrative data in order to exploit within-country variation across "local education markets" (LEMs).

In some respects, available information is better than in other country-specific data sets, such as those analyzed by Bertola, Checchi, and Oppedisano (2007) and their references. And while in PISA only a single test result is recorded at an intermediate secondary-school stage, the French data feature a variety of initial and subsequent individual school achievement indicators. Unfortunately for this paper's purposes, however, neither family incomes nor private school fees are recorded, and there is no information on the school-specific pedagogical aspects that Bertola and Checchi (2013) interact with individual background to characterize across countries

the process that sorts students into private schools. This makes it necessary to infer some relevant information indirectly, from survey questions about each family's financial situation and past school choices, and to formulate and discuss assumptions as to how observable variation influences enrolment choices with or without directly influencing school outcomes.

Sections 2 and 3 describe the structure of the French educational system and of the available data sets. Section 4 identifies and describes the variables that the following sections use to implement a variety of estimation methods and specifications: Section 5 reports linear ordinary and two-state least-squares estimators with geographical and socio-economic status fixed effects or interpretable indicators, and Section 7 uses the latter controls in nonlinear estimation. All specifications and estimation methods detect a mild tendency for unobservably as well as observably weak students to enroll in private schools, which appear to be particularly beneficial for children of culturally poor families. Section 8 summarizes and qualifies the results, and briefly discusses possible reasons why French State schools might fail to benefit exactly the students who most need help.

2. Privately organized education in France

A substantial fraction of the student population is enrolled in private schools at all levels of the French education system, and an overwhelming majority of the private schools are of the *sous contrat* type introduced by the 1959 Debré Act. In 2011, among the about 17% of primary students and about 20% of secondary students who attended private school, only 2.8% were in totally autonomous private schools (*école privée hors contrat*) such as Montessori establishments (Vasconcellos and Bongrand 2013).

The Debré Act provides funding of some *sous contrat* schools' overhead costs (*forfait d'externat*: in 2014 the annual subsidy was 763 euro for each of the first 80 students, and smaller per capita amounts were paid at larger schools). And, since the 1977 Germeur Act, their teachers' salaries are entirely paid by the State, and at given seniority are similar to those of State school teachers. As a condition for State funding, private schools must teach the same curriculum as State ones, and employ only teachers who have passed a national competition (*concours*). But private schools may of course teach the material differently, with different teachers, and to a different student body. The substantial cost of State funding of teachers' wages and other subsidies to private schools makes it all the more interesting to find out how private schools use their limited autonomy.

State and private teachers are managed differently and self-selected because, from their point of view, the State career is more attractive. State school teachers are civil servants (*fonctionnaire*), and they are assigned to jobs by a strictly administrative procedure: a vacant place must be assigned to the applicant who ranks highest in terms of a score based on *concours* results, seniority, and some career features (such as serving in administrative or managerial roles). Private school teachers work in the public sector since 1992, when private education was recognized as a *mission de service public* (it is for this reason, as well as to avoid confusion with the private schools that the British call "public", that in this paper "State" is used to refer to government-run French schools) . However their employment, like that of local government workers, is subject to a form of public law (*contractuel de droit public*) that does not administratively restrict job assignments: for each of the private school teaching positions funded and assigned to schools by the State, school managers may freely choose any *concours*-qualified applicant. So while private school teachers must have passed an exam that is similar to that of State school teachers, if they have also passed the latter they are not likely to seek employment in the private sector, where career paths and working conditions are less appealing.

Private schools are not only staffed by different teachers, but also attended by different students. In the State sector students generally must attend a specific school within their area of residence, and this constraint was strictly enforced in the period covered by the available data. They may instead choose to apply and pay for enrolment at private schools. These can set their own admission criteria - which, as a condition of *sous contrat* funding, must not include religious allegiance. And they cater richer students, because they are free to charge any fees to cover the cost of facilities, amenities, and non-teaching personnel (there are no official data on such fees, but French private schools are not very expensive: Merle, 2012 and other anecdotal evidence indicate that annual fees can be as low as a few hundred euro, and only rarely exceed 2500 euro).

3. Available data

The *Panel d'élèves du second degré* 1995-2006 selects by birthday and follows over time a random 1/40th sample of the French students who entered secondary school in 1996. [1] The data

[1] *Panel d'élèves du second degré, recrutement 1995*, 1995-2011, DEPP - Ministère de l'Éducation (producer), ADISP-CMH (distributor). The data are available upon request for research purposes at https://quetelet.casd.eu/en/utilisateur/connexion and have been analysed among others by Nakhili (2005)

includes information about the student's achievement at entry in secondary school. Besides administrative records, which in France include the parents' occupational status, the data record answers to a survey administered to families in 1998, when panel students were typically finishing the third or starting the fourth and final lower secondary school year. For 15290 of the 17830 initially sampled individuals, the survey collects information about the family's composition, the educational achievements and employment situation of the parents, retrospective information about pre-secondary schooling, and about educational goals and constraints, household rules, satisfaction with living conditions, and other subjective aspects.[2]

The progress of each student is followed during secondary school and beyond. In France, for the first four years of secondary school all students are enrolled in a common comprehensive program (*collège*). Tracking only occurs at the upper (*lycée*) secondary school level: students may enroll in academic (scientific, literary, economic-social) programs that in three years can lead to achievement of a *baccalauréat* exit degree, or in a variety of vocational employment-oriented tracks that lead to a *baccalauréat* in four years, or in technical tracks featuring a common first year and two years of more specialized studies. For each year from 1995 to 2006, the data report the upper secondary track each student is enrolled at the school attended (each school offers multiple academic and/or vocational tracks). About 94% of the initial sample is retained up to 2002, the earliest year when students could complete their secondary studies obtaining a *baccalauréat*, which makes it possible to access tertiary education programs. These are offered not only by universities but also by *Grandes Ecoles* and *lycées*. Some academically-oriented *lycées* select students into *Classes Préparatoires aux Grandes Ecoles* (CPGE), and some professional or technical *lycées* offer selective vocational programs (BTS). Holders of a *baccalauréat* can also apply for admission to selective vocational programs run by universities (IUT), which attract for the best students from technical and vocational tracks as well as for academic track students who fail to gain admission to more prestigious *Grandes Ecoles* programs. In the available data answers to post-*baccalauréat* surveys, administered to panel

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and Cayouette-Remblière and de Saint Pol (2013). Institutional reforms, in particular of the *sectorisation* State school choice constraints, would make it inappropriate to merge the similar panels that started in 1980 and 1989 and the more recent *Panel d'élèves du second degré entrés en 6e en 2007*.

[2] Mailed questionnaires were completed and returned by 12981 families, and 2309 more answered similar questions by phone. Sampling weights are provided for responders to either family survey phases (`pond1`) and for responders to the postal survey phase (`pond2`). The results reported below use `pond1` as Stata `pweights`.

students who did obtain an exit degree, provide information about enrollment in tertiary education or labor market status.[3]

In 1995-96, the 17830 panel individuals were enrolled in 5686 distinct lower-secondary schools (in 2001-02, 1032 of them had dropped out of the sample and probably also out of secondary school, and the rest were observed attending 4594 distinct upper-secondary schools). The data report whether each surveyed individual attends a private school. The overwhelming majority of private schools are of type "*Contrat d'association toutes classes*": only a few dozen panel students attend "*Hors contrat*" private schools. No disaggregate information is available on the amount of school fees and availability of the facilities and pedagogical aids that are typically offered by private schools. Each school is identified anonymously, but its location is known up to cells defined by size of town and *département* local government units (there are 96 *département* in Continental France and Corsica). The student's residence need not be in the same locality as the school, and is not recorded in the dataset.

The information available in the individual survey data set can be merged with that available for somewhat later years from the *Base Centrale de Scolarité* (BCS), the administrative database of the French education system.[4] Suitable data were not collected at the time when the panel individuals attended secondary schools: the BCS was established in 1993, but a requirement for private schools to provide their data in electronic form (if *sous contrat*) was phased in slowly, only achieving complete coverage in 2003. Available data cover the 2004-2006 period. School records for the 11,123 secondary schools are similar to those linked to individual students in the panel. They indicate whether the school is attended by lower secondary (*collège*) or upper secondary (*lycée*) students (and, in the latter case, the academic or professional curricula offered by the school are recorded); the records also indicate whether the school is a private or State establishment and, in the latter case, whether it belongs to a ZEP ("*zone d'éducation prioritaire*") or a REP ("*réseau d'éducation prioritaire*") or is classified as "*établissement sensible*": these indicate that the school is attended by relatively troublesome and socially underprivileged students, and is granted some additional resources that are supposed to improve the quality of State education but, by making it evident that the school is

[3] In coding the school success indicator below, non-response in these surveys might mislabel as a failure the performance of students who drop out of the panel but are studying.

[4] Base centrale scolarité (BCS) – 2004 ; Base centrale scolarité (BCS) – 2005 ; Base centrale scolarité (BCS) – 2006. DEP - Ministère de l'Éducation [producers], ADISP-CMH [distributor]. The data can be requested at https://quetelet.casd.eu/en/utilisateur/connexion.

attended by underprivileged student, might increase the appeal of private education for families who reside in poor or mixed areas. [5] For each of the about 5.5 million students attending these schools in each year, the BCS records age, gender, school(s) attended in the current and in the previous year, and an indicator of socio-economic status similar to that recorded in the panel.

The anonymous identifier of the (also about 11000) schools attended by the panel students cannot be linked to BCS data, but the geographical location of the school is coded similarly in both data sets. City sizes are coded in 8 size categories (from "rural", to "urban area between 200 000 and 2 000 000 inhabitants", and to the Paris urban area), not all of which are present in each *département*. The empirical models below use locally aggregated BCS administrative data, linked to individual panel students, to characterize variation of education demand and supply within France.[6]

4. Sample and variables

The cross-sectional analysis below focuses on the motivation and implications of private school enrolment at the beginning of the panel sample. In the data, variable `secteur1995` can be recoded to a dummy variable `priv` that equals unity if the student is observed in a private school during the first *collège* year, which is the case for almost 19% of the sample.

Students who have repeated primary school years are older than the normal age of *collège* entry. This is the case for more than a quarter of the 17830 panel individuals: variable `datenai` reports the year of birth, which is 1984 for only 13224 students. Age at entry is a potentially useful predetermined variable for empirical models of enrolment choices: older students have lower average ability, consistently with having been held back in elementary school, and are somewhat less likely to enrol in private school (only 16% of them do). For

[5] For 101 schools there are records only in one or two of the three available years of data. No schools are observed switching in 2004-2006 between State and private, or into/out of the REP classification; only a few schools move into ZEP status (6 in 2005 and 1 in 2006) or *établissement sensible* status (1 in 2005, 1 in 2006).

[6] A total of 219 students were sampled in 1995 from 14 LEMs that are not populated in the 2004-06 BCS database, either because those schools ceased to exist or because the local community's size moved across the boundaries of the available classification. These LEMs cannot be characterized by BCS statistics, and the results reported below drop them (with very minor implications for the results) also in specifications that do not use that information.

simplicity, however, the estimation sample includes only the more homogeneous students who have not repeated any school year by the time they begin to be observed.

Higher education's crucial socio-economic implications make it interesting to measure individual achievement in terms of tertiary enrolment (see Evans and Schwab, 1995, and their references). In what follows, students who entered lower secondary school at the normal age are coded as successful if they obtain a *baccalauréat* and the post-*baccalauréat* survey records their enrollment in higher education tracks leading to the tertiary degrees discussed in Section 2. The outcome dummy `succ` is coded to equal unity if variables `SESSION_BAC2002…2006` record a *baccalauréat* by June 2004 (allowing for one or two repeats in high school, and/or for the additional year required in professional tracks) and variable `formagr1` takes values between 1 and 4, recording enrolment in a tertiary education program.[7] Among the 9,197 surveyed secondary school completers, 8,154 report to be studying; `succ` is coded to unity only for the 7,130 who are enrolled in degree-granting programs (rather than "other education/training").

This definition of school success is a rather challenging bar in France, which is passed by only 54% of the 13224 students who entered *collège* at normal age, and by a somewhat lower 50% of the 2597 (19.6%) among them who enrolled in a private *collège*. Choosing tertiary enrolment as the outcome targeted by secondary school enrolment choices is not inconsequential, because it is not just constrained by the student's ability and achievement, but also driven by the family's educational aspirations. Hence, results will need to be interpreted with care, as they would even if educational achievement were measured in terms of other indicators (such as the timing, track, and grades of the student's exit degree, or indeed standardized test scores) available in this or other data sets.

The data record some indicators of cognitive ability at the beginning of the secondary school curriculum. The empirical models below use variable `abil`, defined as the average of the student's level in mathematics and in reading French assessed, on a 0-10 scale, by the school principal at the time of entry in secondary school. The results of basic no-stakes standardized

[7] Four panel students obtain a general *bac* in 2001. They also obtained a scientific or literature *bac* in 2002, and this is treated as the exit degree in coding the data.

test results are also available, but are not as informative as `abil` as a determinant of private school enrolment.[8]

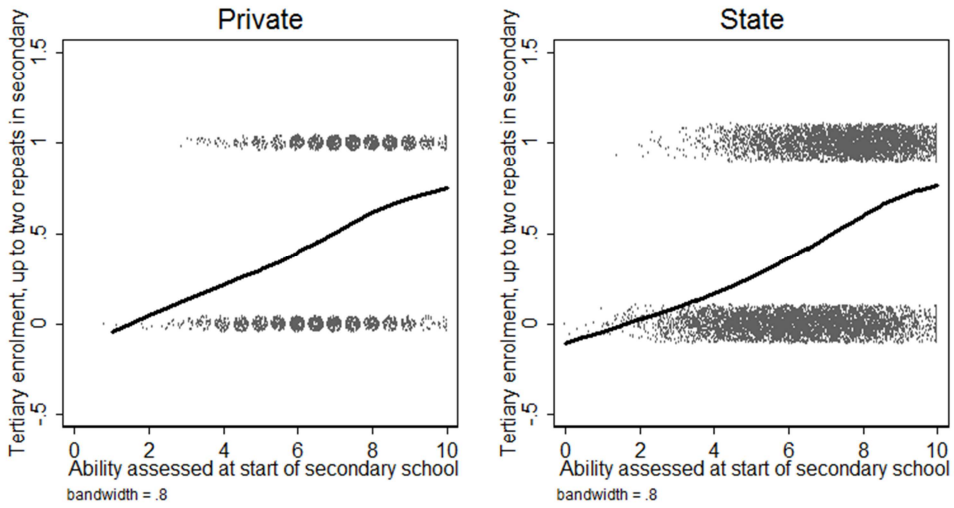

Figure 1. Descriptive empirical relationships between the indicators of school success (variable `succ`, measured as 0 or 1) and of initial individual achievement (variable `abil`, measured in half-point increments) available in the French panel data set.

Figure 1 plots all observations in the estimation sample of available initial observable ability (measured in half-unit increments, because each of the two assessments is an integer) and observed success indicators. The unsurprisingly and strongly increasing relationship between the two, illustrated in the figure by a nonparametric smoother, is not evidently different across State and private schools. Variable `abil` has almost identical means for State school (6.84) and private school (6.85) students, with no obvious evidence of positive or negative sorting across school types. It is very heterogeneous within each group, with standard deviations of 1.74 and 1.58 respectively.

[8] At given test results, assessed ability is on average lower in private schools than in State schools. Thus, the school principals' assessment is unlikely to be biased by kindness or respect, which would if anything lead them to more positive assessments when students are paying customers: it plausibly uses available information honestly, and captures some of the mild negative selection into private schooling detected by the empirical estimates below.

Information on the family's socio-economic status and cultural level can be used to assess how variation in those respects influences the objectives and constraints of educational choices. The panel dataset reports a classification in of the family head's occupation (variable `pcschef`, compiled by the data provider using information from both school records and the family survey).

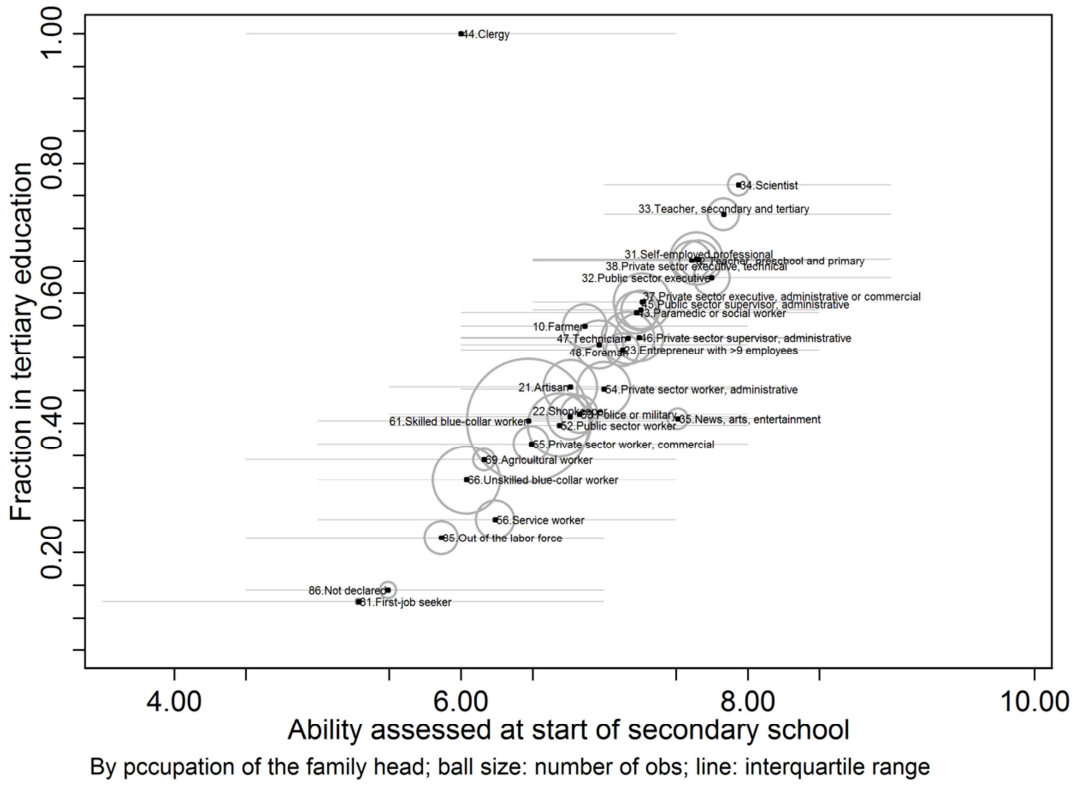

Figure 2. Descriptive empirical relationship between indicators of school success (variable `succ`) and initial individual achievement (variable `abil`) across the socio-economic categories available in the French panel and administrative data.

Figure 2 shows that socio-economic status plays a role in shaping the empirical relationship illustrated in Figure 1: it is strongly related both to the ability of students at the beginning of secondary school, assessed by the group-specific mean of `abil` on the horizontal axis, and to the educational achievement, assessed by the group-specific mean of `succ` on the vertical axis. Initial ability is very heterogeneous within each group, but group-level averages of cognitive ability and school achievement are clearly positively related, with some interesting outliers: the (only four) children of religion professionals are unusually likely to enroll in higher education; children of arts and media workers are on average smarter at age 10 than one

would think on the basis of their observed later school achievement, and the opposite is true for children of farmers and foremen.

This empirical regularity confirms that families' cultural and financial resources play a role in determining their children's school success (Bourdieu, 1986), but such descriptive evidence need not indicate that socio-economic status directly influences educational outcomes. Some of the relationship is mediated by the school choices that are of interest here and may be shaped by financial conditions, and some is spuriously driven by the correlation of occupations with the family's cultural climate and educational aspirations. In the absence of income information, to disentangle the various possible roles of socio-economic status it can be helpful to note that, within each occupational category, variation in the educational level attained by the parents may plausibly influence school performance. To capture the idea that children of better educated parents are likely to find it easier to learn, and to be helped at home when difficulties arise, the empirical specifications below include dummy variables that take value 1 when the father or the mother obtained a tertiary degree (`educ_f`=1 when `A16P`=8 or 9, `educ_m=1` when `A16M`=8 or 9).

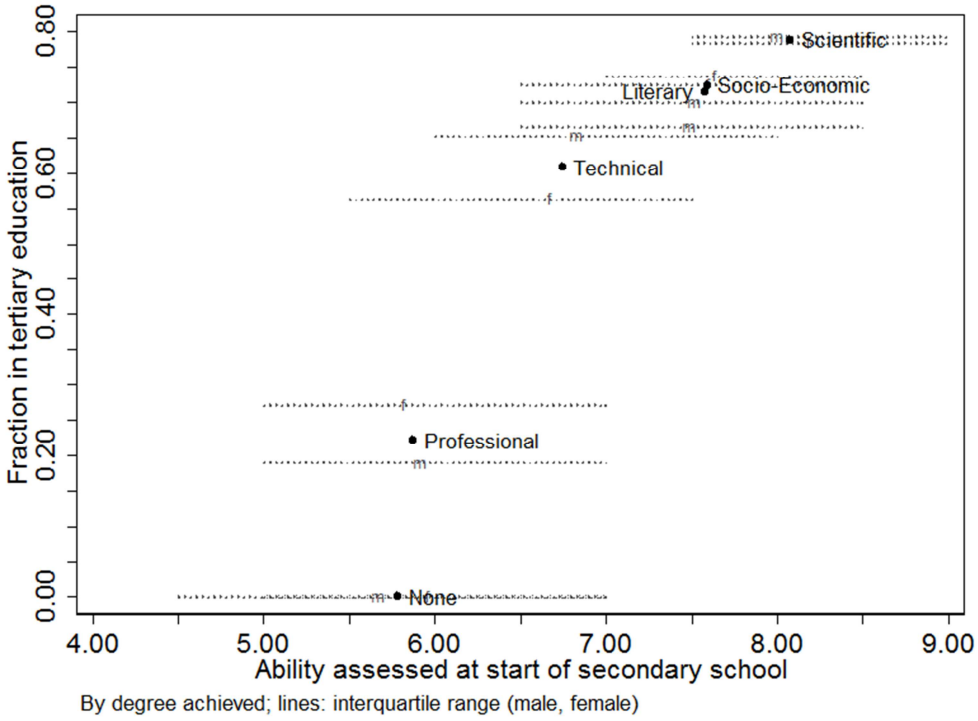

Figure 3. Descriptive empirical relationship between indicators of school success (variable `succ`) and initial individual achievement (variable `abil`), disaggregated by upper secondary school track and gender.

The descriptive evidence shown in Figure 3 shows that female students are somewhat differently likely to choose upper secondary tracks conducive to tertiary education, and more likely to enroll in tertiary education within each track. Because gender is a predetermined possible determinant of the school choice and achievement indicators shown in Figure 1 and characterized below, it would be inappropriate to exclude it from empirical specifications.[9] Conversely, any switches between State and private enrolment and high-school track choices are not predetermined with respect to private school enrolment in the first year of comprehensive secondary school. It is beyond the scope of this paper to model them as elements of the empirical mechanism that maps initial private school choices and individual characteristics into final success or failure.

To measure geographical variation across the LEM environments in which individual panel students make their choices, it is convenient to summarize socio-economic category dummies is replaced by a binomial indicator of privileged family background: dummy `hiSES` equals unity for socio-economic categories that in Figure 2 on average issue relatively able and successful children.[10] BCS administrative data can characterize the local student population in terms of socio-economic status, coded in the same way as `hiSES` for panel individuals.[11]

To give a sense of the extent to which this and private school enrolment vary across French localities, Figures 4 and 5 illustrate their dispersion across departments and city sizes separately. Families with high-socio economic status tend to concentrate in the larger cities and in the most urbanized *départements*, with some interesting variation (for example, the proportion of high-status students is very low in one of the *départements* of the Paris region). The area's socio-economic level increases monotonically with city size. The incidence of

[9] Gender may be relevant to school choice also because parents particularly value the socially selected and well-disciplined student population of private schools for their female children.

[10] These are "23 Entrepreneur with >9 employees"; "31 Self-employed professional"; "32 Public sector executive"; "33 Teacher, secondary and tertiary"; "34 Scientist"; "37 Private sector executive, administrative"; "38 Private sector executive, technical"; "42 Teacher, preschool and primary"; "43 Paramedic or social worker"; "44 Clergy"; "45 Public sector supervisor, administrative"; "46 Private sector supervisor, administrative"; "47 Technician." In the sample of normal-age individuals with survey information 3301 (37%) students belong to these categories.

[11] The BCS records specific socio-economic categories for retired parents. Two of these (each including less than 2% of students' parents) overlap the boundary of the panel's classification. The LEM indicator codes `hiSES=0` for "72 Retired artisan/shopkeeper/entrepreneur" and `hiSES=1` for "73 Retired executive/supervisor."

private schooling similarly varies significantly along both the city size and *départements* geographical dimension: some of the latter variation is likely to be exogenous (in north-western areas with a solid Catholic tradition students disproportionally opt-out of State schools), and some is related to the endogenous school choices modeled here. Because LEM characteristics may plausibly vary both across town sizes and across towns of the same size within each department, in the empirical specifications the relevant variation is measured at the level of all the 456 LEM cells defined by the *département* and size of town where the individual students surveyed in the panel are observed.

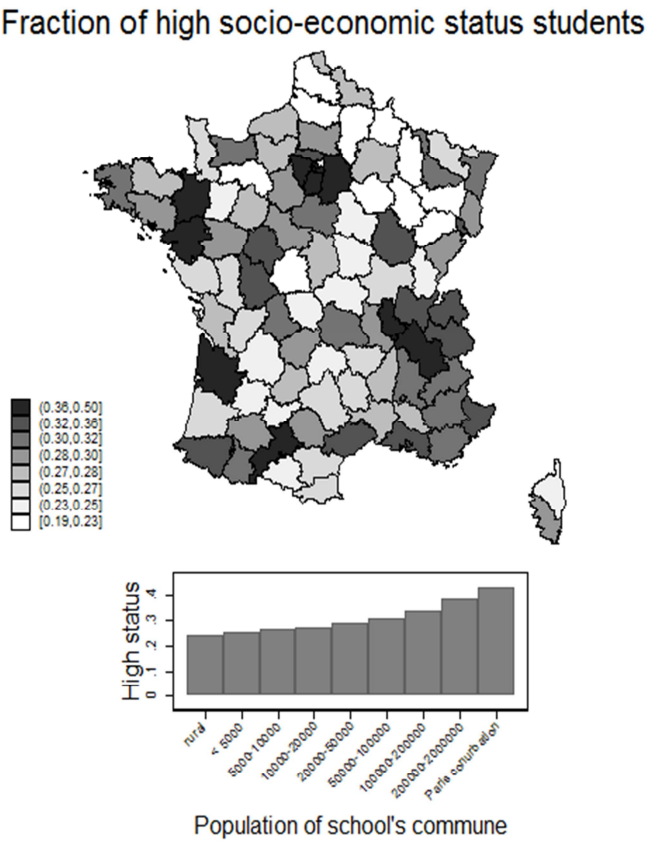

Figure 4. Fractions, by geographic location and community size, of secondary school students in the 2004-2006 *Base Centrale de Scolarité* administrative database with parents belonging to the "high status" socio-economic categories listed in footnotes 12 and 13.

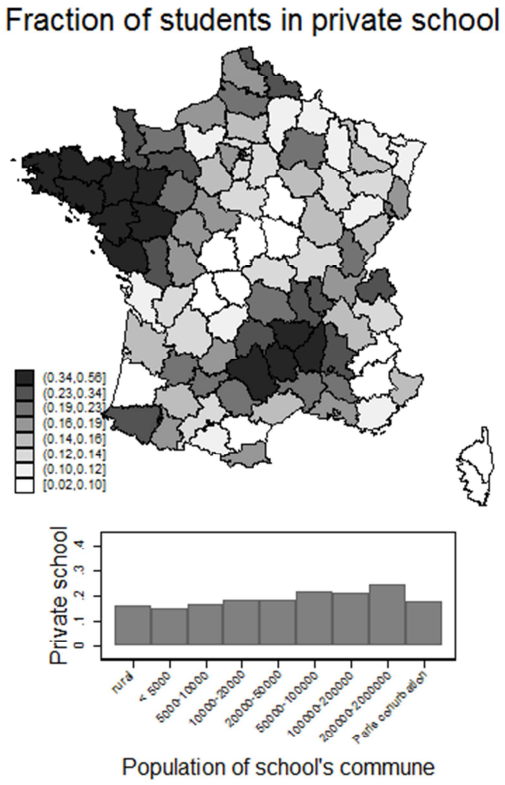

Figure 5: Fractions, by geographic location and community size, of secondary school students enrolled in private schools in the 2004-2006 *Base Centrale de Scolarité* administrative data.

A major shortcoming of the data is the absence of any income, wealth, and tuition fees information. It is however possible to assess the relevance of financial aspects for the family's educational choices using the answers to a 1998 subjective survey question: dummy `res_ins` takes value 1 if `A26`=1 indicates that family's resources "are very far from sufficient to allow the child to pursue his or her studies for as long as (s)he wishes" (as stated by 15.5% of the sample).[12]

The data do not report individual information about non-educational determinants of private school enrolment (such as geographical proximity, taste for specific facilities, or ideology). These may to some extent be captured, after accounting for variation of factors that influence

[12] The results are very similar if dummies for other possible answers are included along with `res_ins`. Consistently the rather low tuition fees of French private schools, a dummy valued 1 if A26=4 (indicating that "financial resources are more than sufficient") is a very weak instrument if used in isolation.

private school enrolment through its contribution to educational outcomes, by previous enrolment in private pre-primary or primary schools. Relevant information is gathered by two questions in the 1998 survey of families. Dummy `prev_priv` is coded to zero if replies to `B3` and `B7` are both 1="entirely in State school" or missing, so that `prev_priv=1` indicates that the student had at least some pre-secondary private schooling: this is the case for 30.2% of the normal-age panel individuals, 73.6% of which also enroll in a private secondary school.

If private school enrolment is determined by unobservable factors that influence school achievement and are correlated with ability and other observed determinants of tertiary enrolment, estimation needs sources of variation that determine private enrolment but do not directly influence school achievement. Financial constraints are certainly relevant to the choice of paying the fees levied by private school, and `res_ins` can be an instrument for school choice under the identifying assumption that they are not directly relevant to school achievement (given such other observables as parents' education and occupational status). The relevance of previous private enrolment to subsequent schooling choices may capture the cultural inclination of the family, or inertia, or the relevance to secondary school choices of the convenience of full-time attendance and lower likelihood of strikes, or indeed financial factors beyond those captured by financial constraints and socio-economic status. The identifying assumption would be that, given other observables, these factors do not directly matter for school results.

Identifying assumptions are always debatable and even more than usually difficult to test in the paper's empirical framework (see footnote 14 below). The results below detect only mild selection-on-unobservables in French data, and the instrumental variable estimates should be viewed as a robustness test for the very similar ordinary least squares estimates. Still, it is useful to discuss briefly what might invalidate the identifying assumptions. Excluding a direct role of `res_ins` in determining school success is not appropriate if, given other observables, a better financial position influences tertiary enrolment directly, or signals culturally relevant resources (not captured by parental education and socio-economic status) rather than purely random shocks to non-cultural capital. The exclusion restriction that legitimates `prev_priv` as an instrument may be false if having attended a private elementary school not only influences observable (and predetermined) ability but also, at given observed ability, makes it easier for children to do well in secondary school, as might be the case if the family's cultural orientation or learning skills acquired in private elementary schools play a role similar to that of well-educated parents. Previous private schooling may also, at given socio-economic status and

other observable characteristics, capture factors that increase the propensity to enroll in tertiary education at a given ability and secondary school achievement.

5. Linear probability models

The sample with non-missing variables includes 11516 students, of which 2233 are observed in private schools. Differences across State and private schools can be detected and characterized by regressing individual success on individual-level exogenous variables, allowing the coefficient of ability to differ across private and public schools.

Table 1. Linear probability estimates.

Dependent variable Method	succ OLS	succ OLS	priv OLS	succ 2SLS
priv Private enrollment at start of sec.school	0.019* (0.01)	0.089** (0.04)		0.157** (0.07)
abil/100 x priv interaction with		-1.031* (0.62)		-2.351** (1.06)
abil/100 Initial assessed achievement	9.750*** (0.24)	9.922*** (0.25)	-0.235 (0.18)	10.131*** (0.29)
educ_f Father has tertiary degree	0.092*** (0.01)	0.093*** (0.01)	0.016* (0.01)	0.094*** (0.01)
educ_m Mother has tertiary degree	0.087*** (0.01)	0.086*** (0.01)	0.012 (0.01)	0.087*** (0.01)
fem Female gender	0.061*** (0.01)	0.061*** (0.01)	-0.011* (0.01)	0.061*** (0.01)
res_ins Insufficient family resources			-0.025*** (0.01)	
prev_priv Some pre-secondary private schooling			0.553*** (0.01)	
number of estimated coefficients	5	6	6	6

Weighted by pond1.
Robust standard errors in parentheses below the coefficients, p-levels: * <0.1 ** <0.05 *** <0.01.

In all columns of Table 1 success (tertiary education enrolment) is very significantly and positively related to initial ability, parental education, and gender. In the first column enrolment in a private lower-secondary school does not significantly influence an OLS regression's intercept. The second column detects a positive level effect as well as a mildly significant negative interaction with assessed ability. The next columns treat private secondary school enrolment as an endogenous variable, recognizing that it may be influenced by unobservables ability as well as by predetermined observable characteristics of each individual. The third column reports a first-stage regression including indicators of previous private schooling and

financial constraints: their coefficients are significant, with the expected positive sign for previous primary school enrolment and negative sign for financial constraints. In the fourth column, Table 1 reports estimates from a regression that instruments the main and ability-interacted effects of private school enrolment with the third column's linear probability prediction and its interaction with ability.[13] The results are similar to those of ordinary least square estimation, and a formal test rejects exogeneity only at p-level 0.11: initial ability influences eventual success less strongly within private than within State schools. To the extent that this indicates that private schooling can remedy individual shortcomings, it can explain why in the first-stage regression it appears to be a mildly attractive choice (all else given) for the parents of relatively low-performing children.

Table 1a. Linear probability estimates with local education market (LEM) fixed effects.

Dependent variable Method	succ OLS	succ OLS	priv OLS	succ 2SLS
priv	0.010 (0.01)	0.078* (0.05)		0.110 (0.07)
abil/100 x priv		-1.000 (0.65)		-2.058** (1.01)
abil/100	9.780*** (0.25)	9.947*** (0.26)	-0.262 (0.18)	10.104*** (0.29)
educ_f	0.085*** (0.01)	0.086*** (0.01)	0.013 (0.01)	0.088*** (0.01)
educ_m	0.081*** (0.01)	0.081*** (0.01)	0.011 (0.01)	0.082*** (0.01)
fem	0.058*** (0.01)	0.058*** (0.01)	-0.011* (0.01)	0.058*** (0.01)
res_ins			-0.018** (0.01)	
prev_priv			0.513*** (0.01)	
number of estimated coefficients	497	499	508	508

Weighted by pond1.
Robust standard errors in parentheses below the coefficients, p-levels: * <0.1 ** <0.05 *** <0.01.

The simplicity of the linear probability model makes it possible to include a large number of control variables. Geographic factors can be allowed to differ at the level of all separate locations defined by *département* and city size indicators, the most detailed geographical

[13] See Wooldridge (2010, Chapter 20). This estimation method yields a just-identified second-stage equation, and does not provide a test for validity of the exclusion of levels and interactions from that equation of the family's financial conditions (res_ins) or inclination to choose private schooling (prev_priv). Informal experiments that drop either variable from the IV set (or include it in the second stage) suggest that prev_priv plays the stronger role in sharpening the results reported below.

location information available in the data. A State school should in principle be available in all locations, but private schools need not be present at the same or nearby locations, and fixed effects account for this and all other local factors. The estimates use only variation across the observations (in the order of a dozen outside large cities) within each locality: a total of 505 locations are populated in the data, but observations with no local dependent variable variation are dropped. As shown in Table 1a, inclusion of geographical fixed effects has very small implications for the results.

Table 1b. Linear probability estimates with LEM fixed effects and socio-economic status categories (SES) fixed effects as indicated.

Dependent variable Method	succ OLS	succ OLS	priv OLS	succ 2SLS	succ 2SLS
priv	0.001 (0.01)	0.061 (0.05)		0.067 (0.07)	0.122* (0.07)
abil/100 x priv		-0.869 (0.65)		-1.644* (1.00)	-1.979** (1.00)
abil/100	9.411*** (0.25)	9.558*** (0.27)	-0.463** (0.19)	9.648*** (0.30)	10.099*** (0.29)
educ_f	0.047*** (0.02)	0.048*** (0.02)	-0.006 (0.01)	0.048*** (0.02)	0.087*** (0.01)
educ_m	0.059*** (0.01)	0.059*** (0.01)	0.004 (0.01)	0.060*** (0.01)	0.082*** (0.01)
fem	0.061*** (0.01)	0.061*** (0.01)	-0.009 (0.01)	0.061*** (0.01)	0.058*** (0.01)
res_ins			-0.005 (0.01)		
prev_priv			0.503*** (0.01)		
SES fixed effects	yes	yes	yes	yes	no
number of estimated coefficients	524	525	534	534	508

Weighted by pond1.
Robust standard errors in parentheses below the coefficients, p-levels: * <0.1 ** <0.05 *** <0.01.

The similar regressions reported in Table 1b extend the set of exogenous variables to include dummies for all socio-economic status categories (coefficients not reported). In the third column, the negative estimated effect of initial ability on private school enrolment becomes more significant, suggesting that the private schooling is more attractive for children who are less able than expected on the basis of their family background. The financial constraints indicator is no longer significant, suggesting that (in the absence of more precise income or wealth controls) socio-economic status captures much of the relevant financial heterogeneity across families. The next two columns of Table 1b report 2SLS regressions based on that

selection equation. Inclusion of socio-economic fixed effects in the second stage recognizes their possible direct relevance, at given individual ability and parental education, for school success assessed in terms of tertiary school enrolment (which is at least partly a choice and more likely for children of privileged families). In the fourth column, this reduces the size and significance of both parental education indicators and of the ability slope interaction. In the last column of Table 1b, a 2SLS regression that excludes socio-economic effects from the second stage yields a large negative private schooling-ability interaction estimate.

This pattern of results suggests that, even when controlling for individual ability and parental education, socio-economic status may matter directly for school achievement, and possibly differently across private and State schools. To try and disentangle these effects it is possible to exploit variation of socio-economic status and LEM characteristics as determinants of private school choice, interacting the summary indicator `hiSES` of individual socio-economic status with an indicator of LEM-level socio-economic conditions: variable `badLEM`, the sum of the student population shares enrolled in problematic ZEP, REP, or *établissement sensible* schools.[14] Like all other geographic indicators, this is estimated using all the lower-secondary school students recorded in the 2004-06 BCS administrative database.

Table 1c displays the results obtained when the main effect of geographical variation is absorbed by LEM fixed effect. The main effect of `hiSES` (given other instruments) is insignificant. Intuitively, and interestingly, their interaction is a significantly positive predictor of private school enrolment: private schools tends to be chosen not only by families without stringent financial constraints (as indicated by the negative coefficient of `res_ins`) or relatively slow-learning children (as indicated by the negative coefficient of `abil` in the first stage regression), but also by high socio-economic status families that otherwise would have to send their children to underprivileged local public schools.

[14] Only about 2% of students are in an *établissement sensibl.* The indicator double-counts them, with negligible implications, when the school is also in a ZEP or REP.

Table 1c. Linear probability estimates with LEM fixed effects and interpretable interactions between high socio economic status dummy and LEM-level incidence of problematic schools.

Dependent variable Method	succ OLS	succ OLS	priv OLS	succ 2SLS
priv	0.010 (0.01)	0.078* (0.05)		0.109 (0.07)
abil/100 x priv		-1.000 (0.65)		-1.961* (1.01)
abil/100	9.780*** (0.25)	9.947*** (0.26)	-0.338* (0.19)	10.090*** (0.29)
educ_f	0.085*** (0.01)	0.086*** (0.01)	0.002 (0.01)	0.087*** (0.01)
educ_m	0.081*** (0.01)	0.081*** (0.01)	0.004 (0.01)	0.082*** (0.01)
fem	0.058*** (0.01)	0.058*** (0.01)	-0.010* (0.01)	0.058*** (0.01)
res_ins			-0.015* (0.01)	
prev_priv			0.511*** (0.01)	
hiSES Socially privileged family (occupations associated with schooling successs)			0.007 (0.01)	
hiSES_badLEM Interaction with local prevalence of problematic schools			0.069** (0.03)	
number of estimated coefficients	497	499	510	508

Weighted by pond1.
Robust standard errors in parentheses below the coefficients, p-levels * <0.1 ** <0.05 *** <0.01.

The following specifications replace geographical fixed effects with interpretable indicators of LEM characteristis as controls or instruments: hiSES_LEM is the share of students who belong to high-status families, and priv_LEM, the share of students enrolled in private secondary schools. These frequencies are computed across all BCS schools in each LEM, whether or not they were chosen by panel individuals, and are meant to characterize the environment in which those choices were made. They provide information that is admittedly imprecise, because schools might have been chosen from narrower or broader area of feasible commuting, but arguably relevant. Including the area's average socio-economic characteristics along with the individual family's lets the latter's relevance to school choices be measured in relative terms, as is appropriate if private schooling lets the family provide or avoid classmates for its children. In explaining school performance, hiSES_LEM can approximate the availability and appeal of higher-education opportunities, both likely to be stronger in richer areas. After controlling for socio-economic characteristics, the LEM-level incidence of private schooling may plausibly capture local supply effects and cultural characteristics. Under the identifying assumption that these are not directly related to school outcome, the incidence of

private schooling can be an instrument along with private primary school and financial constraints (both capturing characteristics specific to the family within the LEM).

Table 2: Linear probability estimates with indicators of LEM characteristics.

Dependent variable Method	succ OLS	succ OLS	priv OLS	succ 2SLS
priv	0.018 (0.01)	0.090** (0.04)		0.143** (0.07)
abil/100 x priv		-1.051* (0.62)		-1.862* (1.02)
abil/100	9.760*** (0.24)	9.934*** (0.25)	-0.302* (0.18)	10.068*** (0.29)
educ_f	0.086*** (0.01)	0.087*** (0.01)	0.003 (0.01)	0.087*** (0.01)
educ_m	0.082*** (0.01)	0.082*** (0.01)	0.006 (0.01)	0.082*** (0.01)
fem	0.060*** (0.01)	0.061*** (0.01)	-0.011* (0.01)	0.061*** (0.01)
hiSES_LEM local prevalence of privileged families	0.177*** (0.05)	0.178*** (0.05)	-0.043 (0.03)	0.179*** (0.05)
prev_priv			0.508*** (0.01)	
res_ins			-0.018** (0.01)	
priv_LEM local prevalence of private schools			0.550*** (0.02)	
hiSES			0.001 (0.01)	
badLEM local prevalence of problem schools			0.047*** (0.02)	
hiSES_badLEM			0.079*** (0.03)	
number of estimated coefficients	6	7	11	7

Weighted by pond1.
Robust standard errors in parentheses below the coefficients, p-levels * <0.1 ** <0.05 *** <0.01.

The results, in Table 2, are similar to those displayed in previous tables for variables already present there. The LEM proportion of privileged students, hiSES_LEM, is insignificant in the first stage, where secondary private school enrolment is determined by the regional prevalence of private schooling as well as by the other instruments introduced above; it is a significant and sensibly positive predictor of tertiary school enrolment in the second stage, where it plausibly captures variation within France of local conditions.

These estimates offer an interpretable perspective on economic and cultural determinants of school choice and performance. Unsurprisingly, however, BCS-based linear control variables do not capture all geographical variation in various factors that influence outcomes directly (such as the presence and quality of universities and other tertiary institutions) and in private

education demand and supply: the testable restriction that the fixed effects estimated by the previous specification are well approximated by observed regional variation is rejected at very low p-values in both the first and second stages.

7. Probit estimates

The results reported so far all indicate that private secondary schooling has different effects on educational achievement along the distribution of ability assessed when entering secondary school. The estimated main and interaction effects of private schooling and ability are very similar in all specifications, and estimate a small school-specific slope difference: each point of ability assessed on the 1-10 scale increases the probability of success by about 10 percentage points in a State school and about 8 percentage points in a private school, with 95% confidence intervals ranging from about 6.25 to about 9.75. Private schooling is also estimated to increase the probability of success by a little less than 15 percentage points at all levels of ability: hence, it appears to be beneficial only for students assessed below the mean of about 7/10 at the beginning of secondary school.

These findings can be checked and refined with specifications that implement more realistic and flexible functional forms and allow selection on unobservables, approximating LEM variation with BCS indicators.[15] Table 3a reports results of separate probit estimation on the subsample of private and State panel students. Like the OLS estimates reported in previous tables, these are biased if private school choice is endogenous, but do deliver an interesting descriptive messages: the coefficient of individual ability within the private school subsample is smaller than within the State school sample, and school success in the private sector is also relatively insensitive to the father's educational achievement dummy and to the LEM's socio-economic status. In Table 3b, a school choice and two outcome probit equations are estimated by the Stata `switch_probit` program (Lokshin and Sajaia, 2011). The estimation procedure control for selection bias in the outcome estimates, reported in the second and third column, on the basis of the private school choice probit reported in the first column: besides outcome-relevant variables, the selection equation includes the same variables that served as instruments in the linear specifications (the individual student's previous and LEM-level private enrolment,

[15] Nonlinear estimation is numerically unfeasible with fully unconstrained fixed effects at the LEM level. Estimating nonlinear specifications with a more limited number of fixed effects yields broadly similar results.

the family's financial constraints, and the prevalence of problematic schools and its interaction with socio-economic status).

Table 3a. Probit estimates by school type subsamples.

Dependent variable Method	Succ Probit, priv=1	succ Probit, priv=0
abil/100	25.601***	28.468***
	(1.88)	(0.88)
educ_f	0.020	0.317***
	(0.08)	(0.04)
educ_m	0.283***	0.212***
	(0.07)	(0.04)
hiSES_LEM	-0.105	0.683***
	(0.31)	(0.15)
fem	0.098*	0.195***
	(0.06)	(0.03)
constant	-1.832***	-2.426***
	(0.16)	(0.08)

Weighted by pond1.
Robust standard errors in parentheses below the coefficients, p-levels * <0.1 ** <0.05 *** <0.01.

The message conveyed by school-choice probit estimates is similar to that of the first-stage regressions reported above. The variables excluded from outcome determination have significant and sensibly signed coefficients: previous private schooling, the local prevalence of private schooling and disadvantaged schools, and the interaction of the latter with the family's high status dummy with all increase the probability of private school enrolment, while the family's financial difficulties decrease it. Ability enters with a negative and significant coefficient in the school choice probit. Its estimated coefficients in the school outcome probits are very similar to those of Tables 3a, suggesting that sorting of students across private and State schools is mostly determined by the observable exogenous variables included in the school-choice probit rather than by unobservable variables that are relevant to both school choice and school performance. An indication of the latter effects is given by the estimated correlation coefficients rho between unobservable determinants of private school choice and unobservable determinants of success in private and public schools. The small negative estimate of that correlation in the priv=1 column indicates that students who choose private schools perform less well than would be expected on the basis of their observable ability and background; the small positive estimate in the priv=0 column indicates that the opposite is the case for those who choose public schools; and the two correlations are jointly different from zero at p-value=0.0101. Hence, there is evidence of quantitatively mild but statistically significant negative selection on unobservables into private schools, which are attended by not

only observably weak (as suggested by the significant negative coefficient of abil in the choice probit) but also unobservably weak students.

Table 3b. Switching probit estimates, socio-economic status influences school choice but not school performance.

Dependent variable Method	priv Probit	succ priv=1 Probit	succ priv=0 Probit
abil/100	-1.778*	25.529***	28.356***
	(0.99)	(1.87)	(0.89)
educ_f	0.016	0.008	0.322***
	(0.05)	(0.08)	(0.04)
educ_m	0.037	0.274***	0.217***
	(0.05)	(0.07)	(0.04)
hiSES_LEM	0.096	-0.063	0.702***
	(0.18)	(0.31)	(0.15)
fem	-0.061*	0.099*	0.193***
	(0.03)	(0.06)	(0.03)
hiSES	0.014		
	(0.06)		
prev_priv	1.655***		
	(0.03)		
res_ins	-0.112**		
	(0.05)		
priv_LEM	2.781***		
	(0.13)		
badLEM	0.474***		
	(0.09)		
hiSES_badLEM	0.321**		
	(0.15)		
constant	-2.061***	-1.750***	-2.399***
	(0.10)	(0.16)	(0.08)
rho		-0.09	0.12

Weighted by pond1.
Robust standard errors in parentheses below the coefficients, p-levels * <0.1 ** <0.05 *** <0.01.

Table 3c assesses the robustness of these results to inclusion of socio-economic status not only as a determinant of school choice but also of school performance, as suggested by the pattern of results in Table 1b. To ease estimation and interpretation, high-status individuals are identified in terms of the simple binomial indicator hiSES. This is insignificant in the school-choice probit, has a significantly positive coefficient only in the State sector success probit, and leaves other coefficient and correlation estimates largely unchanged, with statistically stronger evidence of negative selection (the null hypothesis that both correlation coefficients are zero is rejected at p-value 0.0056).

Table 3c. Switching probit estimates, socio-economic status is allowed to influence school performance.

Dependent variable Method	priv Probit	succ priv=1 Probit	succ priv=0 Probit
abil/100	-1.799*	25.346***	27.722***
	(0.99)	(1.88)	(0.89)
educ_f	0.012	-0.026	0.226***
	(0.05)	(0.08)	(0.05)
educ_m	0.036	0.260***	0.164***
	(0.05)	(0.07)	(0.04)
hiSES_LEM	0.093	-0.125	0.622***
	(0.18)	(0.32)	(0.15)
fem	-0.061*	0.104*	0.198***
	(0.03)	(0.06)	(0.03)
hiSES	0.021	0.075	0.208***
	(0.06)	(0.07)	(0.04)
prev_priv	1.655***		
	(0.03)		
res_ins	-0.111**		
	(0.05)		
priv_LEM	2.778***		
	(0.13)		
badLEM	0.474***		
	(0.09)		
hiSES_badLEM	0.322**		
	(0.15)		
constant	-2.060***	-1.743***	-2.370***
	(0.10)	(0.16)	(0.08)
rho		-0.09	0.14

Weighted by pond1.

Robust standard errors in parentheses below the coefficients, p-levels * <0.1 ** <0.05 *** <0.01.

A negative coefficient for observed ability as a determinant of private school enrolment can be rationalized by ability's smaller relevance to success in private schools. The probit coefficient of ability is estimated by all specifications to be smaller in private than in State schools, but its interpretation is not as straightforward as in the linear regressions above when the predicted probabilities of success across different schools depend nonlinearly on covariates. For example, parental education is an insignificant predictor of school choice in both linear and nonlinear specifications; but while linear specifications assume that the marginal effect of ability is independent of parental education, the two variables interact in determining nonlinear predictions of success probabilities, which need to be conditioned on specific values of all covariates. In the following figures, thicker lines plot the predicted success probability for individuals with assessed initial ability measured on the horizontal line, and other observable covariates as indicated in each figure, when attending a private (solid line) or a public (dashed

line) school. The distance between these lines is the "treatment effect" of private schooling, and is significant at 5% confidence when the thinner lines do not overlap it.[16]

In all cases, estimated relationships are very similar across the private and State sectors, consistently with the tight administrative constraints of the French school system: uniformly stringent educational criteria result in expected secondary school success probabilities that are rather low and tightly related to initial ability. Some of the small differences between State and private schools, however, are statistically significant and substantively interesting.

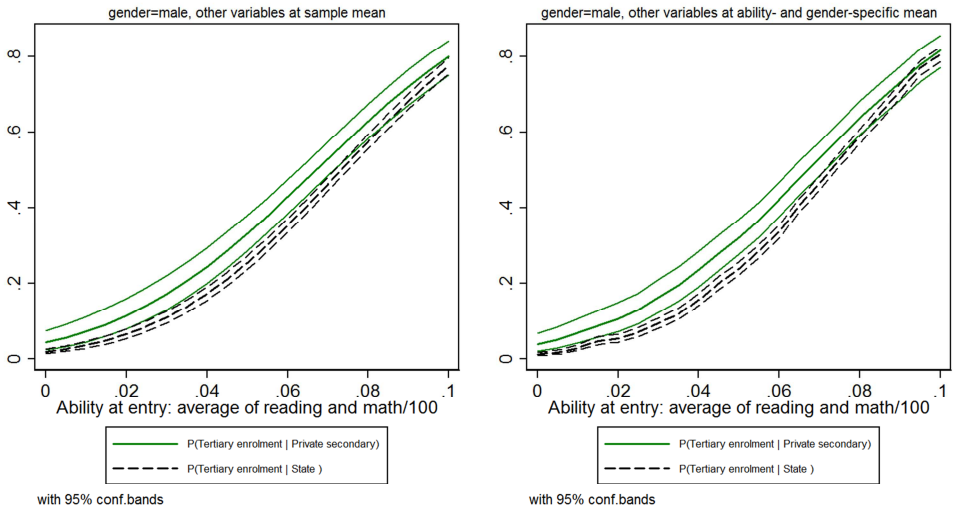

Figure 6. Estimated predictions of school success based on the estimates in Table 3b, assessed for male students at overall or conditional means of other variables.

[16] The predicted success probability is $\Phi(X\beta)$, the standard normal distribution function evaluated at the point estimates. With $\sigma_{X\beta}$ the estimated standard error of the estimates' prediction, the confidence bounds are $\Phi(X\beta \pm 1.96\,\sigma_{X\beta})$.

The left-hand panel of Figure 6 illustrates the success probabilities implied by the results reported in Table 3b for a male student when parental education and geographical location indicators are set at the full sample mean level. Success is more likely at private schools, significantly so at intermediate levels of assessed initial ability. Other characteristics vary across observations, of course, and probabilities of success generally depend on that background variation: while assessed initial ability is exogenous with respect to subsequent school choices, it is related to previous experience and likely higher for relatively privileged children. Indeed in the right-hand panel of Figure 6, where parental education and geographical indicators are set at their ability-conditional average level, for the most able students the probability of success (evaluated at their relatively favorable average background indicators) is essentially identical at both private and State schools.

A positive treatment effect of private schools for less fortunate children suggests that they may obtain from private school some of the help their families' cultural environment cannot provide. To highlight this effect, Figure 7 compares the success probabilities at State and private schools for two male individuals: one with highly educated parents, and one without any tertiary-educated parent. For the former, who is likely to find learning easier and to be helped at home, the effects of enrolment in a State or private school are insignificantly different. Private education instead significantly improves outcomes for a student with less educated parents, who is more likely to need help and (depending on financial and local condition) may or may not be able to get it from a private school. This finding is corroborated by the predicted probabilities plotted in Figure 8 which, using the estimates reported in Table 3c, condition on socio-economic status as well as on parental education.[17] The school performance of children with favorable family backgrounds is mildly (but significantly) worsened by private school enrolment. For students with less educated and poorer parents, conversely, private schools are significantly better at all except the very best initial ability levels.

[17] For averaged individuals the predictions of these estimates are very similar to those shown in Figure 6.

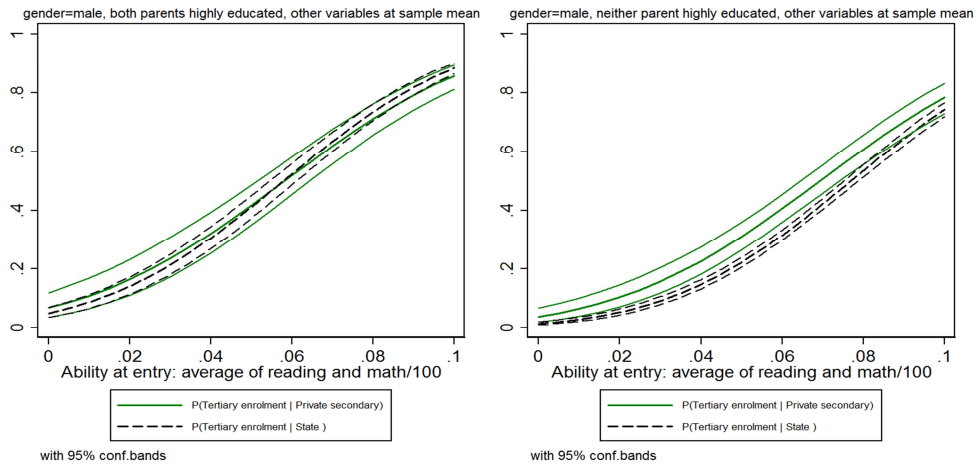

Figure 7. Estimated predictions of school success for male students, based on specific values of other covariates and the estimates in Table 3b.

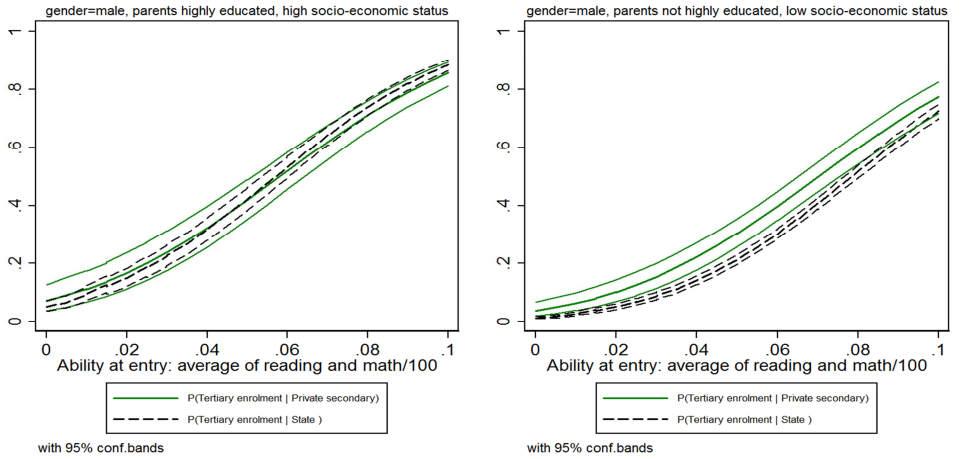

Figure 8. Estimated predictions of school success for male students, based on specific values of other covariates and the estimates in Table 3c.

8. Summary and interpretation of the results

Most French private schools are heavily subsidized and strictly regulated by the State, and the results of this paper confirm that in most respects they are extremely similar to State schools. However they do suggest that France's private schools, on average and at least at the time the data were collected, use educational resources that substitute rather than complement their students' ability to learn. To the extent that the data and empirical procedures make it possible to distinguish material and cultural aspects of family background, it appears to be the case that in France financial resources (as measured by financial constraints and their relevance to private school enrolment) can purchase what family background (as measured by parental education) makes available to students who attend State schools. This suggests that, in order to smooth the implications of uneven family backgrounds, French State schools might need to supply some of the educational services supplied by private schools.

Like all empirical results those of this paper are constrained by data availability, and need to rely on debatable specification choices. A severe limitation of the French data is lack of income, wealth, and school fees information: in the absence of such observable variation, the paper's specifications view previous private schooling as an exogenous determinant of school choice, but not of school performance, in regressions that control for other aspects of family background. Along with other identifying assumptions, such as a plausible and empirically strong role of bad local socio-economic conditions in driving high-status families towards private schooling, this make it possible to detect a small but statistically significant difference, across State and private schools, in the relevance of both observable and unobservable ability in determining tertiary enrolment.

The data analyzed in this paper do not provide information on specific pedagogical resources and technique differences between the State and regulated private segments of the French educational system, and further work may usefully exploit other relevant sources of information. An obvious indicator might be class size, which however is very similar across French public and private schools, and somewhat larger in the latter: in *OECD Education at a Glance 2014* , Chart C7.3 reports average class sizes of 22.66 in public schools, and 23.27 in private schools). A sharp and potentially crucial role may be played by selection and management of teachers, who do empirically appear to be different and to behave differently in private schools.[18] The institutional features reviewed in Section 2 in fact tend to draw

[18] Valette (2012) documents that the proportion of female teachers is higher in private (71%) than in State (60%) schools, and that State school teachers are more educated (45,1% have five-year tertiary

academically better teachers into State schools, and make pedagogical performance less relevant than in private schools to their career and working conditions. This may make State secondary schools in France perfectly suitable for good students, but inappropriate for those who (individually or because of their family background) find it difficult to learn, and cannot afford private schooling.

degree, while only 32,5% of private school teachers do). Felouzis and Perroton (2011) find that private school teachers identify more strongly with their school and are more focused on fulfilment of student needs.

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