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DOES PRIVATE HIGH SCHOOL ATTENDANCE AFFECT PREFERRED UNIVERSITY TRACK CHOICE? A RESEARCH PERSPECTIVE

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Abstract:

Studies in different countries comparing the quality of education in private and public schools have used a variety of measurement methods to determine educational quality and findings have been mixed. For the unique situation of Greece, the variable of student admission to the Greek university system, depending on whether the student's secondary education was in the public or the private system, provides an apt outcome variable to measure relative educational quality. We provide estimates of the effect of private secondary schooling in Greece on students' admission to their preferred university academic department, using data from nationwide surveys conducted identically in 2000 and 2015. This repeated-measures research design allowed us to compare the same set of factors between the two administrations, thus examining for the stability or change of their contribution over time. Our final sample consisted of 4740 secondary school students. We used a weighted questionnaire to investigate the effect of private schooling on the trajectory to university. In our empirical model, a multinomial logistic regression was performed to classify subjects based on values of a set of predictor variables. Results indicate that attending a private high school offers secondary education students a significantly higher probability of stepping successfully into an academic department of higher relevance to their academic preferences and future career expectations. We also find that private high school education significantly minimizes the efforts required for a student to enter a desirable university department. Positive correlations between the attendance of private high school education and demographic attributes of both students and their families were also found. Research and policy recommendations are included.

Key words: *Private secondary education; Public secondary education; University admissions, Students, Greece*

1. Introduction

Whether private or public education is of higher quality appears to vary from country to country. Research on schools in India (Das, 2017), Chile (Anand, Mizala, and

Repetto, 2009), Qatar (Cheema, 2016), and Turkey (Dag, 2015) suggests that in those countries, the educational quality of private primary and secondary schools is higher than for public schools. However, studies in other countries have found no such difference, including research in Chile by Hsieh and Urquiola (2006) and in Italy, where Bertola, Checchi and Oppedisano (2007) found that public schools are more educationally effective than private schools. Different explanations from various authors have been offered to explain the possible advantages of attending private schooling. Some proponents of private schooling emphasize the role of school quality, while others suggest that teacher quality leads to improved educational outcomes (Card and Krueger, 1992). Private high schools rationalize their high tuition cost by typically providing several advantages over public schools: (1) optimal student-teacher ratios; (2) highest-level facilities, equipment, and materials used; (3) ability to attract and retain high-quality teachers; (4) a more engaging school environment, possibly due to administrative leadership, teacher motivation, student motivation, and peer quality; and (5) promise of higher attainment and career prospects (Berger and Winters, 2016). However, some studies have found that any advantage of quality held by private over public schools can be largely explained by differences in characteristics among students and their households (Cordero, Prior and Rodriguez, 2013; Wadhwa, 2014).

Studies comparing quality of education in private and public schools have used a variety of measurement methods, including various stakeholders' perceptions of quality, standardized student tests, and post-secondary education outcomes. For example, to compare the quality of public versus private preparatory schools, Das (2017) surveyed school headmasters in India, Härmä (2013) surveyed parents in Nigeria, and Shabbir et al. (2014) surveyed headmasters, teachers, parents, and students in Pakistan. In other studies, student scores on standardized literacy tests have been used to measure relative quality of schools in Turkey (Dag, 2015), Spain (Cordero, Prior and Rodriguez, 2013), Pakistan (Siddiqui and Gorard 2017), Peru (Balarin, 2015), and Qatar (Cheema, 2016), among others.

Research using post-secondary education outcome variables to measure relative quality include Binelli and Rubio-Codina's (2013) investigation of the differential influence of private and public schools on educational attainment and wages in low and middle income countries. The researchers found that attending a private high school does not affect school progression from high school to university nor wages after high school, while it does increase wages upon college or university completion. Coughlin and Castilla (2014) estimated the effect of private secondary schooling on the average college trajectory of a student in the United States, finding that private high school students are more likely to graduate from college and claiming that private schools achieve this by better preparing their students to start college. Berger and Winters (2016) used adult earnings of privately versus publicly educated individuals in the United States as an outcome variable to indicate relative education quality and found a significant correlation between private schools and higher earnings for women but not for men.

For the unique situation of Greece, how public versus private secondary education is related to university enrolment can be considered an appropriate outcome variable for determining the relative quality of private compared to public secondary education. This is

because successful enrolment in the Greek free university system is a preeminent ambition and goal for secondary students and their families nationwide, largely due to the fact that a university degree goes a long way toward ensuring the student a relatively comfortable and secure lifestyle after graduation.

Academic admission is the process through which secondary-education students step into universities. In Greece, a student who desires to attend a university must take part in nationwide examinations, the so-called “panhellenic examinations”, after graduation from high school (called “Lyceum” in Greece). Based on the score they achieved in the panhellenic examinations, prospective university students apply for university admission, stating in an official form their order of preference of university departments they want to enter. Admissions are determined based on the above order of preference, the score achieved by students in nationwide examinations, and the minimum base score that each university department requires for successful entrance. Examination criteria used for academic admission are the same for all students, though students differ in socioeconomic status, whether they studied in a public or private high school, and academic orientation. Duncan and Sandy (2007) reported heterogeneous results of public and private schooling on student test scores but indicated that the average gap between public and private students is primarily due to family background.

2. Data and Empirical Approach

Data were obtained from a European Union research programme¹. The questionnaire is based on a two-phase nationwide survey; the base year is 2000, and a follow-up was conducted in 2015. We used both 2000 and 2015 waves to obtain data. We exploited two independent samples, each consisting of 2370 high school students, thereby reaching a total sample of 4740 high school students. (See Summary Statistics in Table A1, Table A2 in Appendix). For each scale of the research instrument, the alpha reliability coefficient was higher than 0.80 and the inter-rater reliability coefficient ρ_2 was higher than 0.75.

We use a multinomial logistic regression model per each data wave, i.e., 2000 and 2015. Suppose $Y^* = \beta_1 x_1 + \dots + \beta_k x_k + \varepsilon$, where ε is a random error term with standard logistic distribution. We have data for n sets of observations ($i = 1, 2, \dots, n$). We assume that the dependent variable (student order of preference for a university department) is a stochastic event, given that the response variable Y is a categorical (polytomous) variable with C categories, taking on values $0, 1, \dots, C-1$. We have k explanatory variables $X_1, X_2, \dots, X_k$, referring to the factors of our initial model that predict the success of the academic admission, namely: (1) the order of preference of the academic department to which a student was successfully admitted (1st, 2nd-3rd, 4th-5th, 6th-10th, 11th and below) (2) school type (public high school, private high school) (3) gender (male, female) (4) father's educational level (Primary School, Middle School, High School, Technical School, University, Other) (5) mother's educational level (Primary School, Middle School, High School, Technical School, University, Other) (6) the total number of attempts in panhellenic exams the students made to be successfully admitted to the academic department of their

highest preference (once, twice, more than two times) (7) father's monthly income (amount in €) and (8) mother's monthly income (amount in €). Factors (7) and (8) are taken into account, since a poorer family income might limit private school attendance. The multinomial logistic regression model assumptions are not violated, because: (1) observations Y_i are found to be statistically independent of each other, and (2) observations Y_i are a random sample from a population, where Y_i has a multinomial distribution with probability parameters: $\pi_i^{(0)}, \pi_i^{(1)}, \dots, \pi_i^{(C-1)}$. As with binomial logistic regression, we have to set aside one category for a base category (hence the C-1 parameters π). The logit for each non-reference category $j=1, \dots, C-1$ against the reference category 0 depends on the values of the explanatory variables through:

$$\log\left(\frac{\pi_i^{(j)}}{\pi_i^{(0)}}\right) = \alpha^{(j)} + \beta_1^{(j)} X_{1i} + \dots + \beta_k^{(j)} X_{ki}, \quad \text{for each } j=1, \dots, C-1 \quad \text{where}$$

$\alpha^{(j)}$ and $\beta_1^{(j)}, \dots, \beta_k^{(j)}$ are unknown population parameters

$$\Pr(Y_1 = y_1, \dots, Y_k = y_k) = \begin{cases} \frac{n!}{y_1! \dots y_k!} \pi_1^{(0)} \dots \pi_k^{(C-1)} & \text{when } \sum_{j=1}^k y_j = n \\ 0 & \text{otherwise} \end{cases}.$$

We also note that $E(y_{ij}) = n\pi_j$ and $Var(y_{ij}) = n\pi_j(1 - \pi_j)$.

For example, the model for the log odds of being successfully admitted to the university department of 1st order of preference vs. 2nd-3rd order is:

$$\log\left(\frac{\pi_i^{(1)}}{\pi_i^{(0)}}\right) = \alpha^{(1)} + \beta_1^{(1)} X_{1i} + \beta_2^{(1)} X_{2i} + \beta_3^{(1)} X_{3i}. \quad \text{The same model was applied for the}$$

other orders of preference (2nd–3rd vs. 4th–5th, etc.), respectively.

The terms are included in our model according to the forward stepwise method. This method begins with the model that would be selected by the forward entry method. From there, the algorithm alternates between backward elimination on the stepwise terms in the model and forward entry on the terms left out of the model. This process continues until no terms meet the entry or removal criteria. The chi-square statistic (see Likelihood Ratio Tests in Table 2) is the difference in -2 log-likelihoods between the final model and the reduced model. The reduced model is formed by omitting an effect from the final model. The null hypothesis is that all parameters of that effect are 0.

3. Econometric Results and Discussion

A multinomial logistic regression was performed to model the relationship between the predictors and the four groups of the response variable. The traditional .05 criterion of statistical significance was employed for all tests. Addition of the predictors to a model that

contained only the intercept significantly improved the fit between model and data. Nagelkerke's R^2 values for the 2000 and 2015 models indicate that the models are good but not great. It represents the n^{th} root (in our case the 2370th of the -2log likelihood improvement. As we can see in Table 1, statistical significance is below the 0.01 level, thus, being successfully admitted to a highly preferred academic department is explained by our fitted model

Table 1: Model Fitting Information			
Model		{2000}	{2015}
Model Fitting Criteria	-2 Log Likelihood	5308,133	5497,757
Likelihood Ratio Tests	Chi-Square	161,959	549,866
	df	52	60
	Sig.	,000	,000

Table 2: Likelihood Ratio Tests						
{2000}					{2015}	
Effect	Model Fitting Criteria				Effect	Model Fitting Criteria
	-2 Log Likelihood of Reduced Model	Chi-Square	df	Sig.		-2 Log Likelihood of Reduced Model
Intercept	5320,238(a)	,000	0	.	Intercept	5497,757(a)
attempts 2000	5329,990	9,752	4	,045	attempts 2015	5504,018
dadincome 2000	5321,250	1,012	4	,908	dadincome 2015	5625,429
momincome 2000	5322,876	2,638	4	,620	momincome 2015	5499,770
gender 2000	5326,475	6,237	4	,182	gender 2015	5505,378

As shown in Table 2, in the 2000 model significant unique contributions were made by the variables for attempts, private or public secondary school type, father's education level, and mother's education level. In the 2015 model, significant unique contributions were made only by father's income and school type. Goodness of fit was explored by conducting Hosmer-Lemeshow tests for each pair of groups. In no case was this test significant. Also, school type is a good predictor of successful academic admission in both the 2000 and 2015 surveys, since the results indicate that attending a private high school significantly increases the probability of a student's entering an academic department of 1st order of preference. This effect of private schooling on the successful admission to academic departments of 1st order seems to fade out for the next categories of order of preference. A weakly significant and negative correlation was found between school type and number of attempts, since fewer attempts are required for private high school students to enter academic departments of higher order of preference. The educational level of father and mother seems to play a significant role on successful academic admission in 2000, since students whose parents are highly educated have a significantly higher likelihood of entering an academic department of higher order of preference. In the 2015 survey, father's income has a positive correlation with the order of preference. This might be due to the fact that students from families with higher incomes

may choose more highly appraised private schools, thus leading more predictably to successful academic admission.

4. Discussion and Conclusions

The purpose of this paper was to examine the effects of secondary private schooling on Greek students seeking to enter tertiary education in Greece. A review of the literature on the subject indicates that the relative quality of private compared to public secondary education varies from country to country. The literature also makes clear that a number of different measures of relative quality have been used. To determine the comparative effectiveness of private to public secondary education in the Greek case, we used a measure that is generally held to be of great importance by students and their families, successful enrollment in one of Greece's tuition-free universities, toward which Greek secondary education is aimed.

Our results are consistent with those of Psacharopoulos and Papakonstantinou (2005), who found that only one out of five candidates entered a university in 1999. Another one in five entered the short-cycle technological institutes that are in low demand. Among those who entered university in our sample, 18,9% of the university candidates succeeded in being admitted to the department of their first choice. Moreover, we found that private high schooling significantly affects successful academic admission to a student's preferred university department. When comparing the effects of a set of parameters on academic admission in 2000 and 2015, we show that while in 2000 the significant predictors of academic department of 1st preference are school type, number of attempts of a student to enter a university, and father's and mother's educational level. In 2015, the only significant contributors appear to be school type and father's income.

The findings that private school attendance predicted academic admission to a preferred university department for both the 2000 and 2015 surveys suggests that the quality of private secondary education in Greece, as measured by one indicator of students' post-secondary success, exceeds that of public secondary education. Furthermore, these findings suggest that during the 15-year period separating the two surveys, either little progress was made in raising the quality of Greek public secondary education in comparison to private secondary education, or that any quality advances in public secondary schools were matched by advances in private secondary schools. In either event, a quality gap between public and private schools appears to be a continuing issue for secondary education in Greece.

What is not shown by our results is the high cost of private education to Greek families and the resulting financial burden. Results from the 2015 survey administration showed that among Greek families that send their child to a private lyceum, those in the bottom 20% in income spend 4.842 €/year for private schooling. In addition, families who do not send their child to a private secondary school (and some who do) often spend extra money for the private educational services known as "frontistiria" that supplement both private and public secondary schools, while some families also hire private tutors. The 2015 survey showed that the average amount spent by the financially lowest 20% of Greek

families for all private education services was 4.630 €/year, which represents 48% of the average yearly income of 9.576 €/year for families in the lowest quintile.

These figures suggest that in a nation that prides itself on free university education, a great deal of money is being spent by families, including financially challenged families, to prepare their youth for university entrance examinations. Yet Greek families appear to consider these private education expenses a necessity, even while dealing with recent demanding austerity measures. This has led to the normalization of the idea of shadow education in Greek society (Kassotakis and Verdis, 2013).

Based on the evidence that Greek private secondary schools are performing at a higher level than public secondary schools, as shown by the relative success of students going on to enrol in university, there is a strong need for research to investigate the factors that have apparently led the Greek public secondary education system to a less significant status. In particular, research is needed to enable education leaders to determine improvements in public secondary school education that are likely to increase its effectiveness; and once determined, implementing those improvements should be given high priority. Such research is especially needed in light of the high cost Greek families incur to send their children to private lyceums and utilize other private educational preparation services.

In regard to policy, it is suggested that the Greek government mitigate some of the financial burden of families, especially lower-income families, incurred for preparing their children for the panhellenic exams. This mitigation could be in the form of stipends. These findings strongly suggest the value of reallocating the Greek university financial budget to redress this imbalance. More money could be spent on supporting the university aspirations of lower-income students by relieving some of the financial burden their families bear in preparing them for the university entrance examinations and supporting them at a university. This assistance can validate their yearly income and student-related expenses.

Endnotes

¹ Research programme: "Thales", Action 4: "Economic Burden of Admission to Higher Education" co-financed by the European Union (European Social Fund - ESF) and Greek national funds through the Operational Program "Education and Lifelong Learning" of the National Strategic Reference Framework (NSRF). Greek Ministry of Education, Lifelong Learning and Religious Affairs.

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Appendix
Tables A.1-A.2

Table A.1: Summary Statistics of model fixed factors

		{2000}		{2015}	
		<i>N</i>	<i>Marginal percentage</i>	<i>N</i>	<i>Marginal percentage</i>
Order of preference	1st	853	36,0%	631	26,6%
	2nd -3rd	357	15,1%	854	36,0%
	4th-5th	240	10,1%	478	20,2%
	6th-10th	561	23,7%	292	12,3%
	11th and more	359	15,2%	115	4,9%
Attempts	Once	1031	43.6%	2065	87.1%
	Twice	1023	43.2%	261	11.0%
	More	316	13.2%	44	1.9%
Gender	Male	883	37,2%	847	35,7%
	Female	1487	62,8%	1523	64,3%
Father's education level	Primary School	392	16,5%	125	5,3%
	Middle School	204	8,6%	221	9,3%
	High School	439	18,5%	559	23,6%
	Technical School	21	,9%	412	17,4%
	University	1314	55,5%	1053	44,5%
Mother's education level	Primary School	425	17,9%	145	6,1%
	Middle School	257	10,8%	169	7,1%
	High School	812	34,3%	705	29,7%
	Technical School	16	,7%	178	7,5%
	University	860	36,3%	1173	49,4%
School type	Public	2181	92,1%	1967	83,0%
	Private	189	7,9%	403	17,0%

Table A.2: Descriptive Statistics of model covariates

	<i>N</i>	<i>Minimum</i>	<i>Maximum</i>	<i>Mean</i>	<i>Std. Deviation</i>
Father's income 2015	2370	0	12000	1269,11	831,964
Father's income 2000	2370	59	20543	1299,82	948,640
Mother's income 2015	2370	200	7000	967,31	537,167
Mother's income 2000	2370	23	2935	839,22	313,718