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Elimination of User-fees in Tertiary Education: A Distributive Analysis for Ecuador

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Abstract

This paper offers new evidence and methods for understanding the distributive effect of a universal government policy to eliminate user fees in public universities in Ecuador. The main argument to eliminate user fees in higher education is that it will increase enrollment among the poor. In this regard, eliminating tuition fees is supposed to be a progressive policy. Using several panel data, however, credible evidence exists that eliminating tuition fees has no significant impact on opportunities for tertiary education. In addition, the policy becomes regressive two years after its implementation. Results, however, are sensitive to the welfare indicator used, i.e., either assets index or income poverty. In any case, results show that, at a minimum, the policy had non-progressive effects.

Keywords: University enrollment, Eliminating tuition fees, Redistributive analysis, Ecuador

1. Introduction

The debate about eliminating user fees in higher education is currently very important in some Latin American countries. Some countries have experienced strong protests in which students ask their governments to eliminate tuition fees in universities. Very little, however, is known about the distributive effect this kind of policy has across the region. The Ecuadorian experience, where user fees were eliminated in 2008, offers an important opportunity to evaluate the distributive effects of such a policy.

Many Latin American governments have implemented policies designed to improve access to universities for excluded groups. Among those policies, free public higher education has been common. The argument for suspending user fees has been promotion of equal opportunities through increasing access to university for the poor. It has long been known, however, that "free" education can sometimes have the opposite effect and yield perverse consequences, deepening social disparities. Although tertiary education is free of charge to those who enroll, limited supply usually restricts enrollments by non-price means, such as competitive entrance exams. This non-price mechanism is inequitable because students from families who are not poor can afford the cost of private preparation for university entrance exams. Also, while the poor depend on their children's earnings, those who are not poor can forego these indirect costs if their children study beyond secondary school (Psacharopoulos, 1977).

Advocates of cost-sharing claim that higher education costs are being magnified by dramatically increased enrollments. In addition, governments are besieged with other pressing public needs and fiscal constraint on primary and secondary schooling. In this regard, shifting the higher education tax burden from near-exclusive reliance on the government and taxpayers, to some financial reliance on parents and/or students, is seen as necessary. (Note 1)

In general, costing and rate-of-return studies have underscored the danger of regressive results from suspending user fees. Psacharopoulos (1977) computed indices of effective subsidization and educational inequality for 64 countries with

different levels of economic development. In general, he found that university students are very heavily subsidized in poor countries, but that it is precisely in these countries that access to higher education is restricted by a variety of non-price means. Canton and de Jong (2005) analyzed the role of economic factors in the university enrollment decision for the post-war period in the Netherlands from 1950 to 1999. Their finding was that students are responsive to tuition fees. Other factors, however, such as financial support, i.e., the sum of loans and grants, the college premium of future labor market earnings, and the alternative wage, are important in the enrollment decision. McCoy and Smyth (2010) analyzed the effect of reducing costs in college enrollment in Ireland during the period 1980-2006. Using a multilogit econometric model, they found that the middle class increased enrollment more than the lower class. Merely reducing costs could not improve access to higher education for the poor, especially because of their higher opportunity cost.

In Latin America, notwithstanding the significance of the regressive concern for public policy, we find little empirical evidence regarding the impact of free user fees and tuition in promoting equality of opportunities. Post (2000) argued that selectivity in access to higher education by family income worsened over time in Mexico, despite low user fees charged by the nation's public universities, and suggested that low tuition alone would be unlikely to promote equality of access, because the beneficiaries of free tuition increasingly came from upper-income families. Gonzalez and Menendez (2001) found that individuals attending university belong to the top deciles of income distribution and to relatively highly educated families in Argentina. Nearly 90 percent of Argentine students attending the nation's tuition-free public universities had higher than median per capita family income. The authors compared these students with those who attend private colleges where tuition is paid, and found an implicit transfer to the richest individuals in society.

Post (2011) used successive waves of cross-sectional data to speculate on the impact of Ecuador's suspension of user fees for public education, including universities, in 2008. For the years before and after the suspension of fees, Post compared access to college for the poor and the non-poor, as well as between indigenous and non-indigenous students. He found that, although both the non-poor and the poor students benefited from the policy, the non-poor benefitted more than the poor. Comparing the indigenous and non-indigenous student populations, he showed that the change in indigenous enrollment was insignificant. Meanwhile, university enrollment increased for the non-indigenous. In this regard, he speculated that the policy might widen the educational gap between privileged and marginalized populations. Post's approach was limited, however, by its use of cross section data, and by the fact that family poverty was measured only indirectly, i.e., by whether or not the mother had received a conditional cash transfer from Ecuador's targeted assistance program, the *Bono de Desarrollo Humano*.

The structure of the paper is as follows. In the second section of our paper, we present a description of the policy analyzed and the national political and economic context. Our third section introduces our data and our empirical approach. In the fourth section, we present the results of our analysis, and we draw policy conclusions in our fifth and final section.

2. Policy and context

Ecuador is a lower-middle income country, characterized by high poverty levels and high inequality. Several educational indicators show marked improvement since the early 1990s. Using information from population censuses, we computed net attendance rates for all education levels for the last three decades. The rhythm of expansion differs among education levels. Primary attendance rates remain stable at around 90 percent during the complete period. The most important increment is found in secondary education (Note 2) where the attendance rate increased from 43 percent in 1990 to 46 percent in 2001 and to 70 percent in 2010. Regarding tertiary education, we find an important increment from 9 percent in 1990, to 10 percent in 2001, and to 16 percent in 2010. However, disparities among social groups and regions remain. Attendance rates are considerably lower among indigenous people, Afro-Ecuadorians, and those living in the Amazon areas of the country. The attendance rate for tertiary education among the indigenous increased from 2 percent in 2001 to 6 percent in 2010. The same rate for Afro-Ecuadorians was 5 percent in 2001 and 7 percent in 2010. Finally, important regional disparities are observed. The Sierra highlands have the highest rates of tertiary education, 21 percent, compared to the coast with 13 percent and the Amazon with 9 percent. See Table 1.

Improvement of access to universities started during the 1970s. Access to public education was free and without academic evaluation for a long period of time. During the 1990s, public universities implemented certain fees. At the end of the 1990s through the 2000s, the majority of public universities also began to implement academic entrance exams. Today, all public universities have some kind of entrance evaluation.

In October 2008, Ecuador approved a new Constitution, which declared free user fees for all education levels, including higher education (Note 3). The main objective of this new law was to promote equality of access to tertiary education. In order to access public universities, however, secondary students must pass an academic entrance exam. The policy took effect from October 2008 onward. As a result of the policy, students already enrolled in public universities, and those

who decided to enroll in the first year, stopped paying tuition fees. The tuition waiver policy applied only to those who did not repeat or fail any school year; students who did not pass were required to pay fees, although these were heavily subsidized. To compensate for the money that universities forgo from fees, the government agreed to transfer the equivalent amount to public universities. However, some rectors of public universities complained about the magnitude of the transfer. According to them, the transfer did not completely compensate for the amount of money that public universities previously collected.

In total terms, this policy represented an important amount of the budget. In 2010, the policy represented around US$90 million. The total budget for tertiary education was US$859 million, and the budget for basic education was US$954 million.

The Table 2 introduces the net enrollment rate for higher education in the last six years.

Ecuador made important improvements in its access to higher education during the second half of the 2000s. Nationally, the enrollment rate went up from 16.5 percent in 2005 to 22.4 percent in 2010. At first glance, improvements in the enrollment rate might seem particularly important for the country's disadvantaged populations. For example, the enrollment rate among indigenous people increased from 6 percent in 2007 to 10 percent in 2010 and from 9 percent to 14 percent among Afro-Ecuadorians. Among the whites and *mestizos,* however, the increase was even greater: from 21 percent to 31 percent, and from 21 percent to 24 percent, respectively, between 2007 and 2010. The most important improvement was among the population that identified itself in surveys as "white."

Despite the apparently widening gap by ethnicity, when we use household income as a measure of marginality, we find a different pattern. In the case of income, the enrollment rate for the first and second poorer quintiles increased from 8 percent to 14 percent between 2007 and 2010. Meanwhile, the rate for the richer 20 percent increased only from 33 percent to 34 percent. The greatest increase was found among the poorer quintiles. When we define poverty using a scale based on household assets, however, results differ. The poverty index was computed with dummy variables, which are valued at 1 if the household has land, a refrigerator, television, kitchen, phone, radio, DVD player, and car, and at 0 otherwise, the highest value being 8 and the lowest value being 0. Poor households are those with a score below 4 points in the index (Note 4). In this case, enrollment for the poor increased from 7.5 percent to 10 percent between 2007 and 2010, while it increased from 29.7 percent to 30.5 percent for the non-poor. In addition, at the regional level, we found that the most important improvement—from 24 percent to 28 percent—occurred among students from the highlands, while in the coastal and Amazon regions we found a modest increment in the enrollment rate, from 17 percent to 18 percent, and from 8 percent to 11 percent, respectively. Despite evident changes in recent years, there remain clear disparities in higher education access. The most recent data indicate that the enrollment rate among the indigenous population and the inhabitants of rural areas is around 10 percent, and for the poorest quintile it is around 14 percent. The enrollment rate for whites and for the richest income quintile is between 31 percent and 34 percent, respectively. Interestingly, during the entire period, the enrollment rate is higher for women than for men.

3. Data and empirical approach

To evaluate the redistributive effect of suspending university fees, we analyzed the Ecuadorian Labor Force surveys, which included a module on education enrollment and attendance. In this paper we take advantage of a special feature of these surveys, which is that part of the sample is a panel. One-third of the sample from the urban area was re-interviewed during the following year. We used three different panels in our research, see Table 3. The first one was originally interviewed previous to the policy, in 2005-2006, the second panel was interviewed during the application of the policy in 2007-2008, and the third one was interviewed one year after implementation of the policy, in 2009-2010. In all panels the interviews were undertaken in November.

In each panel we have a baseline and a follow up survey. We restrict our analysis to those people who have finished secondary school and are between 17 and 26 years old in the baseline. These individuals could have enrolled in higher university education in the next year, during the follow-up. In the first panel, we have 411 subjects from 17 to 26 years old that finished secondary school. In the second and third panels we have 503, and 505 respectively. From those, the total numbers enrolled in higher education in the follow-up survey are: 100, 115, and 113 for the first, second, and third panels respectively. The previous panels give us an enrollment rate of around 24 percent, 23 percent, and 22 percent respectively for each (Note 5). It is important to emphasize that we are working with three different panels. Individuals from the first panel are different from individuals in the second and third panels.

To test for differences over time, we merged the three panels into a single dataset and created dummy variables for each panel based on the year of the follow-up survey: one for the first panel (d2006), another for the second panel (d2008) and another for the third panel (d2010). With the pooled data we run the following regression:

$$Y_i = \delta D_i + \alpha P_i + \beta D_i P_i + X_i \gamma + u_i \quad (1)$$

Where Y is higher school enrollment, which takes a value of 1 if the person is enrolled in higher education in the follow-up survey having finished secondary education in the baseline survey, and 0 if the person is not enrolled in higher education in the follow-up, having finished secondary education in the baseline. D stands for the dummy variables for the year. We include two dummies, for 2008 (d2008) and 2010 (d2010), and leave the 2006 as the reference category. P is a dummy for poverty that takes the value of 1 if the household score is below 4 in the assets index, and 0 otherwise (Note 6). DP is the interaction dummy between the dummies for the year and the poor. X is a vector of controls in the base line. In distributive terms, the coefficients of interest are δ, α and β, representing the main effects (δ and α) and the interaction effect (β), respectively. The coefficients of the dummy variables for the year (δ) represent the changes in the probability of being enrolled in a university for all after the application of the user fees policy. The α coefficient refers to the probability of the poor being enrolled in a university in comparison to the non-poor during the entire period. Finally, the β coefficient represents the probability of the poor of being enrolled in a university after the application of the policy of user fees. The most important coefficient is to analyze the distributive effect of the policy. A positive sign would mean that the policy had a progressive effect, while a negative sign would mean that the policy had a regressive effect. A not significant coefficient would mean a neutral effect in distributive terms.

We estimate the parameters of the model with three different specifications. The first specification includes only the dummy variables for the year, the poor, and the interaction dummies. The second specification includes, in addition, individual controls, i.e., age, sex, and ethnic dummies. Finally, specification 3 includes, in addition, controls for the head of household, i.e., sex, age, years of schooling, and ethnic dummies. This last specification is our preferred one because it includes the majority of controls.

Because the policy refers to the elimination of tuition fees in public universities, it is important to differentiate between public and private enrollment. Private enrollment increased considerably during the 1980s and 1990s in Ecuador. According to the data used in this study, private enrollment represents around 30 percent of the total, while public enrollment represents 70 percent. Based on the previous statistics we will estimate equation (1) using a multilogit regression, where the dependent variable takes on three values: 1 for enrollment in a public university, 2 for enrollment in a private university, and 3 for no enrollment. We keep no enrollment as the reference category. We will use the same three specifications as already defined, as well as the same dummies for the distributive analysis, i.e., main effects and interaction effects.

4. Results

We estimated OLS regressions for equation (1). Results are the same if we use logit or probit models. See Table 4. The coefficients for the year dummy variables are not significant. These results remain the same across the three different specifications. This result suggests that, after controlling all the variables included in the regression, the probability of higher education enrollment is the same in 2008 and 2010—during the application of the policy—compared to 2006. The dummy for the poor is not significant, meaning that the poor had the same probability of being enrolled in a university as the non-poor during the entire period of analysis. Finally, the coefficient of the interaction dummy is not significant for the year 2008, but becomes significant for the year 2010. The previous information means that the poor, in the year 2010, had 14 percent less probability of being enrolled in a university than the non-poor. This means that the distributive effect of elimination of the tuition fees was neutral in 2008 and became regressive in 2010.

Results for the multinomial regression are introduced in Table 5. Results are similar to the OLS estimates reported previously. The dummies for the year are not significant for public or private enrollment. This means that the probability of being enrolled in either public or private universities did not change after implementation of the policy. The dummy variable for the poor is not significant, meaning that the poor, having finished secondary school, have the same probability as the non-poor of being enrolled in public or private universities. Finally, the interaction effects are not significant in 2008, but they become significant in 2010 for both public and private enrollment. The previous statistic means that the poor, in 2010, had 5 and 1 percent less probability of being enrolled in public and private universities, respectively.

It is important to note that results are sensitive to the welfare measure used. When we use the poverty definition based on income, we find different results (Note 10). OLS estimates are presented in Table 6. The coefficients for the year dummies are not significant. These results remain the same across the three different specifications. This result suggests that, after controlling all the variables included in the regression, the probability of higher education enrollment is the same in 2008 and 2010, during application of the policy, compared to 2006. The dummy for the poor, defined using income, is not significant. Until now results are the same as those found using the asset poverty definition. Things are different, however, when we analyze the interaction effects. The coefficients of the interaction dummies are not

significant in either 2008 or 2010, meaning that the policy had a neutral distributive effect. The same conclusions can be obtained for the multinomial estimates using the definition of poverty based on income. The dummy for the poor is significant in the private case, meaning that the poor have less probability of being enrolled in private universities that the non-poor. The interaction effects are not significant. See Table 7.

5. Summary and discussion

This paper presents important empirical evidence showing that the policy of free tuition fees in public universities in Ecuador has non-progressive effects. Apparently, the policy benefits the non-poor and the poor in the same way. Conspicuously, when we use an asset index as a welfare measure to define poverty, we find regressive effects of the policy. One possible explanation of this result is that access to tertiary education implies, besides the direct cost, important opportunity costs as well as some additional costs incurred in preparation for the academic entrance exam. The previous items could not be assumed for the poor.

However, results are sensitive to the welfare measure used. When we use the income poverty definition, we find that the distributive effect of the policy is neutral. In all cases, we did not find a progressive result, as expected during the implementation of the policy.

One important factor to take into account is that the policy represents a large amount of the budget, around US$100 million per year, in a country with limited resources and high inequality.

Results reported until now can be criticized because we are not controlling macro changes in the Ecuadorian context that could have affected university enrollment among the poor besides the policy analyzed. As a robustness check, we carried out exactly the same analysis for different student groups that we expected the policy would not have a distributive effect on. One example of such a group of students is those who, during the baseline, were enrolled in the fifth year of secondary school, and during the follow-up, were expected to be enrolled in the sixth year of secondary school (Note 7). Because the implemented policy does not have any reference to the secondary school, we would not expect any redistributive effect of the policy on this group. However, the presence of macro variables that could affect enrollment in general terms in Ecuador would be reflected in significant changes in the enrollment rate of this group also. If we confirm that no significant changes are found in this group, we would have more credible evidence that the redistributive effects found regarding tertiary enrollment could be attributable to the policy.

Results for the OLS estimates of equation (1) for the new group are reported in Table 8.

The coefficients are not significant. No changes are observed in the probability of being enrolled in the sixth course during 2008 and 2010. In the same vein, no differences are found in such probability between the poor and the non-poor. This means that no distributive effects are found regarding the probability of passing from the fifth course to sixth course at the secondary level.

References

Canton E., de Jong, F. (2005). The Demand for Higher Education in The Netherlands, 1950-1999. Economics of Education Review. *24. 651-663*. http://dx.doi.org/10.1016/j.econedurev.2004.09.006

Easton S., Rockerbie, D. (2008). Optimal Government Subsidies to Universities in the Face of Tuition and Enrollment Constrains. Education Economics. 16(2).191-201.

González, M., Menendez, A. (2002). Public University in Argentina: Subsidizing the Rich? Economics of Education Review. 21. 341-351. http://dx.doi.org/10.1016/S0272-7757(01)00030-9

Johnstone, B. (2004). The Economics and Politics of Cost Sharing in Higher Education: Comparative Perspectives. Economics of Education Review *23. 403-410.* http://dx.doi.org/10.1016/j.econedurev.2003.09.004

Lawrence, S. et al. (2001). Persistence of Web References in Scientific Research. *Computer*. 34, 26-31. http://dx.doi.org/10.1109/2.901164

Post, D. (2000). Student Movements and User Fees: Trends in the Effect of Social Background and Family Income on Access to Mexican Higher Education, 1984-1996. Mexican Studies. 16(1).141-163.

Post, D. (2011). Las Reformas Constitucionales en Ecuador y las Oportunidades para el Acceso a la educación Superior desde 1950. Archivos Analíticos de Políticas Educativas. 19(20). 1-24.

Psacharopoulos George. (1977). The Perverse Effects of Public Subsidization of Education or How Equitable Is Free Education? Comparative Education Review. (21(1). 69-90. http://dx.doi.org/10.1086/445922

Smith, Joe. (1999). One of Volvo's core values. [Online] Available: http://www.volvo.com/environment/index.htm (July 7, 1999)

Strunk, W., Jr., & White, E. B. (1979). *The elements of style.* (3rd ed.). New York: Macmillan, (Chapter 4).

Van der Geer, J., Hanraads, J. A. J., & Lupton R. A. (2000). The art of writing a scientific article. *Journal of Scientific Communications*, 163, 51-59.

Note 1. See Johnstone (2004) for a review of the economics and politics of cost sharing.

Note 2. Net attendance rate for secondary school refers to those aged 12 to 17 years old and attending secondary school divided by those aged between 12 and 17 years old.

Note 3. The previous Constitution, approved in 1998, only included free user fees for primary and secondary school. The new Constitution, approved in 2008, also includes free user fees for tertiary education.

Note 4. This gives us a poverty incidence of around 27 percent. This result is equivalent to the poverty incidence computed using the poverty line method.

Note 5. This is the transition rate from secondary school to tertiary school. It refers to those that having finished secondary school are enrolled in higher education.

Note 6. Because of endogeneity concerns we prefer to use the poverty definition based on the assets index instead of income. However, we also present the results using the poverty definition based on income.

Note 7. In Ecuador the secondary school has 6 years of duration. In this sense, the sixth year is the last one of this education cycle.

Table 1. Net attendance rates for primary, secondary, and tertiary education

	1990			2001			2010		
	Primary	Secondary	Tertiary	Primary	Secondary	Tertiary	Primary	Secondary	Tertiary
Total	0.89	0.43	0.09	0.88	0.46	0.10	0,94	0,68	0,16
Sierra	0.91	0.45	0.11	0.90	0.49	0.13	0,95	0,72	0,21
Costa	0.88	0.42	0.08	0.87	0.44	0.08	0,93	0,65	0,13
Amazonia	0.87	0.29	0.01	0.87	0.39	0.03	0,94	0,63	0,09
Men	0.89	0.42	0.09	0.88	0.45	0.10	0,94	0,68	0,15
Women	0.89	0.44	0.10	0.89	0.47	0.11	0,94	0,69	0,18
Indigenous				0.84	0.24	0.02	0,94	0,56	0,06
White				0.91	0.56	0.14	0,93	0,71	0,17
Mestizo				0.89	0.48	0.11	0,94	0,70	0,18
Afro-ecuadorian				0.85	0.37	0.05	0,91	0,58	0,07

Source: Population Censuses, 1990, 2001 and 2010. INEC.

Table 2. Net enrollment rate for higher education (for those aged 17 to 26 years old)

Year	2005	2006	2007	2008	2009	2010
Total	16.5%	18.3%	19.9%	21.3%	21.6%	22.4%
Urban	21.5%	23.6%	25.8%	26.9%	27.1%	28.0%
Rural	5.3%	6.3%	6.5%	8.5%	9.1%	9.9%
Sierra	21.6%	24.2%	23.7%	26.3%	27.4%	27.7%
Costa	12.6%	13.7%	17.3%	17.6%	17.2%	18.2%
Amazonia	7.3%	9.2%	8.4%	10.5%	12.2%	11.4%
Men	15.9%	16.9%	19.0%	19.9%	20.1%	20.7%
Women	17.0%	19.7%	20.7%	22.6%	23.2%	24.2%
Indigenous	6.4%	5.0%	6.1%	5.3%	10.6%	9.6%
White	17.7%	19.7%	21.5%	21.1%	27.4%	30.9%
Mestizo	17.6%	19.7%	21.4%	23.1%	22.5%	23.5%
Afro-Ecuadorian	7.1%	7.1%	8.7%	13.6%	12.9%	14.2%
20% poorest	7.5%	7.0%	8.0%	7.6%	9.8%	13.8%
2nd Quintile	9.3%	8.9%	9.1%	12.9%	15.0%	13.8%
3rd quintile	10.5%	11.7%	14.1%	16.5%	15.3%	18.0%
4th quintile	15.6%	17.6%	21.2%	22.4%	21.7%	20.4%
20% richest	28.3%	31.9%	33.2%	33.2%	33.0%	34.3%
Asset Poor	5.4%	7.4%	7.5%	8.3%	9.9%	10.0%
Income Poor	7.4%	6.3%	8.7%	9.2%	10.8%	12.2%
Asset Non Poor	23.1%	27.2%	29.7%	30.6%	30.4%	30.5%
Income Non Poor	21.5%	23.6%	24.5%	26.0%	25.6%	26.0%

Source: Labor survey. INEC. Several years.

Table 3. Panels and sample sizes

Panel	Number of cases	Population (17-26 years old)	Finished secondary school at baseline (17 - 26 years old)	Not enrolled in higher education in follow up (17-26 years old)	Enrolled in higer education in follow up (17-26 years)	Percentage of enrolled in higher education
2005 – 2006	10346	2035	411	311	100	24.3%
2007 – 2008	12987	2556	503	388	115	22.9%
2009 – 2010	12549	2473	505	392	113	22.4%
Pooled data	35882	7064	1419	1091	328	23.1%

Source: Labor survey. INEC. Several years.

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Table 4. OLS estimates of the probability of being enrolled in higher education. Equation (1) using assets index.

Variable	Esp_1	Esp_2	Esp_3
d2008	0.026	0.027	0.019
	0.044	0.038	0.036
d2010	-0.001	0.044	0.043
	0.044	0.037	0.035
Poor	-0.088	-0.032	-0.013
	0.053	0.05	0.049
Poor_2008	-0.076	-0.07	-0.055
	0.068	0.064	0.062
Poor_2010	-0.063	-0.144	-0.14
	0.067	0.064	0.063
N	1419	1419	1419
r2	0.022	0.239	0.276

Source: Labor survey. INEC. Several years. Legend: coefficient/standard error.

Table 5. Multinomial estimates of the probability of being enrolled in university using assets index.

	Public			Private		
Variable	Esp_1	Esp_2	Esp_3	Esp_1	Esp_2	Esp_3
d2008	0.0102	0.0055	0.0020	0.0105	0.0021	-0.0003
	0.0318	0.0205	0.0198	0.0192	0.0043	0.0029
d2010	-0.0078	0.0185	0.0177	0.0053	0.0050	0.0031
	0.0322	0.0225	0.0223	0.0190	0.0046	0.0033
Pobre	-0.0367	-0.0083	-0.0039	-0.0443	-0.0065	-0.0034
	0.0464	0.0331	0.0345	0.0242	0.0056	0.0044
int08	-0.0342	-0.0176	-0.0058	-0.0530	-0.0100	-0.0057
	0.0575	0.0379	0.0433	0.0208	0.0047	0.0047
int10	-0.0317	-0.0540	-0.0539	-0.0552	-0.0129	-0.0097
	0.0601	0.0246	0.0247	0.0182	0.0034	0.0026

Source: Labor survey. INEC. Several years. Legend: (dy/dx)/standard error. Dy/dx is for the marginal effect on the probability of enrollment because of a change in the Xs.

Table 6. OLS estimates of the probability of being enrolled in higher education using income definition of poverty.

Variable	Esp_1	Esp_2	Esp_3
d2008	0.001	0.016	0.016
	0.041	0.035	0.033
d2010	-0.031	-0.001	0.006
	0.04	0.034	0.033
Poor	-0.011	-0.048	0.003
	0.057	0.05	0.05
Poor_08	-0.024	-0.085	-0.095
	0.089	0.082	0.08
Poor_10	0.115	0.052	0.031
	0.098	0.089	0.084
N	1419	1419	1419
r2	0.003	0.228	0.268

Source: Labor survey. INEC. Several years. Legend: coefficient/standard error.

Table 7. Multinomial estimates of the probability of being enrolled in university using income definition of poverty.

	Public			Private		
Variable	Esp_1	Esp_2	Esp_3	Esp_1	Esp_2	Esp_3
d2008	0.0125	0.0111	0.0115	-0.0100	-0.0010	-0.0021
	0.0329	0.0212	0.0210	0.0214	0.0046	0.0033
d2010	-0.0117	-0.0012	-0.0011	-0.0181	-0.0022	-0.0017
	0.0327	0.0217	0.0213	0.0209	0.0045	0.0034
Poor	0.0602	0.0044	0.0179	-0.0719	-0.0152	-0.0095
	0.0541	0.0279	0.0309	0.0186	0.0043	0.0036
int08	-0.0732	-0.0453	-0.0461	0.1624	0.0269	0.0201
	0.0407	0.0228	0.0223	0.1474	0.0338	0.0255
int10	-0.0334	-0.0042	-0.0029	0.3135	0.0730	0.0483
	0.0622	0.0389	0.0382	0.2151	0.0762	0.0515

Source: Labor survey. INEC. Several years. Legend: (dy/dx)/standard error. Dy/dx is for the marginal effect on the probability of enrollment because of a change in the Xs.

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Table 8. OLS estimates of the probability of being enrolled in the sixth year of secondary **e**ducation. Equation (1).

Variable	Esp_1	Esp_2	Esp_3
d2008	0.012	0.012	0.012
	0.014	0.015	0.015
d2010	0.01	0.01	0.01
	0.014	0.014	0.015
Poor	0.018	0.018	0.018
	0.013	0.012	0.012
Poor_08	-0.012	-0.012	-0.009
	0.014	0.012	0.009
Poor_10	-0.02	-0.02	-0.017
	0.017	0.017	0.015
N	386	386	386
r2	0.004	0.004	0.006

Source: Labor survey. INEC. Several years. Legend: coefficient/standard error.