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School Vouchers Italian Style

Giorgio Brunello
Daniele Checchi

Forschungsinstitut
zur Zukunft der Arbeit
Institute for the Study
of Labor

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Giorgio Brunello
*University of Padua,
CESifo and IZA Bonn*

Daniele Checchi
*University of Milan
and IZA Bonn*

ABSTRACT

School Vouchers Italian Style[*]

School vouchers introduced recently in some Italian regions have lowered the cost of private schools. On one side, we provide evidence that Italian private schools may be selected for different reasons than quality considerations. On the other side, by exploiting individual data on voucher applicants, we present evidence that the percentage of voucher applicants is higher the higher the average quality of private schools, which we explain with the fact that better quality schools provide better services to students, including information and consulting on vouchers. We show that enrolment in private schools responds sluggishly to changes in tuition induced by vouchers. Under stringent assumptions, we estimate the slopes of demand and supply of private education in the largest Italian region, Lombardy, during the first two years since implementation of a voucher scheme, and provide a quantitative assessment of the long-term impact of vouchers on tuition fees and enrolment in private schools.

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Corresponding author:

Daniele Checchi
Faculty of Political Science
University of Milan
Via Conservatorio 7
20122 Milano
Italy
Email: daniele.checchi@unimi.it

1. Introduction

The acknowledged importance of human capital for productivity, growth and innovation has brought school reform to the forefront of academic and policy discussion. In the current debate, the key word for school reform is choice. By increasing choice, policy makers and advisors believe that competition among schools can be enhanced, with favourable consequences on the accumulation of human capital.

Choice implies more competition, but does not necessarily require that private schools play a key role in the education process. Open enrolment policies, and public funding closely tied to the number of pupils, as in the UK or in New Zealand, can also encourage a more efficient use of scarce resources within the public school system (see Clotfelter and Ladd, 1996). The risk of school stratification is often mentioned as a by-product of this type of reform (Fiske and Ladd 2000).

Since Milton Freedman's seminal work on school choice, school vouchers have been widely debated – mainly outside of Italy – as a tool to increase efficiency and equality in educational attainment. Many Italian regions now have vouchers. Do they make a difference? What effect do they have on school choice and efficiency? Answering these questions is hard, especially since the introduction of vouchers in Italy is very recent: even if it works, it takes time for school choice to change things in a significant manner.

This paper is a first look at vouchers as they have been implemented in Italy. Given the relatively poor quality of the data at hand, we keep a descriptive and rather informal style. We start by examining the quality of private schools in Italy, and argue that perhaps they are rather different from US private schools (Section 2). We then briefly review the economic literature on vouchers (Section 3). We move on to illustrate how vouchers are supposed to operate in Italy and to discuss some preliminary descriptive evidence based on administrative data for Lombardy, the largest and richest Italian region (Section 4). We turn to a more substantive discussion in Section 5, where we estimate a demand and supply model and try to gauge the effects of the voucher system on tuition fees and private school enrolment.   We find that the introduction of vouchers in Lombardy should increase both tuition fees – by close to 5 percent – and enrolment in private schools – by about 10 percent. The foreseen change in enrolment will take time to materialize, however, because both demand and supply respond rather sluggishly to price changes. Conclusions follow.

2. Are Italian Private Schools on Average of Better Quality than Public Schools?

On the other side of the Atlantic, the academic discussion on school choice often takes it for granted that the average quality of private K-12 schools is higher than the quality of public schools – see for instance Epple and Romano [1998]. The empirical evidence on the issue is, however, far from overwhelming. Neal [2002] reviews the US empirical evidence and concludes that Catholic private schools raise educational attainment compared to public schools significantly for racial minorities in urban areas, but modestly for urban whites. He also shows that there is no evidence that suburban whites that attend the most expensive public schools actually achieve more than public school students. Figlio and Stone, [1997], on the other hand, show that religious private schools in the US provide lower quality, measured by performance test scores, in mathematics and science than public schools. Sharply in contrast, nonreligious private schools are found to offer higher quality in these fields than public schools.

Ladd [2002] reviews non-US evidence and shows that in Chile Catholic schools generate higher achievement in Spanish and math than public schools but that private secular schools are marginally less productive than public schools. Vandenberghe and Robin [2004] use the PISA dataset for an heterogeneous group of countries to examine the effect of private versus public education on pupils' achievement and show that private education does not generate systematic benefits.

What is the evidence for Italy? Bertola and Checchi [2004] are perhaps the first to show that Italian private schools provide on average lower quality than public schools. They argue that in Italy private schools "..appear to play a remedial role. On average, they increase the performance of students from rich families, but their value added seems to be the recovery of less brilliant students rather than across-the-board high quality education" (p.97). The essential argument by Bertola and Checchi is that private schools are good at catering to the rich and lazy, possibly offering leisure and a degree for a price. Cappellari [2004] confirms their results studying the 1995 high school graduates from the Italian survey on High School and Beyond; he shows that the probability of graduating from a private school rises with the availability of resources in the family of origin but decreases with school performance prior to high school. Brunello and Rocco [2004] confirm this result using data on the 1998 cohort of the same survey and find that enrolment in a public upper secondary school in Italy is higher – ceteris paribus – for students with better marks in

junior high school. They also show that public school graduates are more likely to enrol in college than private school students.

Interesting information on the characteristics of students in Italian private schools can be obtained from the PISA 2000 survey, a cross-country investigation on 15-year-old students.[2] Table 1 presents the results of a probit model where the dependent variable is the probability of enrolment in a private school and the explanatory variables include family background, type of school attended, region where the school is located, and general household attitude toward education.

Table 1: Probability of enrolment in private schools – upper secondary schools.
PISA 2000. Weighed maximum likelihood probit; marginal effects

Dependent variable	coefficient	Standard error
female	-0.010	0.01
age	0.000	0.00
only child	0.007	0.01
father primary school	0.050***	0.02
father lower secondary	0.069***	0.02
father vocational	0.069**	0.05
father upper secondary	0.056***	0.02
father university degree	0.033***	0.01
mother primary school	-0.020	0.01
mother lower secondary	-0.006	0.02
mother vocational	-0.007	0.02
mother upper secondary	0.003	0.02
mother university degree	0.000	0.02
socio-economic index family	0.000*	0.00
student aspirations	0.000	0.00
family wealth	0.025***	0.00
family educational support	0.001	0.00
Home educational resources	-0.006	0.00
parents interested in school	-0.003***	0.00
student cultural activity	-0.005*	0.00
family possession of books	0.003	0.00
North-East	-0.042***	0.00
Centre	-0.045***	0.00
South east	-0.066***	0.01
technical school	0.037***	0.02
general school	0.063***	0.01
N.obs	3868	
Pseudo R²	0.25	

Note: standard error clustered by macro-regions; one, two and three stars for statistical significance at the 10, 5 and 1 percent level of confidence respectively.

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[2] The Pisa (Programme for International Student Assessment) is a survey coordinated by OECD and conducted by Canada Statistics (www.pisa.org). The first wave has been run in 2000 in 35 countries, while a second wave was run in 2003. The aim of the programme is the assessment of student skills (literacy, numeracy and scientific knowledge) in a comparable way across countries. The Italian sample is composed by 4984 students, aged 15, from 172 schools (8 of which are lower secondary schools, and are excluded from the regression reported in the text. Missing information reduces the sample even further.

It turns out that students enrolled in Italian private schools are more likely to be the offspring of educated fathers, to have higher aspirations - in terms of the socio-economic index associated to the job they hope to get when out of school - and to live in wealthier households. They tend also to be enrolled in general secondary schools (at a lesser extent in technical schools), are less involved in cultural activities, and their parents are less interested in their school activity.[3]

Additional evidence on this important issue can be gleaned from the 1998 wave of the Multiscopo (Multipurpose) Survey conducted by the National Statistics Institute on a sample of 20153 Italian households. The survey is useful for our purposes because it includes a section on the schooling of individuals younger than 18. We exploit a question in the survey asking the reasons why the interviewed household has enrolled one or more children in a private school. The available options include school quality (quality of teachers, quality of services provided), religious and ideological reasons, vicinity, availability of seats and economic reasons – relative to the cost of private education.

Table 2 shows the results of a probit regression that associates the probability of enrolment in private schools to some of these reasons and additional covariates. We find that households who have not considered the choice between private and public schools are more likely to enrol their children in public schools. More than cultural and ideological reasons, it is the expectation of better services and higher teacher quality that drives the choice of private schools. Naturally, economic reasons – given the cost of enrolling in private schools – are important for the selection of public schools.

Table 2. Probit model: enrolment in a private school

Variable	Coefficient	St.Err.	Variable	Coefficient	St.Err.
Gender	0.030	0.050	Number rooms / house	-0.023	0.016
			Rented house	-0.080	0.067
Did not think about reasons	-0.893***	0.076			
Quality of teachers	0.555***	0.073	Number siblings	-0.082**	0.036
Services provided	0.585***	0.089	Foreigner	-0.139	0.344
Cultural reasons	0.155	0.102			
Economic Reasons	-0.908***	0.233	Father manager	0.017	0.104
			Father professional	0.329***	0.079
Father's education	0.015**	0.007	Father self-employed	0.193***	0.066
Mother's education	0.009	0.007	Mother manager	0.216	0.164
			Mother professional	0.059	0.156
Computer	0.036	0.057	Mother self-employed	0.119	0.092
Pseudo R²	0.308		N.obs	8093	

Source: ISTAT, Indagine Multiscopo 1998. Robust standard errors. The regression includes type of school, regional and class dummies. One, two and three stars for statistical significance at the 10, 5 and 1 percent level of confidence

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[3] Checchi and Jappelli 2003 conduct a similar exercise on a different sample, drawn from the 1993 Bank of Italy Household Survey (SHIW). They find that family disposable income and parental education are significant predictors of secondary school enrolment. An objective measure of quality, based on the average student-teacher ratio at the provincial level, seems also to affect the choice of the type of school.

The expectation that private schools are of better quality than private schools does not appear to be well grounded, however. There are (at least) four pieces of evidence that makes us seriously doubt that private schools are on average of better quality than public schools. First, many Italian students participate to remedial education, either at school or privately, as they try to catch up with the rest of the class. The probability of participating to this type of education is higher among private school students, even after conditioning for family background. Table 3 shows that the estimated coefficient of the private school dummy is positive and statistically significant at the 5 percent level of confidence.

Table 3. Probit model: probability of enrolment in remedial programs.

Variable	Coefficient	St.Err.	Variable	Coefficient	St.Err.
Gender	0.099**	0.042	Mother self-employed	-0.051	0.078
Private school	0.220**	0.101	Attitude to school	-0.229***	0.018
Father's education	0.005	0.005	Absence	0.113***	0.020
Mother's education	0.001	0.005	Rented house	0.075	0.053
Number siblings	-0.045*	0.023	Computer	-0.068*	0.044
Foreigner	0.130	0.307	Number rooms house	0.016	0.011
Father manager	-0.159*	0.087			
Father professional	-0.190**	0.076			
Father self-employed	-0.093*	0.054			
Mother manager	-0.061	0.165			
Mother professional	-0.153	0.154			
Pseudo R²	0.140		N.obs	6783	

Source: See Table 2.

Second, students in private schools have less homework to do. Not shown here, an ordered probit estimate of the quantity of homework as a function of a number of controls and of the type of school, shows that homework is significantly lower in private schools. Unless work at school and at home are perfect substitutes, so that students in private schools work less at home because they work harder at school, these results suggest that less effort is required to students in private schools.

Third, when we compare the age distribution of students according to school types (see Table 4), we find evidence that private schools attract two different type of students: in the initial years of primary school they gather early starters, who are typically the offspring of educated parents who wish to shorten the educational career of their kids. Later on, some of these early starters shift to public schools (otherwise it would be impossible to observe an increase in younger than regular students there), while a flow in the opposite direction – from public to private - occurs involving students who have been held back by repetitions (*bocciatura*). The fact that the percentage of older students

steadily increases in private schools during upper secondary school indicates that these schools attract students in trouble with their educational career.

Table 4 – Age distribution of students, by class and school types – Italy – 2001-2

School level	Public school			Private school		
	younger	regular	older	younger	regular	older
Primary school						
I	0,00%	98,31%	1,69%	3,64%	94,68%	1,68%
II	2,08%	95,76%	2,16%	15,86%	82,08%	2,06%
III	2,38%	95,03%	2,59%	16,48%	81,20%	2,32%
IV	2,48%	94,61%	2,91%	16,13%	81,47%	2,40%
V	2,82%	93,63%	3,55%	16,73%	80,76%	2,51%
Total	1,98%	95,42%	2,60%	14,09%	83,69%	2,22%
Junior high school						
I	3,65%	88,36%	7,99%	8,54%	87,10%	4,36%
II	3,79%	85,71%	10,50%	8,43%	85,66%	5,91%
III	3,91%	84,11%	11,98%	8,39%	83,76%	7,85%
Total	3,78%	86,08%	10,14%	8,45%	85,53%	6,02%
Upper secondary school						
I	3,67%	74,43%	21,90%	7,40%	67,63%	24,97%
II	4,07%	72,60%	23,33%	8,08%	65,86%	26,06%
III	4,24%	68,70%	27,06%	7,44%	57,08%	35,48%
IV	4,77%	67,60%	27,63%	7,55%	55,42%	37,03%
V	5,25%	68,99%	25,76%	6,21%	41,27%	52,52%
Total	4,32%	70,79%	24,89%	7,19%	55,15%	37,66%
Overall	*3.25%*	*84.59%*	*12.16%*	*10.33%*	*72.45%*	*17.22%*

Source: Ministero dell'Istruzione, dell'Università e della Ricerca, *Scuola non statale: indagine conoscitiva* – a.s. 2001/02, Rome 2003, table 35

Last but not least, and going back to the PISA sample, Table 5 presents the results of the regression of literacy scores on a set of controls and on the type of school. It turns out that the attained score is 22-25 points higher for students of public schools, close to 5 percent of the mean standardized score of 500 (with a standard deviation of 100). An open question is whether this negative effect is due to poor teaching and/or poor services or to the fact that these schools cater to the less talented offspring of wealthy households. To sort these effects out would require the use of valid instruments for participation in private schools, or panel data that remove the fixed individual effect. Since the second option is not available in this dataset, we have instrumented the choice of private school with variables measuring household wealth and preference for cultural activities. Conditional on parental education and socio-economic status, which we include in the regression, these variables are likely to capture both financial resources and attitudes toward schooling. As reported in the last two columns of the table, going to a private school does reduce literacy scores by a substantial – and statistically significant - amount.

Table 5 – Literacy scores based on average school characteristics – PISA 2000 - Upper secondary schools – weighed ordinary least square (ols) and instrumental variables (iv)

	school averages		students (ols)		students (iv)	
	coeff	se	coeff	se	coeff	se
general school	94.87***	13.14	97.45***	4.62	121.39***	29.16
technical school	36.11***	9.84	36.09***	4.21	59.14***	13.43
parental education (years - school average)	-5.93	4.80	-0.33	0.45	0.52	0.43
parental socio-economic status (school avrg)	1.67	1.07	0.12	0.12	0.34***	0.10
school size (number of students)	0.02*	0.01	0.02***	0.00	-0.05**	0.02
student/teacher ratio (school average)	2.50*	1.38	2.22***	0.83	3.30	5.25
lack of teachers	4.54	3.60	4.25***	1.66	17.16***	5.68
poor quality of educational resources	-5.82*	3.22	-5.58***	1.53	-4.43	4.91
poor quality of the school buildings	-0.08	3.48	-1.06	1.41	-10.91**	5.01
teacher behaviour	-0.91	3.61	-0.74	1.94	-11.91**	5.84
student behaviour	9.58**	4.66	9.73***	1.97	-1.56	9.59
teacher moral	-5.23	3.25	-6.08***	2.15	8.52	9.47
private school	-25.00***	9.70	-22.04***	6.71	-311.6***	116.51
city size	-6.24***	2.14	-5.97***	1.35	1.64	6.11
North-West Italy	78.95***	10.43	74.75***	4.91	113.20***	19.39
North-East Italy	67.64***	13.21	63.38***	5.16	75.06***	16.91
Central Italy	53.06***	13.63	43.55***	4.81	38.79***	15.44
South-East Italy	15.20	10.78	11.39***	4.28	12.26	10.66
Constant	369.99***	29.38	380.50***	9.83	370.40***	35.99
N.obs	150		4502		4457	
R²	0.80		0.36		0.02	
Hansen J-statistics					50.56 (0.00)	

Note: Standard errors for school estimates are heteroschedastically consistent – standard errors for individual estimates are robust and cluster adjusted. One, two and three stars for statistical significance at the 10, 5 and 1 percent level of confidence. Instruments for private school in column 5: family wealth, family educational support, home educational resources, parents interested in school, student cultural activity, family possession of books.

3. School Choice and Vouchers

School choice programs have been active in the US since the late 1980s as policy responses to the perceived poor quality of American public schools in the K12 system. These programs include charter schools and vouchers. In the UK, school choice was started by the Education Reform Act of 1988, which introduced a quasi-market for education. In the US, charter schools and vouchers involve private schools. In the UK, the quasi-market operates mainly within a public school system.

The key features of the UK quasi-market are: open enrolment with parental choice; overlapping catch areas around schools; local management and funding of schools; funding on the basis of the number of pupils (see Burgess et al, 2004, for more details). Vouchers in the US are coupons used by the household to pay tuition fees in the school of choice, which could be public or private. The school gets revenue equal to the coupon upon enrolment, and the voucher is funded by public money. The amount of the voucher

can be identical across all students or vary with individual and school characteristics. The typical voucher in the US is worth between 14 and 29 percent of the per-pupil expenditure in the local public schools (Minter Hoxby, 2003). School voucher programs exist in the US only on a small scale, with the main programs being funded in Milwaukee, Cleveland and Florida. Large-scale programs are available in other countries, including Chile, Colombia and New Zealand.

Supporters of school vouchers expect the following effects from the introduction of a program: first, students will shift from public to private schools. Provided that private schools are more productive than public schools and deliver better schooling achievement, this shift should increase the overall productivity of the system. Second, students of better academic quality are more likely to shift, because private schools are keen to attract pupils that improve their average peer quality. Therefore, vouchers are likely to increase stratification, with uncertain effects on efficiency. These effects depend on whether the average gains of pupils in private schools, who enjoy better peers, are superior to the average losses of pupils in public schools, who are stuck with worse peers. Third, competition for students should increase. Such competition will improve public schools in order to avoid losing pupils and the associated resources. Opponents argue that an additional effect is regressive redistribution: unless vouchers are targeted to poor households, the large majority of recipients are the wealthy, who use private schools more than the average household.

The debate on the existence and the size of these effects is on, and no clear consensus has yet emerged, partly because the empirical evidence on the impact of existing programs is at best mixed and unconvincing. One important issue is whether private schools are more productive than public schools. The evidence in Section 2 raises doubts that Italian private schools are on average more productive than public schools. In this environment, it is questionable whether the introduction of publicly funded vouchers can increase overall productive efficiency. If vouchers are offered to all students enrolled in private schools, there will be productivity gains only for those students who move from a low quality public institution to a high quality private institution.

The second related issue is whether vouchers increase efficiency by raising stratification by ability, as private schools try to attract high ability students to increase the average quality of the peer group. The question here boils down to whether peer effects are linear or not. If they are linear, the gains in achievement to a student moving to a private school with better peers is exactly compensated by the loss in achievement of

other students, either in the school left behind or in the destination school. Only if peer effects are asymmetric, and the gains are higher than the losses, is the reallocation induced by vouchers efficiency-enhancing. The evidence on the presence of asymmetries, however, seems to be limited (Ladd, 2002).

The last issue is whether vouchers increase competition. Minter Hoxby [2004] examines in detail the Milwaukee voucher experiment and concludes that "..overall, the improvements in the Milwaukee public schools, following the 1998 voucher reforms, ..[have been] very impressive.." (p.34). Ladd reviews US and non US evidence and conclude on a more pessimistic note. She argues that "..the notion that the unproductive schools will go out of business and that new and more effective public schools will replace them is far easier imagined than done.." (p.15). She also questions Hoxby's results and claims that they are overstated.

Overall, the empirical international evidence on the effects of vouchers on the education market is mixed at best. Private schools around the world are heterogeneous, and the evidence that they are more productive than private schools is not overwhelming, especially outside the US. There is limited empirical evidence that peer effects are non-linear and affect relatively more the academic performance of more talented students. Finally, the effects of vouchers on school competition are controversial. The bottom line is that more empirical evidence is needed before a proper evaluation of the effects of vouchers.

4. Vouchers in Italy

Italy has witnessed a recent wave of expansion in the funds offered to households in support of the educational choices made on behalf of their children. The previous left-wing national government allocated funds to regions in order to cover transportation costs, meals expenditures, and to subsidize private certified schools undertaking specific educational projects (National Law n.62/2000), and some regions topped up these funds with local funds, using the revenue from general taxation. More recently, the current right-wing government has introduced a national fund – with no targeting - aimed at partially subsidizing enrolment in private institutions (National Law n.289/2002). The enacted law has started a heated debate in the country, because the Constitutional Law explicitly

prohibits public funding of private education[4]. When Lombardy, a region with a right-wing local government, first subsidized tuition paid to private institutions, it was sued in the Central Court (*Corte Costituzionale*) by the left-wing national government of the time. The trial never reached a decision, however, because the next right-wing government withdrew from the trial. The rationale behind subsidizing private school tuition is that this improves the freedom of choice of Italian households. The size of the subsidies, however, are rather limited compared to other countries (the coverage rate typically ranging from 25% to 50%), are not related to merit and are only partially related to household income. Let us review how the system works in more details.

4.1 The regional legislation in Italy

Between 2001 and 2003, 9 Italian regions out of 20 introduced a school voucher targeted at reducing educational expenditures. Only 8 regions, however, have earmarked funds to implement the scheme. Table 6 gathers the available information in a comparative way[5]. If we exclude Tuscany and Emilia (governed by left-wing coalitions), all the other regions have designed the voucher as an ex-post reimbursement of tuition expenditure. The percentage of reimbursement varies between 80% (Friuli, for household income below 26.000€) and 25% (Lombardy and Sicily). In 5 regions there is a cap to the subsidy, ranging from 1875€ (upper secondary school in Piedmont for a poor household) to 210€ (primary school in Veneto for a middle income household). The payment of the voucher in all regions but Emilia and Tuscany is conditional on family income - the voucher being paid only for incomes below a given threshold - but is independent of school performance. On the contrary, in these other two regions student performance matters: in Tuscany for instance the voucher is designed as a scholarship for the initial two years of upper secondary school, conditional on attaining promotion. Similarly in Emilia, where the awarded student needs to have an average marks of 7 out of 10.

Therefore we observe two alternative approaches to vouchers in Italy: on the one side, there is a partial reimbursement system aimed at alleviating the tuition costs born by private school users. In this system an income ceiling is introduced to mitigate its regressive nature, due to the fact that the average student enrolled in a private school

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[4] The Constitutional Law states explicitly (art.33) that "…institutions and private citizens have the right to create schools and educational institutes, *without any support* (our Italics) from the public budget (*Enti e privati hanno il diritto di istituire scuole ed istituti di educazione, senza oneri per lo Stato*)"
[5] A brief review of this legislation is also contained in Beltrametti, 2004, p.113 ss.

comes from a well-off household[6]. On the other side, there is a system based on a fixed payment, conditional on school performance and family income, with a much lower income threshold (approximately 10.000€ in Emilia and 18.000€ in Tuscany).

From a theoretical point of view, when the educational investment of households is conditional on income and student ability, and these resources are complements in human capital formation, it can be shown that the optimal educational policy is not redistributive (De Fraja 2002).[7] In this framework, properly designed voucher schemes can address equity issues: by conditioning on both student observable ability - inferred from performance - and on household income/wealth, these schemes can reduce the liquidity constraints of bright students, thereby increasing equality of opportunity in the society as a whole. In the current Italian experience, neither of the approaches illustrated above is satisfactory from an efficiency and equity point of view. By neglecting student achievement as a requirement for eligibility, the first approach does not exploit the potential efficiency gains associated to giving brightest and poor students access to good private schools. By fixing the scholarship amount, the second model does not distinguish between constrained and unconstrained households, and therefore is at risk of deadweight losses. While the first model is clearly regressive, the second risks being ineffective in enlarging equality of opportunities.

The difference in the two systems is also evident when we consider the early decline in the coverage rate in these regions compared to the rest. In Figure 1, we have considered a standard household with two working parents and one dependent child and have computed the voucher paid according to different levels of tuition (from 0.25 thousand to 3 thousand €) and different family income (from 0 to 150 thousands €). As it can be seen from the graphs, the Veneto scheme turns out to be the most generous for modest level of tuition, while the Friuli scheme has the lead for higher tuition expenditure. The Lombardy scheme has the highest ceiling, and therefore reimburses also the tuition paid by rich households.

The recent national law follows the former approach and even neglects the conditionality on family income. Vouchers under this approach do not seem to be carefully designed to increase the choice set available to households, since they cover at best only half of the tuition expenditure. They do not provide incentives to poor households to use

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[6] The ceiling in most cases is so high to include as eligible the majority of households. Lombardy and Veneto are two good examples of this system, as they impose a ceiling of approximately 40000€ per family member, which is far above the gross median labour income for year 2000, equal to 28.000€ according to the Bank of Italy Household Survey.
[7] "Those who get the most out of the education system are the bright children of sufficiently well-off parents…Because of these features, the optimal education policies operates in a direction opposite to a redistributive policy: brighter children are subsidised by the taxpayer and by the average children" (DeFraja 2002, p.458).

the system of private education, nor solicit greater effort from the students. Last but not least, all voucher schemes are not conditional upon the quality of the school attended, whatever measure of quality may be adopted. Overall, these features suggest the hypothesis that vouchers Italian style are mainly a disguised transfer to private schools.

Table 6 – School support schemes in national and regional legislation – Italy - 2004

Region	Law	Private/public	school order	admissible expenditures	amount of the public subsidy	conditional on income	applicants/ expenditure	Notes
All regions	National Law 62/2000	state and certified private (paritaria)	primary, lower secondary, upper secondary	transports, meals and textbooks	decided by each region[8]	family income (ISEE)[9] threshold of 21691€		can be cumulated with regional subsidies
All regions	art.2 of National Financial Law 289/2002	only certified private (paritaria)	primary, lower secondary, upper secondary	tuition	150-200€, depending on the total number of applicants [10]	absent		can be cumulated with regional subsidies
Piedmont	Regional Law 10/2003	state and certified private (paritaria)	primary, lower secondary, upper secondary	tuition	between 75% and 50% of the expenditure, with a cap related to the school level (1125-750€ for primary, 1650-1100€ for lower secondary and 1875-1250 for upper secondary) and family income	75% of expenditure for personal income (ISEE) below 7.600€, declining to 50% for personal incomes between 20000€ and 30400€ (which is the maximum threshold). Children accounted for using the ISEE equivalence scale	16.612 applications for 2003-4 13.491 found successful 18.000.000€ allocated	the subsidy is not paid whenever the tuition expenditure does not exceeds the 2% of personal income

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[8] For example Lombardy reimburses up to 30% of expenditures, with a cap of 516€, 775€ and 1033€ for students attending primary, lower secondary and upper secondary school respectively; there is also a minimum threshold of 51€. The family income ceiling is 14.695€ in Lombardy, 17.721€ in Tuscany and only 10.632€ in Puglia.

[9] ISEE (Indice della Situazione Economica Equivalente) is the equivalised index of the economic situation. It is a measure of the economic possibility of a family member, and is obtained by summing labour incomes, theoretical incomes from properties and fixed incomes from financial assets, minus rents and capital depreciation; the result is then normalised according to an equivalence scale.

[10] The financial law for 2003 set a maximum expenditure at national level equal to 30 millions of euros. The total number of potential applicants is unknown, but considering half of the enrolment in all private schools (comprising both certified and not certified schools), we obtain an estimate of 137.580 students, which entails an average bonus of 218€ The application period spans over three years (2003, 2004 and 2005).

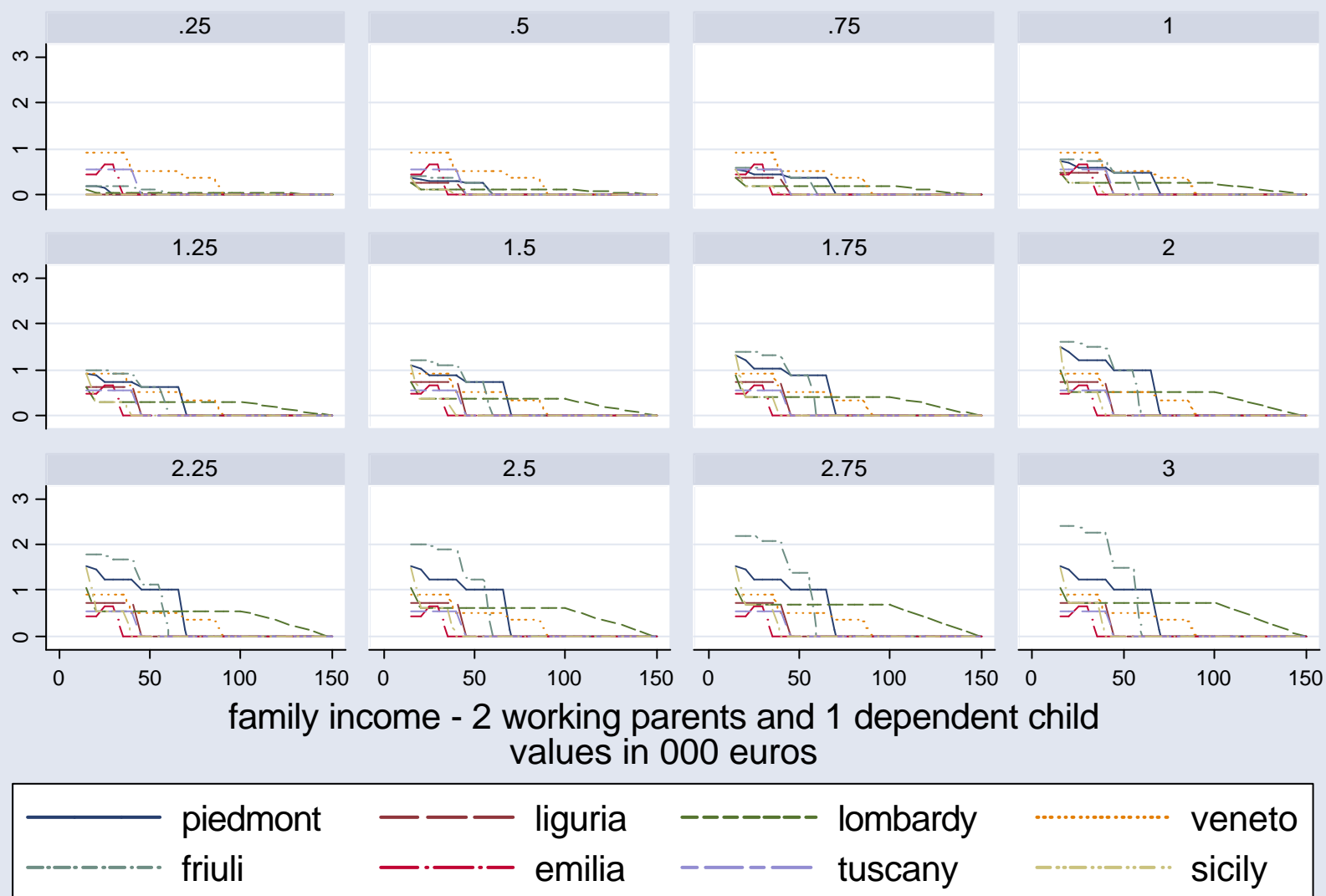| Region	Law	Private/public	school order	admissible expenditures	amount of the public subsidy	conditional on income	applicants/ expenditure	Notes
Liguria	Regional Law 14/2002	state and private (independently on being certified)		tuition	50% of expenditure (75% for handicapped child) with a minimum of 500€ minimum paid in 2003-4 is 250€ and maximum is 750€	family income (IRPEF) [11] threshold of 40.000€ (it is raised by 10.000€ per dependent child in excess over the first one)	774.685€ allocated in 2003-4	
Lombardy	Regional Law 1/2000 - D.C.R.VII/390 20/12/2001 - D.G.R.16256 6/2/2004	state and certified private (paritaria)	primary, lower secondary, upper secondary	tuition and contribution for curricular activities	from 52€ to 1050€	50% of expenditure for family income (IRPEF) per capita less than 8.348€; 25% of expenditure for family per capita income less than 30987€	In 2000-1 55.040 applicants 49.935 successful 30.740.742€ spent In 2001-2 51.131 applicants 48.489 successful 36.417.506€ spent In 2002-3 51.200 applicants 48.300 successful 37.024.750€ spent	the subsidy is not paid whenever it is less than 208€
Veneto	Regional Law 1/2001	state and certified private (paritaria)	primary, lower secondary, upper secondary	tuition special support for handicapped children	600/900/1300 (prim./low.sec./ up.sec.) for personal incomes below 17.000€; 260/520/770 for incomes between 17.000 and 30.000€; 210/360/520 for incomes between 30.000 and 40.000€.	personal income (ISEE) below 40.000€	In 2000-1 15.382 applicants	the subsidy is not paid whenever the expenditure is less than 200€

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[11] IRPEF indicates the gross income declared for fiscal purposes.

Region	Law	Private/public	school order	admissible expenditures	amount of the public subsidy	conditional on income	applicants/ expenditure	Notes
Friuli Venezia Giulia	Regional Law 14/1991	only private (independently on being certified)	primary, lower secondary, upper secondary	tuition	minimum paid in 2001-2 is 607€ and maximum is 2082€	80% of expenditure for family income (IRPEF) below 26.000€, declining to 50% for incomes between 39000€ and 53800€ (which is the maximum threshold – it can be raised by 2588€ per dependent child)	3.000.000€ allocated in 2001-2	
Emilia Romagna	Regional Law 26/2001	state and private (independently on being certified)	primary, lower secondary, upper secondary		125€ for primary 250€ for low.sec. 1000 for up.sec. Up.sec. subsidy is also conditional on an average mark above seven.	personal income (ISEE) threshold of 10.632€ for primary and secondary. For up.sec. declines with personal income, with a ceiling of 21.265€ equivalised income per member of the family	39.980 in 2002-3 for a total of 16.616.750€	for primary and low.secondary school national funds from l.62/2000
Tuscany	Regional Law 32/2002	state and private (independently on being certified)	upper secondary school		550€ for the initial two years conditional on being promoted previous year	personal income (ISEE) below 17.721€	1.055.000€ allocated in	these scholarships are paid under regional funds. Additional scholarships are present under national funds from law 62/2000.

Region	Law	Private/public	school order	admissible expenditures	amount of the public subsidy	conditional on income	applicants/ expenditure	Notes
Puglia	Regional Law 24/2000 (repeated with regional law 5/2004)				not applied for lack of funds			
Sicily	art.3 Regional Law 14/2002	state and certified private (paritaria)	kindergarten, primary, lower secondary, upper secondary	tuition and curricular activities	75% of expenditure if pers. income < 2/5 of maximum income; 50% of expenditure if 2/5<pers.income<1/2 of maximum income; 25% of expenditure if pers.income>1/2 of maximum income.	personal incomes (IRPEF) below a maximum income (given by 15.000€ per student child + 10.000€ per additional family member)	In 2003-4 90.000 applicants 1.189 successful[12] 17.000€ allocated	the subsidy is not paid whenever the expenditure is less than 260€

[12] Applications from the provinces of Palermo, Messina and Catania are still to be checked.

Figure 1 – Simulations of regional systems of school vouchers

family income - 2 working parents and 1 dependent child
values in 000 euros

Legend: piedmont, liguria, lombardy, veneto, friuli, emilia, tuscany, sicily

Graphs by expenditure

4.2 Vouchers in Lombardy

Lombardy is the richest and most populous Italian region, and the first to introduce regional legislation on school vouchers. *School vouchers* in Lombardy are subsidies to the tuition fee paid by households with pupils attending private schools in primary and secondary education. The voucher covers 25% of the total cost of private school tuition, with a cap currently running at € 1300 per pupil.[13] The subsidy is not given to the school, but directly to parents,[14] and is funded with regional and national resources. The dedicated fund has two sources: the biggest chunk is provided by the national government to several regions as a discretionary fund for regional projects, and the smallest part comes from regional taxes. The regional law[15] introduced a minimum threshold of reimbursable expenditure (corresponding to € 206 - 400.000 liras) and allowed a maximum reimbursement corresponding to 25% of the expenditure per child.[16] As a consequence, students attending public schools were almost completely excluded from the voucher. Only families who were resident in Lombardy and with per capita net annual income less than € 30.971 (60.000.000 liras) were entitled to obtain the voucher.

4.3 Private education in Italy and Lombardy

Vouchers in Italy apply mainly, if not exclusively, to students enrolled in private schools. The percentage of students enrolled in these schools is low by international standards. According to James [1984], the percentage of young Italian pupils enrolled in primary and secondary private schools in the early 1980s was equal to 8 and 7 percent respectively, much below the average 18 and 21.4 percent of advanced industrial societies. More recent data for Italy and Lombardy are presented in Table 7 below: in the school year 2001-2002, out of the approximately 6.6 million primary and secondary students in Italy, 395 thousands attended private schools. The percentage of students enrolled in private schools was significantly higher in Lombardy (9.4 percent) than in Italy (5.9 percent).

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[13] The cap was originally set to € 1032 (2.000.000 liras) and € 1291 (2.500.000 liras) for school year 2000/2001 and 2001/2002 respectively. An addition of € 516 (1.000.000 liras) is allowed in case of handicapped children. For the second year the reimbursement rate was set to 50% for families with incomes below 16.000.000 liras.

[14] The requirements to determine financial eligibility for the *voucher* as of the 2003-04 school year have been modified, introducing the possibility of a maximum of 50% reimbursement for poor families.

[15] The initial proposal was approved as "comma 121 of the article 4 of the regional law n.1 issued on 5/1/2000".

[16] For the initial year (2000-2001), the list of reimbursable costs was wider, including tuition and optional activities; transport, meals and books were excluded. For the subsequent years, only tuition and specific expenditure for handicapped children were admitted.

Private schools can be divided in two groups, *certified schools (scuole paritarie)*, that are legally recognized by the central government, and *uncertified schools (scuole non paritarie)*, which do not have such recognition. Recognition requires that schools receive approval of the curriculum by the Ministry and allow free admission of (solvent) applicants. In Italy during 2001-2002 there were 1106 primary schools, 593 lower secondary and 1094 upper secondary schools with legal recognition as private schools. Only students who attended certified schools could receive the voucher. This explains why we observe an expansion of the share of certified private schools in the total number of private schools, which remains almost constant over the three-year period 2000-2003 (see Table 8).

Table 7 – School enrolment according to management type – school year 2001-2002

	Students in Italy		Students in Lombardy	
	Public schools	Private schools	Public schools	Private schools
primary	2.534.191	184.253 (6.78%)	364.771	31.602 (7.97%)
lower secondary	1.704.479	61.040 (3.46%)	225.284	20.188 (8.22%)
Upper secondary	2.421.303	149.343 (5,81%)	313.009	33.790 (9.74%)
Total	*6.659.973*	*394.636 (5.92%)*	*903.064*	*85.580 (9.40%)*

Source: MIUR 2003, Scuola non statale: indagine conoscitiva a.s. 2001/02 – private schools include students enrolled in both *scuole paritarie* and *scuole non paritarie*.

Table 8 – Private schools, certified and not certified – Italy and Lombardy

	2000-2001		2001-2002		2002-2003	
	private	private and certified (*paritarie*)	private	private and certified (*paritarie*)	private	private and certified (*paritarie*)
LOMBARDY						
primary	232	150	244	206	245	223
lower secondary	172	130	173	163	171	167
upper secondary	325	195	329	255	320	284
ITALY						
primary	1670	624	1664	1106	1671	1287
lower secondary	697	405	687	593	680	641
upper secondary	1623	705	1571	1094	1569	1307

Source: MIUR 2004, Relazione al Parlamento sullo stato di attuazione della legge 10/3/2000 n.62 (protocollo 31/3/2004)

4.4 The Data

We obtained from the Lombardy Regional Authority the administrative data on school voucher applicants for two subsequent years: the initial school year 2000-2001, when the voucher programme was introduced, and the subsequent year 2001-2002. Data on voucher applicants contain information on family income, number of family components, name, address, type and class of the school attended, expenditure for school attended and (possibly) the amount of the voucher obtained. In the Appendix we report a detailed description of the main features of this dataset.

We infer the tuition charged by private schools from the expenditure born by households who apply for a voucher. The precision of the inference clearly depends on the percentage of applicants in each school. The descriptive statistics in Table 9 indicate that tuition rises with school level, and that confessional schools charge lower fees than other schools. Within upper secondary schools, general institutes – such as the lyceum - charge higher fees than technical institutes.

Table 9 – Voucher applicants and school tuition – full sample of private schools – school years 2000-01 and 2001-02

Sample of private schools	Applicants 2000-01	Applicants 2001-02	Family income 2000	Family income 2001	Fee 2000	Fee 2001	Δ fee (mean %)
All private schools							
primary	14727	19227	87425	89715	2795	3066	9.70
lower secondary	9236	13372	88125	89962	4308	4568	6.04
upper secondary	14713	18573	84995	88766	5581	5935	6.35
Total (excluding unclassified schools)	38676	51172	260545	268443	12684	13569	6.98%
private secondary schools							
confessional high schools	2254	5270	99950	100372	5586	5841	4.57
non religious high schools	2495	3619	97820	98347	5659	6682	18.08
confessional technical schools	4886	5606	83851	82034	5245	5171	-1.39
non religious technical schools	5078	4078	73144	74498	5863	6443	9.88
Total	*14713*	*18573*	*84995*	*88766*	*5581*	*5935*	*6.35*

Note: negative family incomes (31 in 2000 and 85 in 2001) have been set equal to missing. Source: our elaboration on administrative data – Regione Lombardia. Income and fees in thousand liras

Aware of the potential distortion in the data – see the Appendix – we compute the percentage change in average tuition from the first to the second available year: on average tuition went up by 6.98% in all schools and by 6.35% in upper secondary schools – 4.28 and 3.65 percent in real terms respectively – and the increase was highest among non confessional secondary schools (+18.1 percent).

These changes over time do not take into account the voucher. Almost all applicants were successful and on average each applicant household received from the regional government 1067 thousand liras (551 euros) in 2000-2001 and 1225 thousand liras (633 euros) in 2001-2002. If we consider net rather than gross tuition, the former increased over the two years less than the inflation rate, and the relative net price of private schooling declined on average in real terms by close to one percentage point. In upper secondary schools, however, the real net fee increased on average by 1.55%, a combination of the 0.17% increase in confessional schools and the 14.49% increase in non religious schools. In the last three columns of Table 10 we have also computed the share of private school tuition on household income and its variation over the two years.

We notice a tiny decline in the incidence of schooling expenditure on the income of households sending their children to private institutions in Lombardy. The caveat here is

that we are not observing the entire population of students attending private schools, but only the sub-sample of households who applied for a voucher. Ideally, we would have liked to have data on the entire population enrolled in private schools, in order to analyze the flows in and out of the private sector. In addition, the restriction of vouchers to a sub-set of the relevant population and the random allocation of treatment would have allowed us to implement a serious policy evaluation, based on the comparison of the control group and the treatment group.[17]

Table 10 – Voucher recipients and school tuition fees – full sample of private schools – school years 2000-01 and 2001-02.

Sample of private schools	Successful applicants 2000-01	Successful applicants 2001-02	Fee 2000 net of voucher	Fee 2001 net of voucher	Δ real net fee (%)	Incidence on family income of net fee 2000 (%)	Incidence on family income of net fee 2000 (%)	Δ incidence on family income (%)
All private schools								
primary	14698	19214	2100	2193	1.75	3.60	3.59	-0.01
lower secondary	9226	13371	3233	3291	-0.89	5.48	5.36	-0.12
upper secondary	14683	18567	4207	4385	1.55	7.40	7.20	-0.20
Total (excluding unclassified)	38607	51152	3172	3275	0.57	16.48	16.15	-0.02
Private secondary schools								
confessional high schools	2252	5270	4196	4316	0.17	6.32	6.30	-0.02
non religious high schools	2494	3619	4267	5000	14.49	6.15	7.65	1.50
Confessional tech. schools	4876	5606	3947	3767	-7.26	6.99	6.39	-0.60
non religious tech. schools	5061	4072	4432	4781	5.17	8.91	9.10	0.19
Total	*14683*	*18567*	*4207*	*4385*	*1.55*	*7.40*	*7.20*	*-0.20*

Note: negative family incomes (31 cases in 2000 and 85 cases in 2001) have been set equal to missing. When the fee net of voucher exceeds family income (498 cases in 2000 and 240 cases in 2001), incidence values have been set to missing. The consumer price index inflation was 2.7% between 2002 and 2001. Source: our elaboration on administrative data – Regione Lombardia

Alternatively, we would have been content with a longitudinal sample of Lombard students, containing information on family background (income and education – the latter information is completely missing in our dataset), student performance (once again missing), type of school attended and voucher application. In this case, we could have analyzed the determinants of private school choice - as we have done in Section 2 - before and after the introduction of the voucher, and see whether the policy has affected household choices.

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[17] In the pioneer experience of school vouchers in Milwaukee (Wisconsin) in 1990, vouchers were targeted to low-income families, were only redeemable in private non-sectarian schools and were limited to 1% of the student population. Thanks to an exceeding number of applications, the participants in the program were randomly selected, and the non-selected applicants represented an appropriate control group. With reference to the Milwaukee experience, Rouse writes: "In order to estimate the true effect of choice schools, one must control for family background (such as family income and parental education) and student ability. The goal is to control for all individual characteristics that are correlated with attending the choice school and explain higher test scores such that the only difference between the two groups of students is whether or not they have enrolled in a choice school. In general, the more similar the two groups of students are to begin with, the more credible the evaluation of the program." (Rouse 1998, p.5).

We try to get as close as possible to this approach by merging these data with the data on private schools provided by the Italian Ministry of Education, which include information on school resources – such as the pupil-teacher ratio, the success rate of enrolled students and some teachers' characteristics). We can use the merged data to study two questions: first, by comparing enrolled students and voucher applicants, we can ask why do we observe different percentages of applicants across schools. Second, we can investigate whether there is any correlation between change in enrolment, change in fees and changes in resources. Table 11 reports descriptive evidence on the first question and shows that in the initial year 2000-01 after the introduction of the voucher only 38.8% of the students enrolled in private schools applied to the scheme. The percentage of applicants increased significantly to 60.9% in the following year. This marked increase is partially the consequence of the better classification of applications – recall that approximately one third of the applications in the first year lack the relevant information to assign individual information to a specific school. Since entitlement depends on household income, the percentage of applicants could also reflect the distribution of income in private schools. The large variation observed in the application rate within each year, however, makes it unlikely that this is the full story. We believe that the application rate could also reflect a learning process, and that learning could be affected by economic variables, such as the relative cost of private education, or the type of private schools. Learning, for instance, could be faster when fees are higher relative to household income. Moreover, some private schools could provide better services to customers, including information and consulting on the newly introduced voucher.

Table 11 – Enrolment and voucher applicants in the private schools in Lombardy

Sub-sample of private schools with information on school resources in both years and more than five applicants	Number of school with more than five applicants	Students enrolled		Percentage of voucher applicants (student weighed mean)		Tuition (student weighed mean)	
		2000-2001	2001-2002	2000-2001	2001-2002	2000-2001	2001-2002
private schools							
primary	1	215	272	51%	89%	2600	3012
lower secondary	153	18049	18500	47%	69%	4477	4660
upper secondary	214	24490	24052	33%	56%	5866	6078
Total	*368*	*42754*	*42824*	*39%*	*62%*	*5263*	*5446*
private secondary schools							
confessional general school	56	8229	8416	22%	52%	5862	6064
non religious general school	48	5428	5193	35%	52%	6833	7079
confessional techn.school	52	5418	5308	37%	67%	5133	5324
non religious techn.school	58	5415	5135	44%	55%	5634	5866
Total	*214*	*24490*	*24052*	*33%*	*56%*	*5866*	*6078*

Source: our elaboration on administrative data – Regione Lombardia and Ministry of Education

We use the administrative data for the school year 2001-2002 to estimate the

relationship between the percentage of voucher applicants on enrolled students in each upper secondary school and empirical measures of school quality and household income. To avoid having a bounded dependent variable, we use a logistic transformation of the percentage of applicants. As shown in Table 12, the results suggest that the percentage of voucher applicants in each school is positively correlated with the school average promotion rate, the percentage of experienced teachers in the school and the confessional school dummy, and negatively correlated with the lyceum dummy, the size of the school and the pupil–teacher ratio. There is no significant correlation between application for vouchers and lagged household income. If we interpret a higher promotion rate, a higher share of experienced teachers and a lower pupil–teacher ratio as indicators of better school quality, these results point to a positive correlation between measured school quality and the application rate. We explain this correlation with the fact that schools of better quality provide better services to students, including information and consulting on vouchers.

Table 12 - Estimates of voucher application. Dependent variable: logistic transformation of the percentage of pupils applying for vouchers. Secondary schools. 2001-02

Explanatory variables	Coefficients
Lagged household income	-0.034
	(0.07)
Confessional school	0.375*
	(1.78)
Lyceum	-1.709***
	(3.67)
Pupil teacher ratio	-0.018**
	(2.25)
Pass rate	1.764***
	(2.75)
Size	-0.352**
	(2.01)
Percentage of teachers with at least three years of experience	0.467
	(1.31)
Province	Yes
Type of school	Yes
Integrated school	Yes
N.obs	208
R²	0.281

Note: one, two and three stars for statistical significance at the 10, 5 and 1 percent level of confidence; t-values within parentheses.

When we consider the variations over time of prices and quantities in the market for upper secondary private education (see Table 13), we notice that the gross real tuition fee has increased, the real net tuition fee has declined and the number of enrolled pupils has

also declined over the two available years. In a traditional demand-supply framework, this outcome requires a negative supply shift. We discuss demand and supply in next Section.

Table 13 – Change in enrolment and tuition and demand/supply shifters - private schools in Lombardy (weighed mean %)

Sub-sample of private schools with information on school resources in both years and more than five applicants	Δstudent enrolment	Δ real tuition	Δreal tuition net of voucher	Δreal family income	Δcertified teachers
private secondary schools					
confessional high school	2.27	0.58	-0.18	-2.15	0.29
non religious high school	-4.33	1.58	0.77	-5.33	0.02
confessional techn.school	-2.03	1.61	-1.53	2.54	-0.02
non religious techn.school	-5.17	2.33	-0.18	4.04	0.33
Total	*-1.79*	*1.41*	*-0.48*	-0.45	*0.17*

Source: our elaboration on administrative data – Regione Lombardia and Ministry of Education

5. Do vouchers affect tuition and enrolment rates?

The common view on vouchers is that they affect individual school choice by removing the liquidity constraints that restrict it to cheap and often low quality (public) schools. If vouchers trigger a reallocation of students from public to private schools, we expect enrolment in the latter type of schools to increase over time. The size of this effect depends both on the price elasticity of household demand for private schools and on the response of tuition fees to the introduction of vouchers. In the extreme case where private schools rise tuition fees to appropriate the entire subsidy, liquidity constraints are unaffected and consequently enrolment does not change. In the more general case, the subsidy is distributed between producers and consumers, as illustrated by Figure 2.

Figure 2. Effect of a generic voucher on tuition and enrolment.
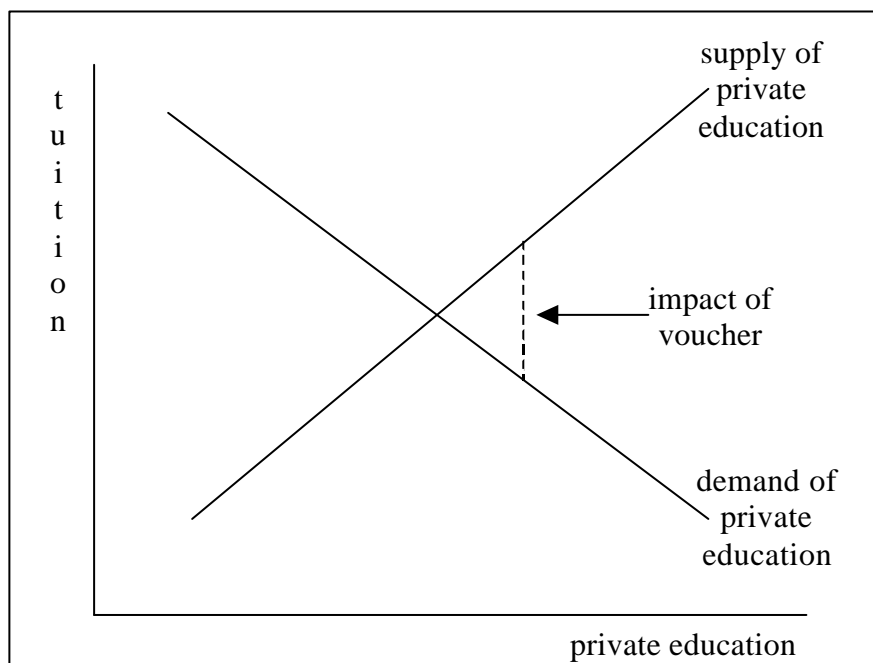
The evaluation of the treatment effect – the voucher – on the outcome of interest – enrolment in a private school – requires a counterfactual, and inference on the causal effect of vouchers should be based on the comparison for the same individual of the outcome after treatment with the outcome that would have been observed in the absence of treatment. This comparison is usually not feasible in social sciences, and the natural alternative to the counterfactual is to find a comparison group. In a randomised experiment, the treatment and control groups are randomly drawn from the population. In observational studies, however, endogenous selection into treatment can seriously bias evaluation. If we can condition the treatment and comparison groups on a set of pre-treatment characteristics such that the outcome in the absence of treatment is independent of the treatment itself, then we can estimate the average treatment effect on the treated with a "difference in difference" estimator, which compares the outcomes before and after treatment across groups (see Wooldridge, 2000).

In our specific case, a candidate comparison group could be the households who are not eligible for the voucher because of their high household income[18]. Assuming that there is no complete sorting of households to schools based on income, so that the "common support" condition does not fail, we could compare the propensity of the treated and of the control group to enrol in a private school. Unfortunately, this is not possible with our data, because we only observe voucher applicants and recipients[19]. Therefore, we cannot make any reliable statement on the causal effects of vouchers, and must limit ourselves in this Section to arguments that are suggestive at best.

We start by remarking that the adjustment of prices and quantities to the voucher can be time consuming. Households who are eligible for vouchers may take time both to learn about the voucher, as discussed above, and to change the school choice of their offspring. Moreover, changes can be difficult after enrolment in the initial grades[20]. This is particularly so when legislation is enacted after the scholastic year has started, as for vouchers in Lombardy. In this case it is reasonable to expect that little action occurs during the first year, and that any eventual change in tuition and enrolment takes place from the second year onwards.

With this maintained assumption in mind, we compute the average change of tuition and enrolment in the private schools of Lombardy between 2000-01 and 2001-02. We focus on upper secondary schools, because of data quality. Moreover, since we do not

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[18] This is correct only if households do not adjust their income to become eligible.
[19] An alternative control group could be that of households residing in neighbouring areas where the voucher does not apply.
[20] Pomini and Rangone, 2004, evaluate the Italian voucher system by using an approach based on transaction costs.

have data on average tuition by school, we proxy this information with the average tuition paid by voucher applicants in the school of reference.

We find that in our cross – section of schools real tuition and enrolment have respectively increased and decreased in the two-years period by 1.41 and 1.79 percent (see Table 13). These changes are relatively small and are consistent with an upward shift of the supply curve and a downward shift of the demand curve in Figure 2, as depicted in Figure 3.

Figure 3. The impact of the voucher on tuition and enrolment.
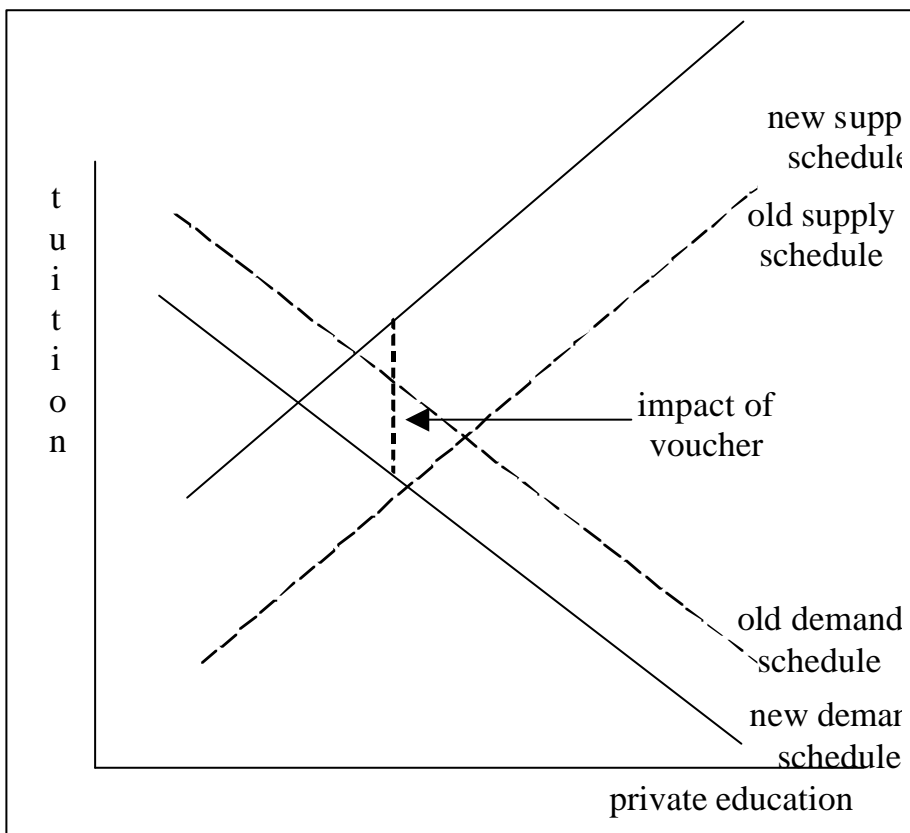
On the one hand, the negative supply shift could be induced by higher costs of supplying private education or by a higher mark - up on marginal costs induced by the voucher. On the other hand, the negative demand shift could be attributed to negative demographic effects associated to population ageing. Figure 4 shows the change in average tuition and enrolment in four groups of schools, with each group identified by the religious affiliation and the type of education (general versus technical). There seems to be some indication that the relationship between tuition and enrolment is negative in general schools and positive in technical institutions.

Figure 4. Changes of enrolment and net tuition. By type of school
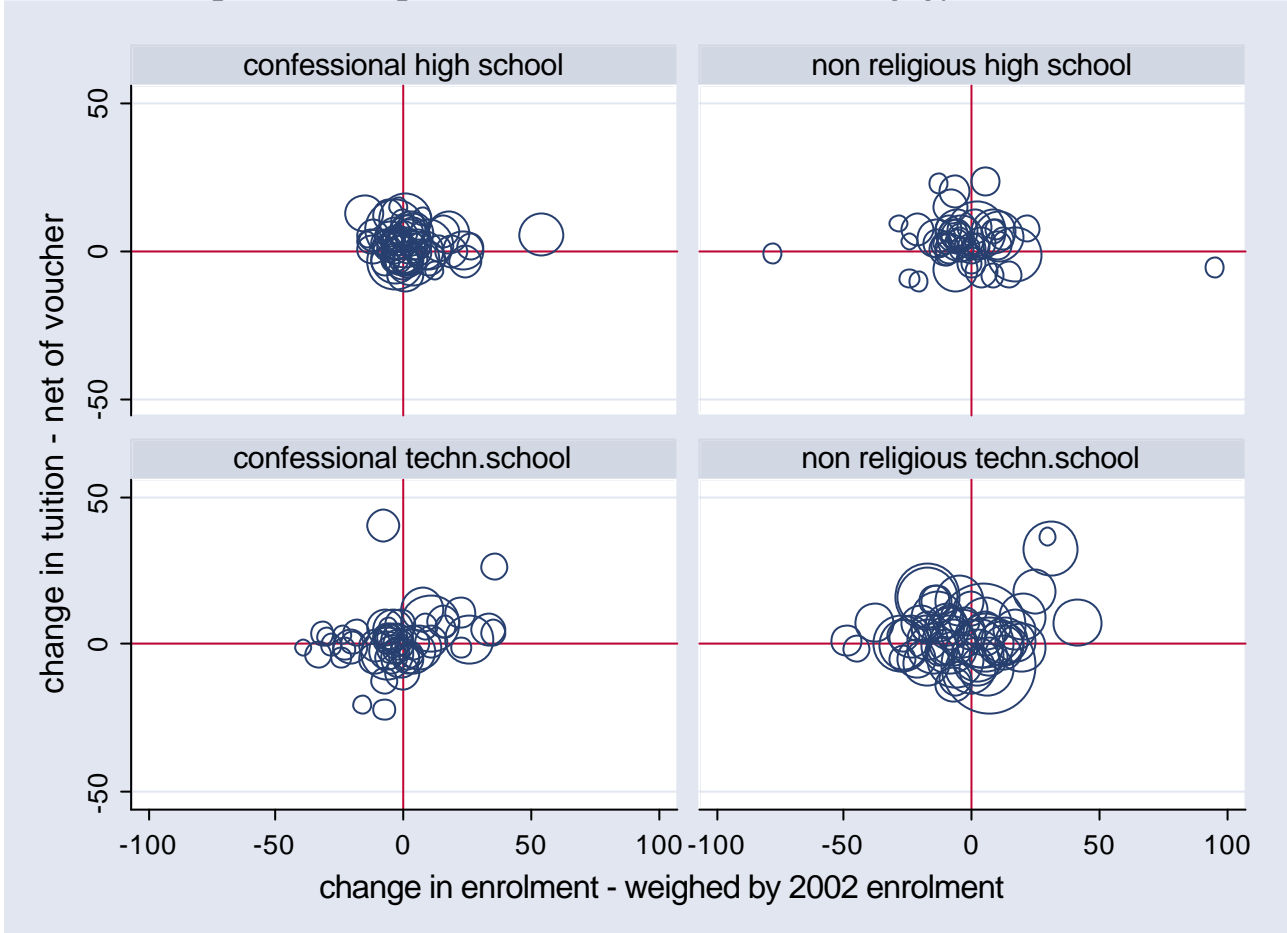
We try to extract from our school – level data some suggestive information on the response of the demand for and the supply of private education to the introduction of vouchers by specifying and estimating a standard demand and supply model. In this model, the demand for private education in school i depends on the net average tuition fee, on the average household income of enrolled students and on quality considerations, and the supply of school i depends on the average gross tuition fee, on quality and other resources necessary to provide education services to the customers. In symbols

$$\begin{cases} F_i^{d} = F_i^{s} - v_i \\ N_i^{d} = \alpha - \beta F_i^{d} + \gamma Y_i + \delta Q_i + \rho R_i \\ N_i^{s} = \sigma + \eta F_i^{s} + \theta Q_i + \varphi R_i + \tau T_i \end{cases} \tag{1}$$

where F is (log) tuition, N is the (log) number of students enrolled in private schools, Y is (log) family income of enrolled pupils, Q is the percentage of certified teachers, our selected measure of school quality, R is an indicator of the religious orientation of the

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school (confessional or not), T is the number of teachers in the school, a proxy of school size, v is the average voucher and i is the index for schools. Given the logarithmic notation, $v = \ln\left(\dfrac{1}{1-t}\right)$, where t is the subsidy rate (0.25 in our case).[21] Since we have no measure of average tuition and household income at the school level, we proxy these two variables with the average tuition and household income of voucher applicants by school.

With endogenous prices and quantities, identification requires that at least one exogenous variable should be excluded from each equation. Our strategy is based on the following two assumptions:

i) the supply of places in private schools does not depend on the average household income of enrolled students. While private schools may prefer to attract pupils from high-income households, or, alternatively, pupils from wealthier households may self-sort into private schools,[22] it is not clear why schools, which cater to higher income households, should have a higher number of pupils than other private schools;

ii) the log number of teachers – a proxy of school size - affects supply but has no effect on demand, once we have controlled for school quality and household income. Demand clearly depends on perceived school quality, but should not be affected by the size of the school, captured by the number of teachers.

The estimate of model (1) can provide valuable information on the price elasticities of demand and supply, which can be used to evaluate the impact of school vouchers on the number of students enrolled in private schools and on tuition fees. To illustrate, if the parameter β is close to zero and the elasticity is very low, the demand for private education is expected to remain constant when the net fee declines. In this case, we cannot expect the voucher to increase competition among schools, and the policy ends up as a redistribution device in favour of relatively well-off households. If on the other hand the estimated parameter β is positive and high, the demand for private education responds to tuition, and a voucher can increase the share of private schools in education, and possibly foster competition between private and public schools. By the same token, the more elastic the demand relative to supply, the higher the share of the subsidy appropriated by private schools.

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[21] Model (1) explains how demand and supply by established schools vary with tuition fees and the voucher, but is silent on the establishment of new private schools.

[22] There is weak evidence that some schools charge differentiated fees according to the ability to pay of families. By regressing the tuition onto family income (and a year control) in each upper secondary school, and then taking the average estimated coefficient across schools, yields a median estimate of 0.005. However, out of 293 estimates, only 33 are statistically significant (t-statistics above two), and 7 out of them are negative coefficients. In any case, one should not forget that we are observing a truncated distribution of family incomes.

We estimate separately the demand for and the supply of upper secondary private education on the data for the school year 2001-2002, and present the results in Tables 14 and 15. The demand price should be average tuition net of the voucher, and we use this price as our dependent variable in the first two columns of Table 14. Nevertheless, since not all households take advantage of the voucher, in the third and fourth columns we also report the estimates based on gross fees.

Table 14 - Estimates of the demand for private education – Upper secondary schools – 2001-02 – robust standard errors

dependent variable	Log pupils	Log pupils	Log pupils	Log pupils
Net fee (log of)	-0.464***	-0.105***		
	(3.03)	(-2.54)		
Gross fee (log of)			-0.501***	-0.114***
			(3.33)	(2.66)
Family income (log of)	0.977***	0.155*	0.956***	0.151*
	(3.82)	(1.65)	(3.79)	(1.63)
Proportion of certified teachers	0.428**	-0.053	0.427	0.055
	(2.27)	(0.66)	(2.27)	(0.66)
Confessional school	0.116	0.046	0.118	0.046
	(1.43)	(1.49)	(1.47)	(1.50)
Pupils(-1) (log of)	--	0.958***	--	0.957***
		(30.04)		(30.04)
Constant	Yes	Yes	Yes	Yes
Type of school	Yes	Yes	Yes	Yes
Type of recognition	Yes	Yes	Yes	Yes
Province	Yes	Yes	Yes	Yes
Property of schools	Yes	Yes	Yes	Yes
Observations	203	203	203	205
Hansen J	0.37 [0.54]	6.95 [0.01]	0.29 [0.58]	7.27 [0.01]
R²	0.33	0.91	0.33	0.91

Note: Instruments: tuition of the previous year, proportion of certified teachers of previous year and provincial dummies. One, two and three stars for statistical significance at the 10, 5 and 1 percent level of confidence; t-values within parentheses

Because the fee is endogenous, we instrument it with the lagged fee and the proportion of certified teachers in the previous year. The regression also includes dummies for the type of secondary school, the type of recognition by the central government and the province of school location. For both specifications - with net and gross fees - we propose a static version, which excludes the lagged value of the dependent variable (first and third columns) and a dynamic version, which includes the lagged dependent variable (second and fourth columns). When significant, the estimated coefficients always attract the correct sign. We find that the static demand for private education depends negatively on the price and positively on average household income, on the religious orientation of the school and on the proportion of certified teachers. On the other hand, the dynamic model suggests that the adjustment of demand to prices and quality variables is very sluggish, as the coefficient of the lagged dependent variable is not statistically different

from one. In this case, the necessary condition for the long-run equilibrium to exist, $b < 1$, is violated. Therefore, we use the estimates of the static demand model for the comparative statics.

We also estimate static and a dynamic version of the supply equation, and instrument the gross fee with average household income, after including the same set of dummies used in the demand function. The estimates in Table 15 suggest that supply depends positively on the gross fee, on the log number of teachers and on the confessional status. There is no statistically significant relationship between supply and the percentage of certified teachers. Moreover, as in the case of demand, the estimated coefficient of the lagged dependent variable is very high and not statistically different from one. Confessional schools offer more admissions - possibly because they face lower marginal costs - and the number of teachers positively affects the supply of private education, as in any standard education production function.

Table 15 - Estimates of the supply of private education – Upper secondary schools – 2001-02 – robust standard errors

dependent variable	Log pupils	Log pupils
Gross fee (log of)	2.164***	0.321*
	(2.80)	(1.69)
Proportion of certified teachers	0.371	-0.113
	(1.40)	(1.28)
Confessional school	0.487***	0.120***
	(3.01)	(2.60)
Teachers (log of)	0.464***	0.105***
	(3.78)	(2.97)
Pupils(-1) (log of)	--	0.954***
		(20.84)
Constant	Yes	Yes
Province	Yes	Yes
Type of school	Yes	Yes
Property of school	Yes	Yes
Type of recognition	Yes	Yes
Observations	205	205
R² (centred)	-0.50	0.90

Note: Instrument: family income (log of). One, two and three stars for statistical significance at the 10, 5 and 1 percent level of confidence; t-values within parentheses

Both demand and supply price elasticities conform to theoretical expectations, with the elasticity of supply exceeding by far that of demand. Therefore, households appropriate a larger share of the voucher than private schools. By solving the system (1) with respect to the gross fee, we get

$$F_i^s = \frac{\alpha - \sigma}{\eta + \beta} + \frac{\gamma Y_i + (\delta - \theta)Q_i + (\rho - \varphi)R_i - \tau T_i}{\eta + \beta} + \frac{\beta}{\beta + \eta} v_i \qquad (2)$$

This expression can be used to compute the multiplier effects associated to the introduction of vouchers, using the estimates of the static models in Tables 14 and 15 to evaluate the parameters in (2). Our estimates imply that about 17% of the voucher in Lombardy is likely to be appropriated by private schools via higher tuition, and that the remaining 83% is going to be taken by households as lower net tuition fees.

Our results also suggest that gross tuition after the introduction of a 25% voucher should increase in the new equilibrium by about 5%[23], which is not far from the 4.1% observed nominal increase one year after the introduction of vouchers..Net tuition, on the other hand, should decrease by 23%, much more than the observed decline after one year (-3.2%). Finally, our estimates predict that enrolment in private schools should rise by 10% in the new equilibrium, in spite of the temporary decline by 1.4% experienced after one year.[24]

We conclude from these estimates that the introduction of vouchers in Lombardy should increase both tuition fees – by close to 5 percent – and enrolment in private schools – by about 10 percent, which corresponds to 2405 students for the sub-sample of private schools studied in this paper. These changes are noteworthy but will take time to materialize, especially for enrolment. While gross fees are close to their new long-run equilibrium values only one year after the introduction of vouchers, enrolment is still far from the target, and has even temporarily declined.

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[23] $\Delta F^s = \dfrac{\beta}{\beta + \eta} \cdot \Delta v = \dfrac{0.464}{0.464 + 2.164} \cdot \ln\left(\dfrac{1}{1 - 0.25}\right) = 0.17 \cdot 0.28 = 0.047$.

[24] $\Delta N^s = \dfrac{\eta\beta}{\beta + \eta} \cdot \Delta v = \dfrac{0.464 \cdot 2.164}{0.464 + 2.164} \cdot \ln\left(\dfrac{1}{1 - 0.25}\right) = 0.38 \cdot 0.28 = 0.10$.

<u>6. Concluding remarks</u>

This paper has reviewed the recent Italian experience with school vouchers. We have examined national and regional policy and used administrative data from the largest region involved, Lombardy, to describe the initial adjustment of households and schools to the introduction of vouchers. Since the data at hand cover only the first two years from implementation and do not include a control group not affected by the policy, our analysis can only be suggestive..

Our key findings can be summarized as follows:

a) we doubt that Italian private schools are on average of better quality than public schools. If anything, the evidence points to the contrary and to the fact that many private schools in this country operate as remedial schools for the less talented offspring of wealthy households;

b) there is evidence that the percentage of voucher applicants is higher the higher the average quality of private schools. We tentatively explain this with the fact that better quality schools provide better services to students, including information and consulting on vouchers;

c) enrolment in private schools responds sluggishly to changes in tuition induced by vouchers. If the current policy is permanent, we expect gross tuition to rise by 5 percent and enrolment in private schools to increase by 10 percent as a result of the introduction of vouchers;

d) there is limited impact (both in the short run and in the long run) of vouchers on gross tuition fees, and the subsidy is mainly appropriated by households. This finding does not support the view that private schools will respond to vouchers by increasing tuition in a substantial way, and does not justify the introduction of ceilings to private school fees.

If private schools are not on average more productive than public schools, in terms of the development of cognitive and affective skills, then one important efficiency argument in favour of vouchers does not apply. There might be other efficiency-enhancing effects over the long-run, but we cannot assess them with the current data. In the extreme case of no efficiency gains, vouchers Italian style could only produce redistribution of income away from the taxpayer to the wealthy households who enrol their offspring in private schools.

The fact that vouchers trigger higher tuition fees could be interpreted as a violation of Italian Constitutional Law, which forbids the public funding of private schools. In this case the funding is indirect, and works its way through the voucher, which is partly

appropriated by private schools via higher gross tuition. Notice, however, that higher prices need not imply higher profits per head, as more enrolment could increase average costs.

It is difficult with our data and results to assess precisely the welfare effects of vouchers. If the policy is revenue neutral, vouchers must be funded either by redistributing public expenditure or by additional taxes. The households who receive the voucher are not necessarily better off if they need to pay higher taxes or to give up part of the government transfers they received before the voucher. One might think that the large majority of households who do not receive the voucher, either because they are too well - off or because they enrol their children in public schools, is worse off, either because of the higher taxes or because of the lower government transfers. This ignores, however, the possibility that the performance of public schools improve as a consequence of vouchers. Finally, private schools are not necessarily better off, as discussed above, because the higher gross tuition could be used to compensate higher average costs due to increased enrolment.

It is also an open question whether the 10 percent increase in the enrolment of pupils in private schools will trigger efficiency gains in poorly performing public schools. Better performance in public schools might require adequate incentives not only for schools – by linking for instance funding to the number of enrolled students – but also for teachers. There is a broad consensus in the relevant literature that the quality and performance of teachers is the key factor for school quality (see Hanushek, 2002).

Accountability, merit pay, testing, training and selection of teachers are important key words for those who take seriously the depressing results of international surveys – such as PISA – on the average performance of Italian schools. Unfortunately, the political resistance in this country to measures that could improve the performance of public schools is at least as high as the scepticism on the role of vouchers.

It is not for us to say whether this paper will contribute to increase or to reduce such scepticism. We are aware that a proper evaluation of the causal effects of vouchers on enrolment and tuition fees does require better data and a careful research design. We view our contribution as a preliminary introduction to this important exercise.

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Appendix – Data description

We obtained from the Lombardy Regional Authority the administrative data on school voucher applicants for two subsequent years: the initial school year 2000-2001, when the voucher programme was introduced, and the subsequent year 2001-2002. From the original file with 57.704 records for 2000-2001 and 57.134 records for 2001-2002, we were able to identify 56.650 and 51.438 students enrolled in private schools respectively[25]. A minority of these students was dropped because they were not entitled to apply. As a consequence, we are left with 55.560 applicants for the first year and 51.234 for the second year. Data on voucher applicants contain information on family income, number of family components, name, address, type and class of the school attended, expenditure for school attended and (possibly) the amount of the voucher obtained.[26] The numbers in Table 7 show that our data cover approximately 2/3 of private school enrolment in Lombardy.[27]

Table A.1 – Enrolment in private schools in Lombardy – school years 2000-01 and 2001-02

	Voucher applicants in private schools – 2000-01	Voucher applicants in public schools – 2000-01	Voucher applicants who could not apply –2000-01	Voucher applicants in private schools – 2001-02	Voucher applicants in state schools – 2001-02	Voucher applicants who could not apply –2001-02	Students in private schools– 2001-02
Unclassified	16.884	12	685	62	6	1	
Primary	14.727	4	68	19.227	4	84	31.590
lower secondary	9.236	72	109	13.372	16	99	20.177
upper secondary	14.713	799	395	18.573	442	429	33.777
Total	*55.560*	*887*	*1.257*	*51.234*	*468*	*613*	*85.544*

Source: our elaboration on administrative data – Regione Lombardia

A drawback of the administrative data is that they do not contain the number of pupils in each private school, but only the number of applicants to the voucher. Because of this, we merge these data with the data on private schools provided by the Italian Ministry of Education, which include information on school resources – such as the pupil-teacher ratio, the success rate of enrolled students and some teachers' characteristics). Of the 736 private schools in Lombardy and in the archives of the Minister of Education - 246 primary, 173 lower secondary and 317 upper secondary - 39 schools did not appear in the administrative data on voucher applicants - 18 primary, 5 lower secondary and 16 upper secondary. Unfortunately, private schools are not compelled to provide the Ministry of Education with this information, and therefore there are a significant number of missing cases. Table A.2 shows the distribution of certified schools in Lombardy and in our sample (last column). There are many missing values in primary and lower secondary schools, but much better data for upper secondary schools. Therefore we will focus only on the latter type of schools in our empirical analysis.

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[25] In year 2001-2002 we had to exclude 4813 records where school information was absent and 5 records where the voucher exceeded family expenditure. All individuals reported to have obtained a positive contribution. The average family income of excluded households was 84.259.735 liras, and the average contribution 1.257.337 liras. The corresponding figures for the retained sample are 89.015.015 liras and 1.645.618 liras respectively.

[26] As it can be seen from the first line of Table A.1, the type of school attended is not always available, especially in the file for the first year. This is mainly due to the presence of integrated schools (*scuole integrate*, i.e. schools including all school levels). When we exclude integrated schools from the sample, the percentage of undefined school levels drops to 1.09% in 2000-01 and goes to zero in the following year.

[27] We have been unable to find the exact number of students enrolled in private schools in Lombardy during the academic year 2000-2001. National figures (including autonomous provinces – Val d'Aosta, Trento and Bolzano) indicate a total number of pupils of 521.626 for academic year 2000-1 and 530.542 for the following year, suggesting a rising trend in enrolment.

Table A.2 – Private schools in the Ministry of Education archives and in the administrative data. Lombardy

	Private schools in Ministry archives	Private schools in Ministry archives and in administrative data		Private schools not in Ministry archives but in administrative data		Private schools in Ministry archives reporting information on students and teachers		Private schools in Ministry archives reporting information on students and teachers in both years
		2000-2001	2001-2002	2000-2001	2001-2002	2000-2001	2001-2002	
Primary	246	216	221	8	7	2	4	2
lower secondary	173	166	168	--	--	160	161	160
upper secondary	317	277	290	24	16	248	266	243
more than one level	--	--	--	9	10	--	--	--
Total	*736*	*659*	*679*	*41*	*33*	*410*	*431*	*405*

Source: our elaboration on administrative data – Regione Lombardia and Ministry of Education

In order to investigate whether schools with non missing values in the administrative dataset represent a distorted sample of the private school population, we have compared in Table A.3 three features of schools: tuition, average household income of voucher applicants and average school size. We notice that the sub-sample of private schools reporting information on school resources – columns (7) and (8) in the table - have higher tuition fees than the sample of private schools in the administrative data – columns (1) and (2) in the table, with the difference driven by the over-representation of upper secondary schools, which charge higher fees. Similarly, we do not find significant differences in average family incomes or in school size - proxied by the number of voucher applicants - between the sample of voucher applicants and the sample drawn from the Ministry of Education.

Table A.3 – Potential sources of distortions in sample selection.

A. average tuition

	Private school sample of voucher applicants		Private schools in Ministry archives reported by voucher applicants		Private schools not in Ministry archives reported by voucher applicants		Private schools in Ministry archives reporting information on students and teachers in both years	
	2000-2001	2001-2002	2000-2001	2001-2002	2000-2001	2001-2002	2000-2001	2001-2002
primary	2733	2817	3137	3263	3146	3094	3117	2953
lower secondary	4525	4641	4490	4641	--	--	4496	4663
upper secondary	5785	6139	5916	6176	4072	4056	5926	6181
more than one level	4571	4736	--	--	3991	4108	--	--
Total	4600	4803	4646	4848	3876	3868	5347	5566

B. average family income

	Private school sample of voucher applicants		Private schools in Ministry archives reported by voucher applicants		Private schools not in Ministry archives reported by voucher applicants		Private schools in Ministry archives reporting information on students and teachers in both years	
	2000-2001	2001-2002	2000-2001	2001-2002	2000-2001	2001-2002	2000-2001	2001-2002
primary	83108	85208	87834	88755	92994	114503	97101	70566
lower secondary	93858	94551	87203	88581	--	--	87527	88584
upper secondary	77090	77168	86373	85449	74825	76484	86425	86514
more than one level	90872	91249	--	--	104690	107192	--	--
Total	86961	87604	87061	87300	85397	93854	86913	87157

C. average number of voucher applicants per school

	Private school sample of voucher applicants		Private schools in Ministry archives reported by voucher applicants		Private schools not in Ministry archives reported by voucher applicants		Private schools in Ministry archives reporting information on students and teachers in both years	
	2000-2001	2001-2002	2000-2001	2001-2002	2000-2001	2001-2002	2000-2001	2001-2002
primary	80.56	64.83	65.53	85.46	53.13	33.00	56.50	89.25
lower secondary	192.67	182.67	54.47	78.90	--	--	55.16	81.08
upper secondary	39.91	47.11	35.30	62.43	37.63	10.75	37.97	61.87
more than one level	46.48	79.62	--	--	73.10	26.20	--	--
Total	49.98	71.51	50.04	74.00	49.02	20.15	44.85	69.52

Source: our elaboration on administrative data – Regione Lombardia and Ministry of Education.