

Erasmus University Rotterdam

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**The impact of the closure of Private Universities on
University expenditures and enrolment decisions:
Evidence from Albania**

Student: Dorela Beqaj

Student number: 372369

Supervisor: Dr. Sacha Kapoor

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Abstract

This study investigates the impact that the first phase of the Higher Education Reform (closure of half of the existing Private Universities) had on University expenditures and enrolment decisions in Albania. Based on a difference-in-difference strategy, the findings suggest that the Reform is associated with a negative impact on expenditures and enrolment in Private Universities, and a positive impact (in few cases) on Public University outcomes. The different effects found on Public and Private University outcomes are very likely to be related with peoples' perceptions regarding the validity of their investments in Higher Education, and the differences in quality between Public and Private Universities.

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1. Introduction

The aim of this study is to examine the impact that first phase of the Reform on Higher Education in Albania had on expenditures and the probability of being enrolled in University. This Reform consisted in the closure of 18 Private Universities (Higher Education Institutes), that were assessed to not meet the criterions for operating as Institutions of Higher Education. The analysis includes the distinction between Public and Private Universities, in order to observe whether the Reform affected differently Public and Private University outcomes. As a way to capture the effect of the Reform on the outcomes of interest, I use a difference-in-difference strategy, by observing the differences in time before and after the reform interacted with the indicator of possession of an Academic Degree by the head of household.

The reason behind choosing this research question is that it would be with interest to observe whether the first phase of the Reform (closure of half of the Private Universities) had a significant impact on expenditures and enrolment decisions on Universities. Also, it is useful to examine whether it had the same or a different impact on Public and Private University outcomes. This would allow for a better understanding of the effect of the first part of the Reform not only on University outcomes, but also in the outcomes of the different types of Universities, which may be related with peoples' perception regarding the investment on each kind of University. The nature of the data and the time when the data were collected, allows to examine only the effects of the closure of Private Universities in the outcomes, without any additional policy interventions.

Before examining the impact that the Reform had on expenditures and enrolment outcomes on University, Public and Private University, I first focus on the effect that the Academic Degree of the Head of Household and other explanatory variables such as income, have on these outcomes. For doing this, I use cross sectional data from 2009. There are two main reasons why I consider Head's Academic Degree besides other households' characteristics, to be an important variable on explaining University expenditures and enrolment decisions.

Firstly, higher education is considered to be a valuable investment for the future of young generation, in a former communist country such as Albania, where higher education was provided only to a small fraction of people with excellent performance in secondary education.

Data from the Census of 2001 show that only 7.38% of the total population older than 30 years old had a University Degree (INSTAT, 2001), indicating that the share of highly educated people during the communist regime was low. Thereafter, based on 2005 data from the Institute of Statistics in Albania, it has been found that education increment affects the increase of the chances to be employed, and higher educated people in particular, are found to have a wage premium of 71.9% compared to primary educated individuals. As for the secondary educated people, this wage premium is found to be 23.6%, which highlights the importance of higher education for wage increments in a country where higher education was provided only to a small fraction of population (World Bank, 2012).

Secondly, the lack of student loans in Albania, as well as the slightly patriarchal nature of Albanian families, is supposed to increase the students' dependence on their families regarding financing their studies, and probably, their enrolment decisions. Therefore, it is with interest to observe to what extent does the higher education of the Head of household, besides other factors, such as income, affects the investments in higher education for the young cohort. In case that the correlation between Head's Academic degree and University outcomes is as expected (positive and significant), it would be a useful variable, which interacted with the year variable, would successfully capture the effect of the Reform in the outcomes of interest.

The data used for this study are micro data in household level from the Household Budget Survey for years 2009 and 2014, obtained in collaboration with the Institute of Statistics of Albania. The analysis is conducted in two phases, where the first phase consists in using cross-sectional data from 2009, and the main focus is on examining the factors that are related to higher education expenditures and the probability of being enrolled in University. The second phase of the analysis, which is the most important part, uses pooled data for years 2009 (pre-reform year) and 2014 (reform year), and focuses on the impact that the Reform had on University, Public and Private University expenditures and enrolment decisions, by using a difference-in-difference strategy.

The main findings suggest that Head's Academic Degree is the main variable that explains expenditures and enrolment outcomes for University in general, and Public and Private University separately. Then, the estimations for the effect of the Reform suggest that it had a negative impact in Private University expenditures and enrolment, and in few cases a positive impact in Public University outcomes. The reason behind this is related with the peoples'

perception regarding the differences in quality among both kinds of Universities, and the validity of their investment in higher education. The analysis proceeds as follows: section 2 presents the literature review, section 3 elaborates on Higher Education in Albania and the Higher Education Reform of 2014, section 4 presents the data, section 5 describes the methodology used, section 6 presents the results, and section 7 concludes.

2. Literature Review

There are several factors that are directly and indirectly related with students' enrolment decisions in higher education. According to a study of (MATHTECH, INC, 1998) there are two main groups of factors that affect these decisions: the first one contains students specific factors, where included parental education, students' academic performance, and parental expectations for their children's achievements, and the second one contains social and institutional conditions of students, such as tuition fee of higher education, family income, financial conditions, employment or unemployment levels, and other education alternatives besides University. Parental education is part of the first group of factors, and together with the other factors it is considered to influence in students' enrolment decisions. This factor is found to be influential since in the early academic performance and preparation of children.

Based on psychological and sociological insights, (Davis-Kean, 2005) has studied the impact that parents' education has on children's academic performance from the group-age of 8 to 12 years old in the US. The main finding suggests that parental education positively affects their children's academic performance through their behaviour towards their children and the expectations that they have about their results. However, this finding is not consistent for all the racial groups since there are differences among races regarding this relationship. In addition, in an early paper where future college attendance decisions of 9th grade children are studied, (Hossler & Maple, 1993) find that among other factors, parental education and parental expectations for their children's future achievements, influence positively in the willingness of this group of children to attend college in the future.

In her study that focuses on the factors that affect enrolment decisions in 2 or 4-year college, (Rouse, 1994) finds that among other individual and family characteristic such as academic performance, income level, and high school class ranking, parents' education significantly affects the college application decisions of their children. In a later study that is based on a case

study methodology, (Rowan-Kenyon, Bell, & Perna, 2008) use data from 15 high schools in 5 states of the USA, in order to investigate on the factors that are related with parental involvement in their children's college decisions. They find that parental higher education is important regarding their involvement in their children's education, which affects their enrolment decisions in higher education. Parents' higher education, is important not only in terms of providing more information and incentives for their children to attend college, but also because less educated parents are less likely to be informed about scholarships and financial aid programs about their children's college, and/or less incentivised to save in advance for this purpose.

Similar arguments are provided by (Tierney & Auerbach, 2005) in their study based on the literature on family involvement in their children's education and college preparation. Parental education is found to have a positive and influential impact on students' college attendance decisions because more educated parents are more aware of college requirements in both educational and financial aspects. Therefore, in contrast with the less educated parents, they can use this information and personal contacts in a helpful way for their children's college enrolment and/or financing.

In a study that investigates the factors behind differences in enrolment rates in University among students from different levels of income distribution in Canada, (Frenette, 2007) finds that parental education is one of the main factors that explains the gap. It accounts for 32% of the differences in enrolment rates between students that belong to different income distribution groups. Another study by (Weiss & Steininger, 2013) focuses on the influence of parental academic degree in their children's enrolment in higher education in Germany. Although the general effect was mainly positive in the probability of being enrolled in university, this effect was stronger and more robust for the group of upper secondary graduated children who were 'undecided' about their enrolment in higher education.

In case of Albania, there is a lack of empirical studies that focus on higher education and particularly in the impact that family characteristics such as parental education and family income, may have on enrolment decisions and/or expenditures on higher education. However, while focusing in early age outcomes, parental characteristics such as education and employment status, are found to be important in increasing pupils' performance in schools. In a study conducted by the World Bank, (Serra, Barr, & Packard, 2011) find that among many

other factors, parental education is a factor that has a positive and significant impact in children's results, and a negative impact in their dropout rates.

In conclusion, the results of the studies presented in this section suggest that parental education affects their children's education outcomes and higher education decisions by positively influencing in their academic performance, and increasing their awareness regarding the importance of higher education and future decisions, which incentivises them to consider their university enrolment decisions in an earlier age, and become more prepared about their future goals. Moreover, higher educated parents are more aware of financial programs that provide easier access to higher education for their children, and/or are more likely to save in advance in order to be able to afford their children's higher education expenditures in the future.

3. Higher Education in Albania and the Higher Education Reform

Albania is a former communist country where all the economic activities were centralized and planned by the government, until the fall of the regime in 1990. Education and higher education was also part of this central planning: the main focus of the government in that time was to provide primary and secondary education to a large fraction of population, whereas higher education was provided only to a small fraction of population, based on the vacancies that were in the labour market for these higher educated people. The fraction of higher educated population in that time was 7.38%. This estimation is made based on Census Data from the Institute of Statistics of Albania in 2001 (INSTAT, 2001), and this percentage is calculated based on the ratio of higher educated people older than 30 years old in 2001.

The other part of the population, who were not eligible to be enrolled in the Higher Education Institutions, were assigned to attend vocational schools in order to acquire certain professional skills that would meet the labour market demand. After the fall of the communist regime, Albanian economy was no longer centralized, and as a result everyone could decide him/herself regarding attending University in case he/she met the eligibility criteria. According to the Institute of Statistics of Albania, the gross enrolment ratio in tertiary education for Albania in year 2015, was 63% (INSTAT, 2015).

Figure 1., shows the enrolment number of new students for all Higher Education Institutions, Public and Private Institutions, from the academic year 2006-2007 to 2015-2016. As it can be

inferred by the figure, there is an increasing trend for the enrolment rates until 2012-2013. In 2013-2014 the enrolment rates of new students in both Public and Private Higher Education Institutions have been decreased with 20% and 28% respectively compared to the previous year. Afterwards, in the 2 following academic years, these rates increased again, reaching the maximum in 2015-2016.

The enrolment rate of 2015 and the numbers presented in Figure 1., suggest that higher education is accessible for all the individuals in Albania, and the major part of the people who have completed upper-secondary education level, are enrolled in Higher Education Institutions. Also, besides the opportunity to have access through their secondary education diploma, and State Exams into Higher Education Institutions, people who wanted to attend tertiary education, could also achieve this by being enrolled in Private Higher Education Institutions. Furthermore, Private Higher Education Institutions provided a higher variety of study programs compared to the Public ones.

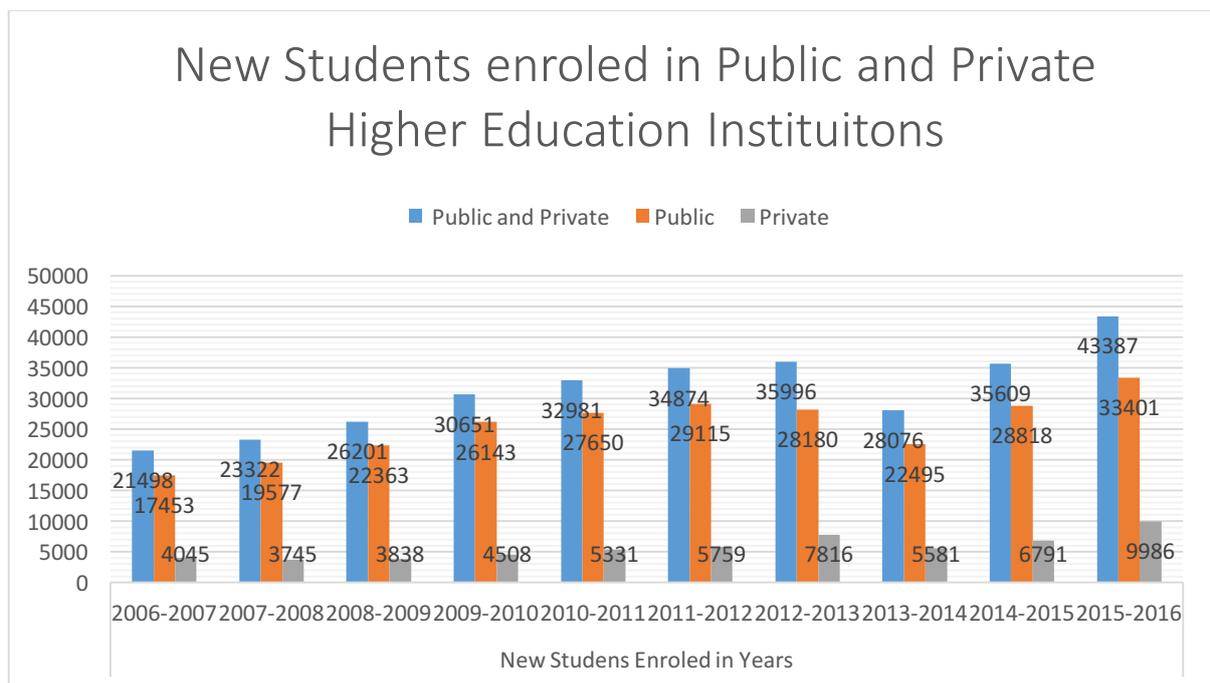


Figure 1. New students enrolled in years in Public and Private Higher Education Institutions, Data Source: Ministry of Education and Sports, Albania.

Data from 2013 suggest that for Bachelor studies Private Higher Education Institutions provided 308 different study programs against 240 study programs of Public Higher Education Institutions, and for Professional Master they provided 143 against 128 study programs

respectively (Open Data Albania, 2013) . Due to the increasing number of students that were willing to attend the Private Higher Education Institutions, the number of these institutions started to increase, although a part of them did not provide a qualitative education, which increased the number of graduated students, but not the quality of their education.

According to a World Ranking made by “Ranking Web of World Universities” in 2012 the best Universities in Albania were ranked 7289th and 8735th, whereas the worst was in 20634th out of 20745 Universities ranked in world range (IDEA, 2012). This is an indicator of a large difference between Universities in Albania, and also highlights their low quality in general. Therefore, in 2014, the Ministry of Education and Sports, after auditing the quality of all the Higher Education Institutions and noticing that many of them did not meet the necessary criteria for operating in the market, decided to close 18 of these Institutions (Ministry of Education and Sports, 2014), and suspend 13 of them (Ministry of Education and Sports, 2014). The validity of the graduated students’ diplomas in the closed Institutions was examined case by case by the Ministry. The existing students of the closed Institutions had the right to continue their studies in other Higher Education Institutions that met the criteria and provided the same or very similar study profiles to the ones that they were currently following.

No increase on the tuition fees were made for these students. On the other hand, the students who were currently enrolled in the suspended Institutions had the right to finish their studies in these Institutions and their diploma would be valid after finishing their studies, but these Institutions were not allowed to enrol new students for at least 2 years, until they met the criteria required from the Ministry regarding the quality of education. Then, in case of being able to meet the quality criteria imposed by the Ministry, the suspended Institutions could be able to continue their activity after 2 years of suspension.

This is the part of Reform that took place in 2014, and consisted only in auditing all the Higher Education Institutions, and closing and suspending some of them. This part of the Reform did not consist in any intervention or change in the tuition fees faced by the students. The changes in the tuition fees occurred in the following years, and each Higher Education Institution imposed these fees based on their financial needs. Yet, the subsequent parts of the Reform that are related to changes made in financing the Higher Education Institutions, do not affect the results of the analysis conducted in this paper, given that 2014 data can capture only the impact of the closure and suspension of some of the Private Higher Education Institutions.

4. Data

The data are obtained from the Institute of Statistics in Albania from the questionnaires of the Household Budget Survey, for years 2009 and 2014. These datasets are not available online and are used only with the approval of the Institute of Statistics conditional on respecting the “Confidentiality Law”, which consists in using these data only for study purposes. The datasets consist in detailed information regarding expenditures and income of the households, and contain 5595 households (22216 individuals) observations for 2009, and 6565 households (25090 individuals) observations for 2014. In the first part of the analysis I use only the dataset of 2009, in order to examine the impact that the main explanatory variable “Academic degree of the Head of Household” has on the outcomes of higher education expenditures, and the probability of being enrolled in University¹.

Table 1. presents the summary statistics for the data of years 2009 and 2014. The variable “Total University Expenditures” reflects the monthly expenditures of the households for both kinds of Universities: Public and Private. The amounts are expressed in Euro. The mean of total university expenditures for 2009 is 30.43 Euro, the minimum is 0 and the maximum is 7352 Euro. The very high amount of the maximum value does not reflect only the tuition fee that is paid for attending University.

While declaring their expenditures for higher education, households consider all kinds of expenditures that arise as a function of attending the University such as: house rents (for those who rent a house instead of choosing student dormitories that are cheaper), everyday expenses for the students who do not study in their hometown, expenditures for extra private courses that may be helpful for increasing the students’ academic performance, and probably even entertainment expenditures that students who do not study in their homeland may have.

Moreover, the data indicate household expenditures, and the very high amounts of expenditures may belong to wealthy families who have more than one of their children that is studying. Consequently, these families will be faced with higher expenditures than families on which only one child attends higher education, and/or studies in his/her hometown and lives with

¹ From now on the term University will refer to all the Higher Education Institutions that provide Bachelor, Master and/or Phd study programs to the students.

parents. Given that there are no student loans, and most of the students are financed by their parents during their studies, parents whose children study in a different city, perceive every kind of their child's expenditure as education expenditure because all the expenses that their household faces for providing optimal conditions to their child, have been made in function of their education. However, although there is an explanation for some of the very high values of education expenditures, this is a source of measurement error.

The main problem with the measurement error in the dependent variable, is the potential correlation with the independent variables. If there is no systematic correlation between education expenditures and the explanatory variable(s) in the regression, then the measurement error is not problematic for the OLS estimations. In contrast, if the measurement error in the dependent variable is systematically correlated with the explanatory variables, this would lead to biased estimates (Wooldridge, *Introductory Econometrics, A Modern Approach*, 2009). In this case, one cannot exclude the possibility that the error in the dependent variable: education expenditure, is not correlated with the independent variables. For instance, it might be that households with a low level of education may find it hard to make the distinction between expenditures made for education (tuition fee, courses, dormitory), and expenditures that are not related with education (entertainment).

However, with the actual data, it is not possible to observe whether this is the case, which leaves room for doubting the unbiasedness of the results. This is the main reason why I do not focus only on regressions that have higher education as dependent variable, but also in the regressions that have the enrolment status as a dependent variable. Furthermore, I focus on a restricted sample for the baseline estimations by using the more realistic values for University expenditures, which consist in a maximum of 1800000 old leks (1325 Euro) monthly University expenditures. The main results presented further in this study, will be based on the restricted sample whereas the results of the estimations with the full sample can be found in the Appendix.

Table 1: Summary Statistics 2009 and 2014 data

	2009 Observations	2009 Mean (Std.Deviation)	2014 Observations	2014 Mean (Std.Deviation)	Difference in means(2009- 2014)
Total University Expenditure in Euro	5595	30.43 (406.16)	6565	47.31 (317.3)	16.8*** (5.10)
Public University Expenditure in Euro	5595	21.41 (233.4)	6565	39.56 (271.8)	18.2*** (4.28)
Private University Expenditure in Euro	5595	6.06 (138.2)	6565	5.102 (123.27)	-0.96 (2.37)
Total Income in Euro	5595	16764.7 (18676.4)	6565	10588.2 (70514.7)	-6176*** (970.88)
Labor Income in Euro	5595	6593.6 (12426.4)	6565	4140.5 (11764.7)	-2452*** (219.5)
Non Labor Income in Euro	5595	10147.1 (12426.4)	6565	6416.9 (69558)	3731*** (949)
Age of the Head of Household in Years	5595	55.61 (13.24)	6565	55.83 (13.37)	.223 (.242)
Head Female (Female=1)	5595	0.1351 (0.3418)	6565	0.139 (0.346)	.0039 (.006)
Head Married (Married=1)	5595	.8230 (.3816)	6565	0.8383 (0.3681)	.015** (.0068)
Head's School Years	5595	9.373 (3.898)	6565	9.806 (3.6129)	.43*** (.068)
Head of Household with Academic Degree (1=Yes)	5595	0.10026 (.3004)	6565	0.1063 (0.3082)	.006 (.005)
Number of Household Members	5595	3.9707 (1.752)	6565	3.821 (1.681)	.148*** (.031)
Enrolled in University (1=Yes)	5595	0.0278 (0.1646)	6565	0.0394 (0.1946)	.011*** (.0033)
Enrolled in Public University (1=Yes)	5595	0.0237 (0.1523)	6565	0.0357 (0.1857)	.012*** (.003)
Enrolled in Private University (1=Yes)	5595	0.00411 (0.0639)	6565	0.0033 (0.0577)	-.0008 (.001)
Head not working (0=work)	5595	0.4339 (0.4956)	6565	0.4755 (0.4994)	.041*** (.009)

Note: Standard deviations are expressed in brackets under the means

The following two variables present the expenditures of 2009 for Public and Private Universities separately where the mean for public university is 21.41 Euro and for private university is 9.01. The lower mean for private university expenditures may be attributed to the fact that also the household who spend 0 Euros are included in the analysis, and the fact that there are more households with positive expenditures for public university compared to private university, influences the means. The preference of investing more in Public Higher Education compared to Private Higher Education is related with the quality and the perception that people have regarding the quality of Universities. Public Universities have been operating for a longer period of time and have the reputation of being more challenging for the students. On the other hand, Private Universities differ with each other in terms of the programs offered, challenging environment, admission criteria for new students, and effort level required from the students in order to be graduated. Therefore, these differences among Private Universities, create the perception of a lower quality of education and less competitive environment for the students.

The maximal values are higher for private university expenditures: 7352 Euro and lower for public university expenditures 5147 Euro. The other variables reflect total annual income, labour income, and non-labour income for each household. The mean of the total level of income 16765 Euro, the minimum level is 0 and the maximum is 372 059 Euro. The mean of annual labour income is 6593.6 Euro, the minimum 0 and the maximum 294118 Euro, whereas for non-labour income the mean is 10147 Euro, the minimum 0, and the maximum level is 327941. Income level is included in the regression in the standardized form, in order to make the scaling units negligible, and create the possibility of an easy interpretation of the coefficient.

The standardization of income is based on the income level and the beta coefficient of the standardized values represents the impact of an increase of the income level with one standard deviation (Wooldridge, *Introductory Econometrics, A Modern Approach*, 2013). The following variable “Age of the Head of the Household” reflects the age of each household’s head, which varies from 19 to 101 years old. The mean of this variable is 55.61 years old, indicating that in most of the cases the age of the head of households is relatively high. The explanation regarding this old average age of the Head of household can be given by the fact that most of the unmarried young people continue to live with their parents, and some of them

may even be financially dependent from their parents until they finish their studies and/or find a job and earn their own income.

Moreover, a part of the young people, continue to live with their parents even after they get married and/or have children, due to the fact that besides the presence of traditional elements that encourage the family unity, many of the young people consider living with their parents to be helpful for facing the difficulties of daily life (Çela, Kamberi, & Pici, 2015). As a result, parents are very likely to influence and/or be aware of their children's decisions despite the age of their children. The other variable "Head of the Household Female", which is a dummy variable that takes the values from 0 to 1, where the value of 1 indicates that Head of the household is female. The mean of this variable is 0.1351, reflecting that in only approximately 13.5% of the households, the head of the household is a female. The variable "Head of household Married" has the value of 0 if the Head of the Household is not married, and the value of 1 if the Head of Household is married. The mean of 0.823 shows that in most of the observations, the head of household is married.

The variable "Head of Household's School Years" shows the total number of completed school years by the head of the household. The minimum number of school years is 0, the maximum is 20, and the mean of this variable indicates that the average number of school years completed by the heads of households is approximately 9. The variable "Head of Household with Academic Degree" indicates that the head of household has an academic degree if its value is 1. The mean of this variable shows that only 10% of the Head of households possess an Academic Degree. The following variable "Number of Household Members" indicates the number of persons in each household. The mean of this variable is 3.97, which reflects that the average number of people in a household is 4, whereas the minimum number is 1 and the maximum is 19 members.

The variable "Enrolled in University" is a dummy variable that shows whether a person is currently enrolled in University by taking the value of 1 if the person is enrolled, and the value of 0 if the person is not enrolled. The mean of this variable is 0.0278. The following two variables reflect whether the person is enrolled in a Public University, with the mean 0.0237, and whether he/she is enrolled in a Private University with the corresponding mean of 0.00411. The last variable "Head not working" indicates whether the Head of Household is not working. This variable takes the value of 0 if the Head of household is working, and 1 otherwise. The

mean of this variable is 0.4339, indicating that in average 43.4% of the Head of household were not currently working at the moment of the interview.

For the observations of 2014, the number of households is 6565. Although the observations of 2014 will be used together with the observations of 2009 for the second part of the analysis, in Table 1., there are presented the variables with observations of 2014 separately, in order to avoid confusion with the observations of 2009 regarding the minimal and maximal values, and to allow for a comparison with the variables of 2009 in terms of means, minimum and maximum values.

For 2014, the mean of Total University expenditures is 47.31 Euro, which is higher than the mean of 2009, whereas the minimum expenditures are 0 and the maximum are 6176 Euro, (lower than in 2009). Regarding the Public University expenditures, the mean is 39.56 Euro (higher than 2009), the minimum 0, and the maximum 5882 (higher than 2009) Euro. The expenditures for Private Universities have a mean of 5.102 (lower than 2009) old Euro, minimum of 0, and maximum of 6167 (lower than 2009) Euro. As it can be inferred by a simple comparison with the data from 2009, the expenditures for Public Universities have been increased, whereas the expenditures for Private Universities have been decreased in 2014.

The mean of total annual income is 10588.2 Euro (lower than in 2009), the minimum is 0 and the maximum is 5566176 Euro (higher than 2009). The mean of labour income is 4140.5 (lower than 2009), the minimum is 0 Euro, and the maximum is 397058 (higher than 2009). The mean of non-labour income is 6416.9 (lower than in 2009), whereas the minimum is 0 Euro and the maximum is 5566176 (higher than 2009). The variable that indicates the age of the head of household has a mean of 55.83 years old (almost the same as in 2009), a minimum of 12 and a maximum of 100 years old. The dummy variable that indicates whether the head of household is a female has a mean of 0.139 (slightly higher than 2009), and the variable that indicates whether the head of household is married has a mean of 0.8383 (slightly higher than 2009). The variable that represents the school years completed by the head of household has a mean of 9.8 (higher than 2009), a minimum of 0 and a maximum of 20 years of schooling.

The variable of Head Academic Degree has a mean of 0.1063, which is 0.6 percentage points higher than the mean of 2009. The variable that indicates the number of household members

has a mean of 3.821, which suggests that in average there are 4 people living within a household (the same as in 2009). The minimum value for this variable is 1, and the maximum is 13 members. The variable that indicates whether a person is enrolled in University has a mean of 0.0394 (higher than in 2009), where the mean of being enrolled in a Public University is 0.0357 (higher than 2009), and the mean of being enrolled in a Private University is 0.0033 (lower than 2009). Finally, the variable that shows whether the head of household is not working, has a mean of 0.4755, which is higher than in 2009.

Overall, the summary statistics presented separately for data from 2009 and 2014, indicate that the education expenditures have been increased in total and for Public University, and have been decreased for Private Universities. The same pattern can be observed in the enrolment rates. Regarding the level of income, there has been a decrease of the average level, and an increase of the maximal values. The number of household members, academic degree of the head of household, and the indicator whether the head of household is not working, have similar patterns with the indicators of 2009.

In Table 1. of the Appendix, there are presented summary statistics for the pooled data of 2009 and 2014, which are used in the second part of the analysis. The additional variable presented there is the interaction variable between Head's Academic Degree and year 2014, which is used in the regression as the main explanatory variable that captures the effect of the Reform. This is a dummy variable with a mean of 0.057. The table and description of the other data included in this table can be found in the Appendix.

5. Methodology

In this section there will be presented the methodology used for addressing the research question. In the cases where the dependent variable indicates the expenditures in Euro for total, Public, and Private University, there are used OLS regressions. In the cases where the dependent variable is a binary variable that indicates the enrolment status in University, Public, or Private University, there are used Probit and Linear Probability regressions. The analysis consists in two phases, where both OLS and Probit (or LPM) regressions are included. The aim of the first phase of the analysis is to capture the effect that Head's Academic Degree has on the outcomes of enrolment in University and University expenditures, whereas the aim of the

second phase is to capture the effect of the closure of half of the Private Universities in these outcomes, which is the main focus of this research. The strategy used for capturing this effect is difference-in-difference.

For the first phase of the analysis there are used data from 2009, through which can be captured the effect of Head's Academic Degree in the outcomes before the occurrence of the Reform. The baseline regression specification for University expenditures can be written as:

$$(1) \textit{University expenditures}_i = \beta_0 + \beta_1 \textit{HeadAcademicDegree}_i + \beta_k X_i \Gamma + \varepsilon_i$$

The dependent variable in equation (1) indicates the total household University expenditures. This variable is included in levels and in its logarithmic form, although the numeric form is preferred towards the inclusion in its logarithmic form because of the potential measurement error that it contains. As argued in (Wooldridge, More on Specification and Data Issues, 2009) if measurement error is present in the dependent variable and it is included in its logarithmic form, the measurement error in the dependent variable would be in a multiplicative form. The notation of β_0 represents the constant. The main explanatory variable is a binary variable that indicates whether the Head of Household has an Academic degree, and its coefficient is β_1 . The other term in the right hand side of the equation represents a vector of additional control variables that are used in the multiple regression.

The first variable included in vector X, is the income level, where the standardized form of this variable is used, in order to avoid problems that might be present as a consequence of the scaling units. In the cases when the outcome is expressed in its logarithmic form, the variable of income is expressed in its logarithmic form as well. The other variables included are Age of the Head of Household, the quadratic term of age, a dummy variable that indicates whether the Head of household is a female, a dummy variable that indicates whether the Head of household is married, number of people living within a household, and a dummy variable that indicates whether the Head of household is not working.

One of the potential endogenous variables is the number of members within a household. As argued in (Jensen, 2003), the households decisions regarding the number of children may be driven from their preferences of having boys instead of girls. Consequently, the families who

do not have boys at the beginning, continue to give birth to other children, until they become parents of son/s. This leads to an increase of the number of household members regardless their economic conditions, and/or their real possibilities to finance their expenditures, including education expenditures. Moreover, if the fertility decisions are taken based on the preference for boys, female children become more likely to live in larger households, which leads to less resources allocated for their expenditures. This may create a gender bias in resource allocation, even if this does not come as a result of the willingness of their parents.

However, the use of household fixed effects, is very helpful for overcoming this problem, and is considered to be an effective control for this, and other family unobserved factors (Kingdon, 2005). In the case regression presented in equation (1), I use both Primary Sampling Units fixed effects, and household fixed effects within a Primary Sampling Unit, as a way to capture Households fixed effects. The inclusion of these effects, is also helpful for minimizing the omitted variable problem. In case of this model, the variables that indicate students' performance during secondary education, have remained in the error term, due to the lack of data regarding these indicators. Therefore, this is an additional argument in favour of the inclusion of fixed effects that help to minimize both endogeneity and omitted variables problems.

Besides observing the impact that Head's Academic Degree has on University expenditures in general, I also observe the impact that this variable and the other explanatory variables have on Public and Private University expenditures separately. Therefore, equation (1) is re-estimated two additional times with Public and Private University expenditures used as dependent variables at each time. This phase of the analysis proceeds with the estimation of the impact that Head's Academic Degree and the other explanatory variables have on the probability of being enrolled in University. This phase of the analysis proceeds with the estimation of the impact that Head's Academic Degree and the other explanatory variables have on the probability of being enrolled in University. In order to do this, the baseline equation is estimated by using Probit or Linear Probability regressions.

In the Probit Model, there is estimated the impact that each of the explanatory variables has on the probability of success (Wooldridge, Limited Dependent Variable Models and Sample Selection Corrections, 2009): in this case probability of being enrolled in University. The dependent variable is a binary variable that indicates whether the individual within a household

is enrolled in University. The independent variables are the same as those presented in Equation (1). However, the interpretation of the effects of the coefficients is not straightforward, as in the case of OLS regressions. In case of Probit models, there need to be computed the marginal effects of each coefficient on the outcome, in order to make a correct interpretation of the magnitude. In total there are estimated 6 types of equations for the first phase of the analysis: 3 types of equations consist in the estimation of the impact that Head's Academic Degree and the other explanatory variables have in total, Public and Private University expenditures separately, and other 3 types of equations are used to estimate the impact that the independent variables have on the probability of being enrolled in University, Public University, and Private University separately.

The second phase of the analysis includes data from both years 2009 and 2014. Besides capturing the effect that Head's Academic Degree and the other explanatory variables included in the regressions, have on the outcomes of University expenditures and probability of enrolment, the aim of this part is to capture the effect of the Policy change that occurred in 2014, which consisted in the closure of 18 Private Universities. In order to capture the effects of the Policy intervention, there is used difference-in-difference, where the main explanatory variable is the interacted term of Head Academic Degree and Year 2014.

Given that the dataset does not consist in a panel (which implies that one cannot use fixed effects model in this case) the most appropriate strategy of estimation is difference-in-difference. This strategy consists in capturing the effects of the Policy change, by considering the potential outcomes that would be present in the absence of this change (Angrist & Pischke, 2009). In this case these potential outcomes would be mainly explained by the time variation (Year) and the main explanatory variable 'Head's Academic Degree'. This part of the analysis also consists in 6 different equations estimated with pooled data: 3 that focus on total, Public, and Private University expenditures, and 3 that focus on the probability of being enrolled in University, Public University, and Private University. For the equations with expenditure outcomes, the baseline specification is:

$$(2) \text{ University expenditures}_{it} = \beta_0 + \beta_1 \text{HeadAcademicDegree} * \text{Year}_{it} + \beta_2 \text{HeadAcademicDegree}_i + \beta_3 \text{Year}_{2014} + \beta_k X_{it} \Gamma + \varepsilon_{it}$$

The dependent variable indicates the total household University expenditures for years 2009 and 2014, β_0 represents the constant, β_1 represents the coefficient of Head's Academic Degree interacted with Year 2014, which captures the effect of the Policy intervention on the outcome, β_2 represents the effect of Head's Academic Degree, β_3 captures the changes in the outcome that can be attributed to time effects, and $X_{it}\Gamma$ represents the vector of additional explanatory variables, which are the same as the variables included in Equation (1). The last term in the right hand side is used to indicate the error term.

As mentioned previously, this type of equation is estimated 3 different times due to the estimation of the effects on total, Public and Private University separately. The fixed effects used in this regression do not include Household within Primary Sampling Unit because the data are not panel data. Instead of this, I use Primary Sampling Unit fixed effects and Month fixed effects, as an attempt to minimize endogeneity and omitted variable problems. Further, the difference-in-difference strategy is used in Probit and Linear Probability regressions, in the cases where the dependent variable indicates the enrolment status in University, Public, and Private University.

As in the previous equations, even in this case, the independent variables are the same with the previous ones, and the main intention of these equations is to capture the effect of the Reform in the Probability of being enrolled in University, Public, or Private University. There are 3 different equations estimated that predict the effect that the policy intervention had on the outcomes represented by the dependent variable, as well as the impact that the control variables have on the probability of being enrolled in University, Public University, and Private University separately. The interpretation of the marginal coefficients is the same as previously explained in this section. The following section proceeds with the presentation and interpretation of the results obtained from each of the equations presented in this section.

6. Results

In this section there will be presented the results of the analysis. In the first subsection, there will be presented the results of the regressions that focus on the effect of Head's Academic Degree in probability of being enrolled, and University expenditures. The data for this part of the analysis are cross sectional data from 2009. In the second subsection, there will be presented

the results of the difference-in-difference strategy, which aims to capture the effect of the Reform in enrolment rates and University expenditures. For this part of the analysis there will be used pooled data from 2009 and 2014. Finally, in the third subsection there will be presented the extension of the difference-in-difference analysis by estimating the model that includes only positive values of University expenditures, and later including an additional interaction term between age of the head of household and Year 2014, and an interaction term between the gender indicator of the head of household and Year 2014, as a way to control for potential differences that may be captured by this term.

6.1. OLS and Probit results 2009

This subsection presents the results of the regressions that aim to explain the correlation between the main explanatory variable ‘Head’s Academic Degree’, and additional explanatory variables with University expenditures and Probability of being enrolled in University. Table 2., presents the results of the regressions that focus on the impact that Head’s Academic Degree and other explanatory variables have on total, Public, and Private University expenditures. Columns (1), (3), and (5) present the results of the regressions without fixed effects included, and columns (2), (4), and (6) present the results of the regressions with household within PSU and PSU fixed effects.

The results suggest that in all the regressions the effect of the Academic Degree of the Head of Household is positive and significant in all total, Public, and Private expenditure outcomes. The magnitude of this coefficient in total University expenditures with fixed effects included (column 2) indicates that households in which the head possesses an Academic Degree spend 25 Euro per month for University.

For Public and Private University expenditures separately the magnitude of this effect is lower 11.8 and 13.3 Euro respectively. Compared with the effect of the other coefficients in expenditure outcomes, it results that Head’s Academic Degree is the only coefficient that remains robust and has an impact not only in total University expenditures, but also in Public and Private University expenditures estimated separately.

Table 2: OLS regressions 2009, dependent variables: Total, Public and Private University expenditures

	<i>University</i>		<i>Public</i>		<i>Private</i>	
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Head Degree</i>	21.72*** (4.72)	25.07*** (5.24)	10.68** (4.25)	11.8** (4.7)	11.04*** (2.09)	13.27*** (2.39)
<i>Income</i>	3.15* (1.66)	2.31 (1.82)	3.07** (1.49)	2.53 (1.63)	.075 (0.73)	-.22 (.83)
<i>Head Age</i>	2.61*** (.73)	2.56*** (0.79)	2.23*** (0.67)	2.22*** (.7)	.36 (0.33)	.33 (.36)
<i>Head Age2</i>	-.02*** (.006)	-.02*** (.006)	-.01*** (0.005)	-.01*** (.006)	-.0029 (.0029)	-.0029 (.0030)
<i>Head Female</i>	1.93 (6.77)	-1.19 (6.97)	4.31 (6.10)	1.9 (6.26)	-3.12 (3.00)	-3.09 (3.18)
<i>Head Married</i>	0.28 (6.20)	-2.81 (6.40)	3.77 (5.59)	.65 (5.75)	-3.48 (2.75)	-3.46 (2.92)
<i>Number of HH members</i>	1.32 (.97)	1.26 (1.11)	1.04 (0.875)	.74 (.99)	.28 (.43)	.51 (.50)
<i>Head not working</i>	-2.93 (3.49)	-6.13 (3.7)	-3.96 (3.14)	-7.05** (3.32)	1.02 (1.54)	.92 (1.69)
<i>Constant</i>	-65.17*** (21.76)	-81.4* (33.85)	-58.83*** (19.6)	-72.84** (30.39)	-6.34 (9.64)	-8.55 (15.46)
<i>Household fixed effects</i>	No	Yes	No	Yes	No	Yes
<i>PSU fixed effects</i>	No	Yes	No	Yes	No	Yes
<i>N</i>	5568	5568	5568	5568	5568	5568
<i>R2</i>	0.0098	0.1396	0.0070	0.1425	0.0059	0.0820

Standard errors in parenthesis, * significant at 10% level, ** significant at 5% level, *** significant at 1% level, no stars imply not significant.

Income level has an effect in total and Public University expenditures, only in the regressions where it has not been controlled for fixed effects. The magnitude of this coefficient suggest

that an increase in the income level with one standard deviation, is associated with an increase in total and Public expenditures with 3.15 and 3.07 Euro respectively. In the case of Private University expenditures, income does not appear to have a significant impact.

The coefficients of Age of the head of household and the quadratic term of age are significant at 1% level in the regressions that explain total and Public University expenditures, but insignificant in the regressions that explain Private University expenditures. The other coefficients of all the remaining explanatory variables included in the regressions, appear to be insignificant except from the coefficient of 'Head not working' in Public University expenditures. This coefficient is significant at 5% level and its magnitude suggests that the fact that the head of household is not working is associated with 7 Euro less expenditures on Public University.

The correlation between this variable and the outcome, can be through two channels. The first one is that employment or unemployment of the head of household is related with the income level of the household: if the head of household is not working, this is expected to be associated with less income for the family, which in turn would possibly affect University expenditures for other family members. The second channel is through the choice that the rest of the family members have between working and studying. It is very likely that in the case when the families where their head is not working are facing financial difficulties, the other adult members choose to contribute in family's welfare by working, instead of studying.

In Table 3., there are presented the results of Probit regressions that explain the correlation between explanatory variables and enrolment in Universities, Public, and Private Universities. Besides the Probit results, there are also presented the results of Linear Probability regressions (columns 1,3, and 5) as a way to check for the validity of the marginal coefficients of Probit model. The similarity between the magnitude and significance of the respective coefficients in these regressions confirms that the marginal effects of the Probit regressions capture the effects that these variables have on the outcome, and the small difference with the Linear Probability results can be attributed to the different distributional form.

Table 3: Linear Probability and Probit regressions 2009, dependent variables: enrolment in University, Public, and Private University, Marginal effects presented

	<i>University</i> (1-LPM)	<i>Public</i> (2-Probit)	<i>Public</i> (3-LPM)	<i>Private</i> (4-Probit)	<i>Private</i> (5-LPM)	<i>Private</i> (6-Probit)
<i>Head Degree</i>	.030*** (.006)	.022*** (.005)	.020*** (.006)	.016*** (.005)	.010*** (.002)	.0056*** (.002)
<i>Income</i>	.002 (.002)	.001 (.001)	.002 (.002)	.0015 (.0018)	.0003 (.0009)	.0003 (.0006)
<i>Head Age</i>	.003*** (.001)	.003*** (.001)	.003*** (.001)	.003*** (.001)	.0001 (.0004)	.0002 (.0004)
<i>Head Age2</i>	-.00002*** (.000009)	-.00003*** (.00001)	-.00002*** (.000009)	-.00003*** (.00001)	-.000002 (.000003)	-.000003 (.000004)
<i>Head Female</i>	-.002 (.010)	-.003 (.011)	.001 (.009)	.001 (.011)	-.003 (.003)	-.002 (.003)
<i>Head Married</i>	-.003 (.009)	-.004 (.009)	.001 (.008)	.001 (.009)	-.005 (.003)	-.003 (.002)
<i>Number of HH members</i>	.0017 (.001)	.002 (.0014)	.001 (.001)	.002* (.0013)	.0001 (.0005)	.00007 (.0005)
<i>Head not working</i>	-.005 (.005)	-.004 (.005)	-.008* (.0048)	-.007 (.004)	.002 (.0018)	.002 (.0018)
<i>N</i>	5568	5568	5568	5568	5568	5568
<i>(Pseudo) R2</i>	0.0080	0.0333	0.0064	0.0323	0.0042	0.0434

Standard errors in parenthesis, * significant at 10% level, ** significant at 5% level, *** significant at 1% level, no stars imply not significant.

As in the case of OLS results on expenditure outcomes, even in this case the variable that strongly affects the enrolment outcomes in all the cases is ‘Head’s Academic Degree’. The magnitude of this coefficient in University enrolment indicates that individuals that come from household where the head is highly educated are 0.022 percentage points more likely to be enrolled in University. This magnitude is slightly lower for enrolment in Public University (0.016), and much lower for enrolment in Private University (0.0056).

The variables which's coefficients are significant for probability of being enrolled in University and Public University are 'Head's age' and 'Head's age squared' with a positive and negative effect in the outcomes. However, even though the effect of these variables appears to be very strong (1% significance level), it is not present in the regressions that explain enrolment in Private Universities, neither for Linear Probability regression, nor for the Probit regression.

Another coefficient that is significant at 10% level for enrolment in Public University in the case of Linear Probability regression is 'Head not working'. This coefficient is not significant in the Probit regression which may be attributed to the difference in the distributional form between Probit and Linear Probability regressions. In the case of Probit regression for Public University enrolment, the number of people in the household appears to have a positive and significant (10% level) effect in the outcome. The magnitude of the coefficient suggests that an increase of the number of members in the household with one member is associated with an increase of 0.002 percentage points in the probability of being enrolled in Public University.

Overall the results presented in this subsection suggest that the variable which has a positive and significant effect on both University expenditures and enrolment outcomes is 'Head's Academic Degree'. The impact of this indicator is robust after the changing of regressions' specifications as well as in the cases where Public and Private University outcomes are estimated separately. Therefore, considering the strong and positive correlation that this variable has with all the outcomes estimated above, I use its interaction with time in the next subsection, as a way to capture the effects that the Policy change occurred between 2009 and 2014 has on each of the outcomes of interest.

6.2. Difference in difference results

In this subsection there will be presented the main results that aim to capture the effects of the Policy change in both expenditures and enrolment outcomes. The analysis continues to be focused on total, Public and Private expenditures, as well as in University, Public and Private University enrolment outcomes. The reason behind estimating Public and Private University outcomes separately is that the results are expected to be different due to the differences in peoples' expectations about the validity of investment in each kind of University after the Reform. The sample continues to exclude the very high values and it consists in 12050

observations, out of 12160 observations that were in the original sample. The results using the full sample can be found in Appendix 2.

The results of the OLS regressions that focus on total, Public, and Private University expenditures are presented in Table 4. The coefficient of the interaction term that aims to capture the changes that the Reform had on the outcomes, is significant only in the case of Private University expenditures and has a negative sign. The magnitude of this coefficient suggests that due to the Reform, the households' expenditures where the head is highly educated, decrease with 11.75 Euro per month. On the other hand, this variable does not appear to have any significant effect on total and Public University expenditures. The reason that explains this result is related with the perception that people have about the quality of these Universities, and the expectations regarding the validity of their investments in higher education.

Before the occurrence of the Reform, each person was making his/her enrolment decisions based on his/her own perception about the quality of the University, admission criteria, courses offered, and other factors that were not related with the validity of diploma after being graduated. Then, after the announcement about the Reform and the occurrence of the Reform, which was associated with the invalidity of many of the diplomas obtained in the closed Universities, investment in Private Universities was not considered to be as safe as investing in Public University. Even though the remaining Private Universities were assessed to meet the necessary criteria for operating as Higher Education Institutions, the occurrence of the Reform created the perception that it is likely that in the future the quality of the existing Universities may be reassessed, which would increase the risk for the invalidity of the diplomas obtained in these Universities.

For the Private University outcomes, the only variables that affect significantly the expenditures, are the interaction term described previously, and Head's Academic Degree which has a positive and significant effect of 12 Euros increase in monthly Private University expenditures. The impact of this coefficient is also positive for total and Public University expenditures, although it does not remain significant after the inclusion of fixed effect in the regression for Public expenditures.

Table 4: OLS regressions for the effect of the Reform on Total, Public and Private University expenditures

	<i>Total</i>		<i>Public</i>		<i>Private</i>	
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Head Degree*year</i>	-1.87 (12.20)	7.62 (13.0)	.59 (8.55)	8.63 (9.75)	-10.13** (3.97)	-11.75** (5.63)
<i>Head Degree</i>	23.11*** (6.40)	19.09*** (7.20)	12.62** (6.23)	6.85 (7.09)	10.96*** (3.82)	12.15** (5.31)
<i>Year 2014</i>	8.23*** (2.37)	10.48*** (3.16)	6.37*** (2.01)	8.90*** (2.49)	-0.38 (.52)	-0.04 (0.75)
<i>Income</i>	.52 (0.85)	1.19 (1.025)	.33 (.70)	.70 (0.86)	.05 (.22)	.07 (.29)
<i>Head Age</i>	3.15*** (.48)	3.44*** (0.52)	2.64*** (0.41)	2.93*** (0.44)	.13 (.16)	.16 (.17)
<i>Head Age2</i>	-.027*** (.004)	-.03*** (.004)	-.02*** (.003)	-.02*** (.003)	-.001 (.001)	-.0017 (.0013)
<i>Head Female</i>	-2.08 (3.26)	-1.23 (3.65)	0.52 (2.78)	1.09 (3.05)	-2.18 (1.75)	-1.71 (1.85)
<i>Head Married</i>	-1.78 (2.94)	-1.37 (3.26)	-.31 (2.54)	-0.14 (2.66)	-2.35 (1.73)	-1.81 (1.92)
<i>Number of HH members</i>	2.43*** (.58)	2.09*** (.73)	2.55*** (.51)	2.65*** (0.61)	.12 (.14)	.11 (.16)
<i>Head not working</i>	-8.09** (3.27)	-9.8** (3.25)	-5.54** (2.71)	-7.35*** (2.73)	.72 (1.12)	.53 (1.05)
<i>Constant</i>	-79.6*** (14.37)	-97.11*** (16.67)	-70.29*** (11.7)	-84.93*** (14.32)	-0.06 (5.69)	-3.47 (6.05)
<i>Month fixed effects</i>	No	Yes	No	Yes	No	Yes
<i>PSU fixed effects</i>	No	Yes	No	Yes	No	Yes
<i>N</i>	12050	12050	12050	12050	12050	12050
<i>R2</i>	0.0074	0.0801	0.0074	0.0752	0.0048	0.0482

Standard errors in parenthesis, * significant at 10% level, ** significant at 5% level, *** significant at 1% level, no stars imply not significant. Standard errors robust.

The year variable, age of head of household, and number of people in the household affect positively both total and Public University expenditures. On the other hand, the quadratic term of age of household's head, and the unemployment status of the head of household affect negatively total and Public University expenditures. These coefficients remain significant after the inclusion of fixed effects for both outcomes. The results of the regressions where the dependent variable is used in its logarithmic form, can be found in Table 3., in the Appendix.

In Table 5., there are presented the results of Probit and Linear Probability regressions where the dependent variables are enrolment outcomes in University, Public, and Private Universities. The only case where the interaction term has a significant effect is in the Linear Probability regression for Private University enrolment. This result suggests that due to the Reform, in households where the head is highly educated, the probability of being enrolled in Private University decreases with 0.009 percentage points.

The coefficient of Head's Academic Degree suggests that this variable has a positive and significant effect on the probability of enrolment in University, Public, and Private University in both Probit and Linear Probability regression specifications. The effect of the year variable is positive and significant only in the outcomes of University and Public University enrolment, as well as the effect of head's age and number of household members. The quadratic term of age and the temporary unemployment of head of household appear to have a negative effect on probability of being enrolled in University and Public University.

Interestingly, the coefficients of 'Head Female' and 'Head Married' appear to be significant at some of the regression specifications. The female coefficient is negative and significant for the enrolment outcomes on University and Public University. The coefficient of head's marital status is negative and significant in the Probit regressions for the enrolment in University, Public and Private University, and only for University enrolment in Linear Probability specification.

Table 5: Linear Probability and Probit regressions for the effect of the Reform on enrolment in University, Public, and Private University. Marginal effects presented

	<i>Total</i> (1-LPM)	(2-Probit)	<i>Public</i> (3-LPM)	(4-Probit)	<i>Private</i> (5-LPM)	(6-Probit)
<i>Head Degree*year</i>	-.011 (.012)	-.009 (.007)	-.0041 (.012)	-.005 (.007)	-.009** (.004)	-.003 (.002)
<i>Head Degree</i>	.032*** (.009)	.025*** (.005)	.021** (.009)	.018*** (.006)	.010*** (.003)	.004*** (.001)
<i>Year 2014</i>	.006** (.002)	.006** (.0029)	.007** (.0027)	.007** (.003)	-.0003 (.0008)	-.0005 (.001)
<i>Income</i>	.0001 (.0008)	.0001 (.0005)	.00004 (.0008)	.00006 (.0005)	.00008 (.0002)	.00006 (.00007)
<i>Head Age</i>	.003*** (.0007)	.004*** (.001)	.003*** (.0007)	.004*** (.001)	.0001 (.0002)	.00029 (.00034)
<i>Head Age2</i>	-.00003*** (.000006)	-.00004*** (.00001)	-.00002*** (.000003)	-.00004*** (.000001)	-.000001 (.000002)	-.000003 (.000003)
<i>Head Female</i>	-.010** (.004)	-.015** (.006)	-.007* (.004)	-.012** (.006)	-.002 (.002)	-.002 (.0019)
<i>Head Married</i>	-.009* (.005)	-.013** (.005)	-.006 (.004)	-.009* (.005)	-.003 (.002)	-.002** (.001)
<i>Number of HH members</i>	.0026*** (.0007)	.0029*** (.0007)	.002*** (.0006)	.002*** (.0007)	.0001 (.0001)	.0001 (.0002)
<i>Head not working</i>	-.008** (.004)	-.006* (.004)	-.010** (.004)	-.008** (.004)	.001 (.001)	.001 (.001)
<i>N</i>	12050	12050	12050	12050	12050	12050
<i>R2</i>	0.0077	0.0342	0.0068	0.0340	0.0029	0.0479

Standard errors in parenthesis, * significant at 10% level, ** significant at 5% level, *** significant at 1% level, no stars imply not significant. Standard errors robust.

6.3. Further analysis

In this subsection there will be presented two additional extensions of the previous analysis. The first extension consists in the estimations made only based on positive expenditures on Total, Public and Private Universities. In the second extension there is considered a new interaction term between year and head's age, which will be used to control for an additional potential difference that may be captured by this term. Finally, there will be included a new interaction term between gender of the head of household, and time. The reason behind using age and gender variables interacted with time (as a way to capture differences caused by the reform through these variables), is the fact that they are exogenous.

Table 6., presents the results of the OLS regressions where only positive values for Total, Public and Private University expenditures are used. This consists in a much smaller sample compared to the one used previously, in particular for Private University expenditures. The results obtained by using this sample suggest that the interaction term between 'Head's Academic Degree' and 'Year' has no effect in none of the expenditure outcomes. Head's Academic Degree appears to have a positive and significant effect in total and Private University expenditures only, and the magnitudes of these coefficients are much higher compared to those estimated previously.

The effect of Year is positive and significant for total and Public University expenditures. The effects of interaction, Head's Academic Degree and Year are presented without and with additional control variables included. In case of the Year effect for total University expenditure, its magnitude suggests, that for households who have positive expenditure on University, Year 2014 is associated with an increase by 135.79 Euro. Income appears to have a positive effect on total and Public University expenditures, which was not found to have any effect until this moment. Age of the head of household has a positive effect only in total University expenditures.

In contrast with the previous findings, the coefficients that indicate gender and marital status of the head of household have a positive effect in some of the outcomes. The coefficient of 'Head Female' is positive and significant on total and Public University expenditures, whereas the coefficient of 'Head Married' is positive and significant at 10% level only in the case Public University expenditures. Number of household members appears to be positively correlated

with total and Public University expenditures, whereas the unemployment status of the head of household does not appear to be significant at any of the cases.

Table 6: OLS regressions for total, Public and Private University expenditures, with positive expenditures only.

	<i>Total</i>		<i>Public</i>		<i>Private</i>	
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Head Degree*year</i>	-67.3 (95.5)	-46.9 (86.5)	2.4 (10.3)	32.9 (86.7)	-316.7 (253.4)	-392.7 (350.9)
<i>Head Degree</i>	107.9* (64.09)	115.2** (56.9)	14.7 (73.5)	27.2 (54.9)	360.4*** (129.2)	324.6* (160.6)
<i>Year 2014</i>	93.13* (48.4)	135.79*** (49.64)	113.13** (52.07)	159.8*** (53.8)	-106.9 (168.2)	-12.2 (154.2)
<i>Income</i>		112.06*** (34.28)		119.1*** (36.5)		135.9 (195.2)
<i>Head Age</i>		16.45* (9.77)		14.7 (9.7)		-18.3 (29.4)
<i>Head Age2</i>		-.14 (.09)		-.13 (.09)		.28 (.29)
<i>Head Female</i>		236.9** (117.12)		338.4*** (87.5)		-220.8 (153.4)
<i>Head Married</i>		79.25 (112.9)		166.9* (95.5)		177.8 (145.6)
<i>Number of HH members</i>		57.95*** (16.74)		73.3*** (17.2)		-65.24 (75.5)
<i>Head not working</i>		50.8 (43.6)		42.88 (45.12)		92.03 (159.29)
<i>Constant</i>	541.6*** (37.5)	-303.7 (215.6)	534.7*** (40.6)	-386.05* (210.6)	603.6*** (110.7)	839.5 (617.6)
<i>N</i>	306	306	281	281	28	28
<i>R2</i>	0.0179	0.1335	0.0220	0.1672	0.2868	0.4676

Standard errors in parenthesis, * significant at 10% level, ** significant at 5% level, *** significant at 1% level, no stars imply not significant. Standard errors robust.

In Table 7., there are presented the results of the regressions that include the new interaction term between age of the head of household and year. Panel A presents the results of the OLS regressions on expenditure outcomes, and Panel B presents the results of the Probit regressions on enrolment outcomes. In order to allow for an easier interpretation of the magnitude, the variable ‘Head Age’ is used in its standardized form while interacted with time.

Table 7: OLS and Probit regressions where age is interacted with time. Outcomes: Total, Public, and Private University expenditures and enrolment in University, Public and Private University

	Panel A OLS			Panel B Probit		
	(1-Total)	(2-Public)	(3-Private)	(1-Uni)	(2-Public)	(3-Private)
<i>Head Degree*time</i>	-55 (10.28)	8.40 (9.79)	-11.77** (5.38)	-.009 (.007)	-.005 (.007)	-.003 (.002)
<i>Head Age*time</i>	-1.71 (1.49)	-1.67 (1.38)	-.11 (.56)	-.0057 (.0036)	-.005 (.003)	-.0009 (.001)
<i>Head Age</i>	3.11*** (.46)	3.03*** (.45)	.17 (.15)	.004*** (.001)	.005*** (.0014)	.00037 (.00038)
<i>Head Age2</i>	-.025*** (.003)	-.025*** (.003)	-.001 (.001)	-.00004*** (.00001)	-.00004*** (.00001)	-.000004 (.000003)
<i>Year2014</i>	8.41*** (2.58)	8.92*** (2.52)	-.38 (.77)	.005* (.003)	.007** (.004)	-.0008 (.001)
<i>Head Academic Degree Income</i>	19.06** (8.16)	6.89 (7.09)	12.15** (5.10)	.025*** (.005)	.018*** (.006)	.004*** (.001)
<i>Constant</i>	-.92.6*** (15.61)	-.91.7*** (14.98)	-3.91 (5.09)			
<i>Fixed Effects</i>	Yes	Yes	Yes			
<i>N</i>	12050	12050	12050	12050	12050	12050
<i>(Pseudo) R2</i>	0.0742	0.0758	0.0482	0.0352	0.0356	0.0615

Standard errors in parenthesis, * significant at 10% level, ** significant at 5% level, *** significant at 1% level, no stars imply not significant. Standard errors robust. Controlled for Head’s gender, marital status and unemployment status, and number of household members.

The results suggest that the new interaction term does not have any significant effect in none of outcomes of interest. On the other hand, the other interaction term that was also used previously appears to have a strong and negative effect on the outcome of Private University expenditures. This coefficient suggests that in households where the head possesses an Academic Degree, the occurrence of the Reform is associated with 11.77 Euro less monthly expenditures on Private Universities.

The effect of Head's Academic Degree in the outcomes is positive and significant in all the outcomes, with the exception of expenditures in Public University. The effect of 'Year 2014' appears to be positive and significant for the expenditures and enrolment outcomes in University and Public University, but negative and insignificant in Private University's outcomes. The effect of head's age and its quadratic term is positive and negative respectively, for the outcomes of expenditures and enrolment in University and Public University. Finally, there is no significant effect of income found in neither of the regressions.

In Table 8., there are presented the results of the OLS and Probit regressions where an additional interaction term is added: 'Head Female' interacted with 'Year 2014'. However, similarly with the interaction of 'Head Age' and 'Year 2014', this variable appears to have a negative and insignificant correlation with the outcomes in all the regressions. Again, the first interaction term between 'Head's Academic Degree' and 'Year 2014' is significant at 5% level, and associated with a decrease of expenditures for Private Universities.

The effects of the variables 'Head Age' and its quadratic term are very similar with the respective effects of the regressions presented in Table 7. Also, the effect of Head's Academic Degree is significant and positive in all the regressions except from the regression that estimates Public University expenditures, and the magnitudes of the coefficients of Head Age are very similar with the respective magnitudes of these coefficients in the regressions of Table 7. However, the effect of 'Year 2014' has a higher magnitude in the regressions of total and Public University expenditures presented in Table 8, as well as in the regression where enrolment in University is the dependent variable.

The results of the estimations presented in Tables 7. and 8, suggest that the effect of the Reform is present in Private University expenditures and can be captured only through Head's Academic Degree. Considering the previous findings of this section, it is noticeable that this

effect remains robust after changing the specification of the baseline regression which consists in including or excluding fixed effects, and adding additional interaction variables.

Table 8: OLS and Probit regressions where gender is interacted with time. Outcomes: Total, Public, and Private University expenditures and enrolment in University, Public, and Private University

	Panel A OLS			Panel B Probit		
	(1-Total)	(2-Public)	(3-Private)	(1-Uni)	(2-Public)	(3-Private)
<i>Head Degree*time</i>	-0.84 (11.11)	8.03 (9.58)	-11.75** (5.36)	-0.009 (.007)	-0.005 (.007)	-0.003 (.002)
<i>Head Age*time</i>	-1.48 (1.54)	-1.35 (1.44)	-.13 (.55)	-.0052 (.0037)	-.005 (.003)	-.0009 (.001)
<i>Head Female*time</i>	-4.06 (5.48)	-5.25 (5.32)	-.28 (1.6)	-.011 (.010)	-.007 (.010)	-.001 (.002)
<i>Head Age</i>	3.11*** (.46)	3.01*** (.45)	.17 (.15)	.004*** (.001)	.004*** (.0013)	.00038 (.00035)
<i>Head Age2</i>	-.025*** (.003)	-.025*** (.003)	-.001 (.001)	-.00004*** (.00001)	-.00004*** (0.00001)	-.000004 (.000003)
<i>Year2014</i>	9.07*** (2.7)	9.69*** (2.73)	-.08 (.78)	.007** (.003)	.007** (.003)	-.0007 (.001)
<i>Head Academic Degree</i>	19.26** (8.17)	7.15 (7.09)	12.13** (5.08)	.025*** (.005)	.019*** (.005)	.004*** (.001)
<i>Head Female</i>	1.65 (4.63)	4.15 (3.97)	-1.88 (2.37)	-.008 (.009)	.007 (.009)	.001 (.002)
<i>Constant</i>	-92.1*** (14.69)	-91.19*** (13.89)	-3.94 (5.09)			
<i>Fixed Effects</i>	Yes	Yes	Yes	No	No	No
<i>N</i>	12050	12050	12050	12050	12050	12050
<i>(Pseudo) R2</i>	0.0742	0.0758	0.0482	0.0356	0.0358	0.0619

Standard errors in parenthesis, * significant at 10% level, ** significant at 5% level, *** significant at 1% level, no stars imply not significant. Standard errors robust. Controlled for income, Head's marital status and unemployment status, and number of household members.

In general, the results presented in this section suggest that among the explanatory variables included in the models, Head's Academic Degree appears to be the most important one while explaining household expenditures and enrolment decisions in University in general, and Public and Private Universities separately. Regarding the impact that the Reform had on these outcomes, in the cases where such an effect is captured by the difference-in-difference regressions it appears to be negative for the Private University outcomes, for both expenditure and enrolment decisions. Also, when the full sample is used (results presented in the Appendix), in some of the regressions that focus on Public University outcomes, the effect of the Reform is positive. As mentioned earlier in this section, the reason behind these effects of the Reform is related with the way that people perceive the quality of Public and Private Universities, and the validity of investments in Private Universities.

7. Conclusion

The research question addressed in this study was about the impact that the first phase of the Higher Education Reform, that consisted in the closure of half of the existing Private Universities in Albania, had on expenditure and enrolment outcomes for Universities in general, and Public and Private Universities separately. The analysis is made by firstly examining the impact of several factors such as: Academic Degree of the Head of Household, income, unemployment, and other characteristics, in both expenditure and enrolment outcomes. Then, after resulting that Head's Academic Degree was the main variable which appeared to have a strong and positive correlation with all total, Public and Private University expenditures and enrolment rates, there was used a difference-in-difference strategy with an interaction term between Head's Academic Degree and Year as a main variable of interest.

The results suggested that the Reform had a negative impact on Private University expenditures in most of the cases, and in enrolment in Private Universities in one case. The reasons behind these are related with the perception that people may have about the quality of the Private Universities, and the validity of the investment in Private Universities. The fact that after having operated in the market for many years, suddenly half of the Private Universities were closed (and another part suspended), creates the perception that this may happen even to some of the remaining Private Universities in the future, which has lowered the credibility of people on these Institutions.

Also, the fact that the Universities that did not meet the criteria for operating as Higher Educational Institutions, were Private Universities, confirmed the perception of many individuals that the quality of education in these Universities was lower compared to the Public ones. This is not surprising, given that in the absence of periodical auditing processes, Private Universities tend to maximize their profits increasing the numbers of student accepted regardless their abilities and/or the educational environment that these Institutions can provide to their students. However, even though the occurrence of the Reform is associated with uncertainty regarding the quality and the future of the remaining Private Universities in the short run, periodical audits from the government would be helpful to improve the reputation of these Institutions, and allow people to have more realistic perceptions for Higher Education Institutions in the long run.

This analysis presented the different effects that the first phase of the Reform had on Public and Private University expenditures and enrolment based on household level data. Despite the fact this study suggests an interesting finding, there is room for future research on this topic, which can be improved by using individual data that include more factors related with higher education, such as high school grades and state exam results. Also, besides using data that focus on expenditure, grades, income, and other variables that were included in this study, it would be with interest to collect individual data regarding the perception that people have on the quality and validity of their investment in either Public or Private Universities. This would allow for an estimation of the relationship between peoples' perception on each kind of Higher Education Institution and enrolment decisions.

8. Bibliography

- Çela, A., Kamberi, G., & Pici, E. (2015). *Albanian Youth 2015 "Slow Change, Internet Dependency and...EU trust!"*. Friederich Ebert Stiftung.
- Angrist, J. D., & Pischke, J.-S. (2009). Fixed Effects, DD, and Panel Data. In J. D. Angrist, & J.-S. Pischke, *Mostly Harmless Econometrics* (pp. 227-241).
- Angrist, J., & Pischke, J.-S. (2009). Nonstandard Standard Error Issues. In J. Angrist, & J.-S. Pischke, *Mostly Harmless Econometrics* (pp. 308-323).
- Davis-Kean, P. E. (2005, June). The Influence of Parent Education and Family Income on Child Achievement: The Indirect Role of Parental Educations and the Home Environment. *Journal of Family Psychology*, 294-304.
- Frenette, M. (2007, February). *Why Are Youth from Lower-income Families Less Likely to Attend University? Evidence from Academic Abilities, Parental Influences, and Financial Constraints*. Retrieved from Statistics Canada: https://www.researchgate.net/profile/Marc_Frenette/publication/23546175_Why_Are_Youth_from_Lower-Income_Families_Less_Likely_to_Attend_University_Evidence_from_Academic_Abilities_Parental_Influences_and_Financial_Constraints/links/00b7d524061a65572f000000.pdf
- Hossler, D., & Maple, S. (1993). Being Undecided about Postsecondary Education. *The Review of Higher Education*, 285-307.
- IDEA. (2012). *Rankimi boteror lista e universiteteve shqiptare*. Retrieved from Shqiperia.com: <https://www.shqiperia.com/Rankimi-boteror-lista-e-universiteteve-shqiptare.-Epoka-i-pari-UT-i-dyti.17864/>
- INSTAT. (2001). *Census 2001, Census Data*. Retrieved from Instituti i Statistikave Shqipëri: <http://www.instat.gov.al/en/census/census-2001/census-data.aspx>
- INSTAT. (2015). *Education, International Comparison: Gross enrolment ratio*. Retrieved from INSTAT: <http://www.instat.gov.al/en/themes/education.aspx>
- Jensen, R. (2003). *Watson Institute*. Retrieved from Equal Treatment, Unequal Outcomes? Generating Sex Inequality Through Fertility Behaviour: http://watsoninstitute.org/pub/Jensen_FertPrefs.pdf
- Kingdon, G. G. (2005). Where Has All the Bias Gone? Detecting Gender Bias in the Intra-household Allocation of Educational Expenditure. *Economic Development and Cultural Change*.
- MATHTECH, INC. (1998). *Factors Related to College Enrollment*. Retrieved from MATHTECH: <https://www2.ed.gov/offices/OUS/PES/finaid/enroll98.pdf>
- Ministry of Education and Sports. (2014). *Decision for omission of the licence for some of the Private Higher Education Institutions, nr. 539*. Tirana: Ministry of Education.
- Ministry of Education and Sports. (2014). *Decision for suspension of activity for some of the Private Higher Education Institutions*. Tirana: Ministry of Education and Sports.
- Open Data Albania. (2013). *The offer for programs of study by Higher Education Institutions Public and Private*. Retrieved from open.data.al: <http://open.data.al/en/lajme/lajm/id/860/The-offer-for-programs-of-study-by-Higher-Education-Institutions-Public-and-Private>

- Rouse, C. E. (1994). What to do after High School: The Two-Year versus Four-Year College Enrollment Decision. In R. G. Ehrenberg, *Choices and Consequences, Contemporary Policy Issues in Education* (pp. 59-89). New York: ILR Press.
- Rowan-Kenyon, H. T., Bell, A. D., & Perna, L. W. (2008). Contextual Influences on Parental Involvement in College Going: Variations by Socioeconomic Class. *The Journal of Higher Education*, 564-586.
- Serra, D., Barr, A., & Packard, T. (2011, April). *Education Outcomes, School Governance and Parents' Demand for Accountability*. Retrieved from The World Bank: <http://documents.worldbank.org/curated/en/321891468250262749/pdf/WPS5643.pdf>
- Tierney, W. G., & Auerbach, S. (2005). Toward Developing an Untapped Resource: The Role of Families in College Preparation. In Z. B. Corwin, J. E. Colyar, & W. G. Tierney, *Preparing for College: Nine Elements of Effective Outreach* (pp. 29-49). New York: State University of New York Press, Albany.
- Weiss, F., & Steininger, H.-M. (2013, August). Educational family background and the realisation of educational career intentions: participation of German upper secondary graduates in higher education over time. *Higher Education*, 189-202.
- Wooldridge, J. M. (2009). Introductory Econometrics, A Modern Approach. In J. M. Wooldridge, *Introductory Econometrics, A Modern Approach* (Vol. 4, p. 527). South-Western CENGAGE Learning.
- Wooldridge, J. M. (2009). Limited Dependent Variable Models and Sample Selection Corrections. In J. M. Wooldridge, *Introductory Econometrics, A Modern Approach* (pp. 575-580).
- Wooldridge, J. M. (2009). More on Specification and Data Issues. In J. M. Wooldridge, *Introductory Econometrics, A Modern Approach* (p. 317). South-Western Cengage Learning.
- Wooldridge, J. M. (2013). *Introductory Econometrics, A Modern Approach*. Michigan State University.
- World Bank. (2012). *Albania - Secondary and tertiary education : labor market and education*. Retrieved from World Bank: <http://documents.worldbank.org/curated/en/718601468192886356/Albania-Secondary-and-tertiary-education-labor-market-and-education>

9. Appendix

Appendix Table 1: Summary Statistics, Pooled data for years 2009 and 2014

Variable	Observations	Mean	Standard Deviation	Minimum Value	Maximum Value
Total University Expenditure	12160	37.47	280.64	0	7352
Public University Expenditure	12160	30.49	235.75	0	5882
Private University Expenditure	12160	5.54	130.6	0	7352
Total Income	12160	13382.3	53455	0	556617
Labor Income	12160	5269.6	12132	0	39705.8
Non Labor Income	12160	8161.17	5220.5	0	556617
Age of the Head of Household	12160	55.73	13.31	12	101
Head of the Household Female (Female=1, Male=0)	12160	0.137	0.344	0	1
Head of Household Married (Married=1)	12160	0.831	0.374	0	1
Head of Household's School Years	12160	9.606	3.753	0	20
Head of Household with Academic Degree (1=Yes, 0=No)	12160	0.1035	0.3046	0	1
Number of Household Members	12160	3.890	1.715	1	19
Enrolled in University (1=Yes, 0=No)	12160	0.0341	0.1815	0	1
Enrolled in Public University (1=Yes, 0=No)	12160	0.0302	0.1713	0	1
Enrolled in Private University (1=Yes, 0=No)	12160	0.0037	0.0607	0	1
Head of HH not working (0=work)	12160	0.4564	0.4981	0	1
Head Degree *Year 2014	12160	0.0574	0.2326	0	1

Table 2: OLS and Probit regressions 2009 full sample used, dependent variables: Total, Public and Private University expenditures (columns 1, 3, and 5) and enrolment in University, Public University and Private University (columns 2, 4 and 6)

	<i>University</i>		<i>Public</i>		<i>Private</i>	
	<i>(1-OLS)</i>	<i>(2-Probit)</i>	<i>(3-OLS)</i>	<i>(4-Probit)</i>	<i>(5-OLS)</i>	<i>(6-Probit)</i>
<i>Head Degree</i>	42.5** (18.18)	.025*** (.006)	22.18* (12.09)	.018*** (.005)	20.34 (14.05)	.006*** (.002)
<i>Income</i>	.0.101 (4.06)	.004** (.002)	4.66** (2.26)	.003* (.001)	-4.56 (4.22)	.0009 (.0006)
<i>Head Age</i>	4.23** (1.98)	.004*** (.001)	4.72*** (0.91)	.005*** (.0014)	-0.49 (1.67)	.00007 (.0004)
<i>Head Age2</i>	-0.04** (0.016)	-.00004*** (.00001)	-0.037*** (0.008)	-.00004*** (.00001)	0.002 (0.01)	-.000002 (.000004)
<i>Head Female</i>	-1.43 (9.08)	-.002 (.013)	-0.43 (6.35)	.0012 (.012)	-1.004 (6.57)	-.002 (.003)
<i>Head Married</i>	0.19 (6.5)	-.002 (.011)	1.18 (5.74)	.003 (.011)	-0.98 (5.16)	-.003 (.003)
<i>Number of HH members</i>	2.87*** (1.08)	.0018 (.0015)	2.41** (1.06)	.002 (.001)	0.45 (0.43)	-.0001 (.0006)
<i>Head not working</i>	-13.4 (9.25)	-.007 (.005)	-20.01*** (7.58)	-.010** (.005)	7.62 (6.38)	.0022 (.0020)
<i>Constant</i>	-146.5** (60.79)		-156.3*** (25.21)		9.81 (53.01)	
<i>Household fixed effects</i>	Yes		Yes		Yes	
<i>PSU fixed effects</i>	Yes		Yes		Yes	
<i>N</i>	5595	5595	5595	5595	5595	5595
<i>(Pseudo) R2</i>		0.0395		0.0431		0.0569
	0.1050		0.1113		0.0860	

Standard errors in parenthesis, * significant at 10% level, ** significant at 5% level, *** significant at 1% level, no stars imply not significant.

Table 3: OLS regressions for the effect of the Reform on Total, Public and Private University expenditures, dependent variable in logarithmic form, restricted sample

<i>Variable</i>	<i>(1-Total)</i>	<i>(2-Total)</i>	<i>(3-Public)</i>	<i>(4-Public)</i>	<i>(5-Private)</i>	<i>(6-Private)</i>
<i>Head Degree*Year</i>	-.144 (.16)	-.036 (.189)	-.042 (.165)	.080 (.187)	-.132** (.061)	-.163** (.069)
<i>Head Academic Degree Year 2014</i>	.435*** (.12)	.352** (.138)	.284** (.126)	.187 (.141)	.150*** (.055)	.168*** (.059)
<i>Income</i>	.002 (.011)	.017 (.015)	.0009 (.011)	.015 (.015)	.001 (.003)	.002 (.003)
<i>Head Age</i>	.047*** (.010)	.049*** (.0103)	.046*** (.010)	.048*** (.010)	.001 (.003)	.002 (.003)
<i>Head Age2</i>	-.0004*** (.00008)	-.0004*** (.00008)	-.0004*** (.00008)	-.0004*** (.00008)	-.00002 (.00003)	-.00003 (.00003)
<i>Head Female</i>	-.12** (.063)	-.103 (.067)	-.087 (.057)	-.068 (.062)	-.037 (.031)	-.028 (.032)
<i>Head Married</i>	-.113 (.069)	-.085 (.069)	-.071 (.060)	-.055 (.061)	-.046 (.030)	-.035 (.030)
<i>Number of Household members</i>	.037*** (.009)	.040*** (.0115)	.036*** (.009)	.038*** (.010)	.001 (.002)	.001 (.002)
<i>Head not working</i>	-.117*** (.058)	-.152*** (.058)	-.137** (.054)	-.171*** (.055)	.0182 (.021)	.014 (.018)
<i>Constant</i>	-.959*** (.328)	-.84 (.550)	-1.03*** (.305)	-.880*** (.540)	.045 (.129)	-.020 (.122)
<i>Month fixed effects</i>	No	Yes	No	Yes	No	Yes
<i>PSU fixed effects</i>	No	Yes	No	Yes	No	Yes
<i>N</i>	12050	12050	12050	12050	12050	12050
<i>R-squared</i>	0.0079	0.0770	0.0072	0.0776	0.0032	0.0563

Standard errors in parenthesis, * significant at 10% level, ** significant at 5% level, *** significant at 1% level, no stars imply not significant. Standard errors robust.

Table 3., presents the OLS results where the dependent variable is now included in its logarithmic form. Again, as in the previous case, the effect of the interaction term is present only in Private University expenditures and it is significant at 5% level. The magnitude of this effect in the regression with fixed effects included (column 6) suggests that due to the Reform, the households' expenditures on Private Universities where the head is highly educated, decrease with 16.3% per month. The effect of Head's Academic Degree is positive and significant in all the expenditure outcomes, whereas the effect of time is present only in the case of total and Public University expenditures with a positive impact. Age of the head of household and the number of household members have a positive and significant effect on Public and total University expenditure, whereas age squared and the indicator that the head has not been recently working, are negatively correlated with the outcome. Also the coefficient of 'Head Female' appears to have a negative effect on total University expenditures, although it becomes insignificant after including fixed effects.

Table 4: OLS and Probit regressions for the difference-in-difference without additional controls, full sample

	<i>University</i>		<i>Public</i>		<i>Private</i>	
	<i>(1-OLS)</i>	<i>(2-Probit)</i>	<i>(3-OLS)</i>	<i>(4-Probit)</i>	<i>(5-OLS)</i>	<i>(6-Probit)</i>
<i>Head Degree*Year</i>	31.91 (29.62)	-.005 (.007)	41.88* (24.24)	-.0036 (.008)	-19.43 (16.37)	-.001 (.002)
<i>Head Degree</i>	42.33** (19.27)	.032*** (.005)	17.74 (12.08)	.025*** (.006)	23.68 (16.11)	.006*** (.0016)
<i>Year</i>	25.66*** (6.56)	.012*** (.003)	21.06*** (5.15)	.012*** (.003)	2.88 (3.09)	-.0003 (.001)
<i>Constant</i>	10.09 (9.52)		11.05 (8.97)		0.07 (2.5)	
<i>PSU fixed effects</i>	Yes	No	Yes	No	Yes	No
<i>Month fixed effects</i>	Yes	No	Yes	No	Yes	No
<i>N</i>	12160	12160	12160	12160	12160	12160
<i>(Pseudo)R²</i>	0.0720	0.0151	0.0746	0.0127	0.0412	0.0261

Standard errors in parenthesis, * significant at 10% level, ** significant at 5% level, *** significant at 1% level, no stars imply not significant

Table 5: Probit regressions 2009 and 2014 with full sample, dependent variables: enrolment in University, Public University and Private University, marginal effects presented

	(1-University)	(2-Public University)	(3-Private University)
<i>Head Degree*year</i>	-.005 (.007)	-.002 (.008)	-.0018 (.0024)
<i>Head Degree</i>	.033*** (.005)	.025*** (.006)	.006*** (.001)
<i>Year 2014</i>	.013*** (.003)	.014*** (.003)	-.0002 (.001)
<i>Income</i>	.0005 (.0007)	.0003 (.0006)	.00008 (.0001)
<i>Head Age</i>	.005*** (.001)	.005*** (.001)	.0005 (.0004)
<i>Head Age2</i>	-.00005*** (.00001)	-.00005*** (.00001)	-0.000006 (0.000004)
<i>Head Female</i>	-.013 (.008)	-.012 (.008)	-.0008 (.002)
<i>Head Married</i>	-.008 (.007)	-.007 (.006)	-.002 (.002)
<i>Number of HH members</i>	.0046*** (.0008)	.004*** (.0007)	.0003 (.0002)
<i>Head not working</i>	-.008** (.004)	-.009** (.004)	.0011 (.0014)
<i>N</i>	12160	12160	12160
<i>Pseudo R2</i>			

Standard errors in parenthesis, * significant at 10% level, ** significant at 5% level, *** significant at 1% level, no stars imply not significant. Standard errors clustered at Household within PSU level.

Table 6: Effect of Academic degree of Head of Household and Reform in Public University Expenditures year 2009 and 2014, dependent variable in numeric and logarithmic form

<i>Variable</i>	<i>(1-Log)</i>	<i>(2-Log)</i>	<i>(3-Linear)</i>	<i>(4-Linear)</i>
<i>Head Academic Degree*Year</i>	.087 (.183)	.214 (.217)	31.14 (19.68)	41.8* (23.9)
<i>Head Academic Degree Year 2014</i>	.370*** (.126)	.252* (.150)	24.83** (9.95)	16.02 (11.7)
<i>Income</i>	.200*** (.043)	.253*** (.054)	17.73*** (4.11)	22.5*** (5.19)
<i>Head Age</i>	.040** (.017)	.005 (.017)	1.34 (2.05)	2.59 (2.17)
<i>Head Age2</i>	.058*** (.012)	.058*** (.012)	3.96*** (1.47)	3.96*** (1.53)
<i>Head Female</i>	-0.0005*** (.0001)	-0.0005*** (.0001)	-0.03*** (0.01)	0.03*** (0.01)
<i>Head Married</i>	-0.075 (.073)	-0.075 (.078)	5.25 (7.79)	3.78 (8.17)
<i>Number of Household members</i>	-0.048 (.072)	-0.042 (.073)	3.58 (6.20)	3.59 (6.61)
<i>Head not working</i>	.061*** (.010)	.066*** (.011)	6.67*** (1.42)	6.95*** (1.58)
<i>Constant</i>	-0.165*** (.061)	-0.206*** (.061)	-9.97* (5.66)	-14.2** (5.72)
<i>Constant</i>	-1.37*** (.358)	-1.23** (.574)	-113.1*** (42.25)	-129.2*** (41.18)
<i>Month fixed effects</i>	No	Yes	No	Yes
<i>PSU fixed effects</i>	No	Yes	No	Yes
<i>N</i>	12160	12160	12160	12160
<i>R-Squared</i>	0.0116	0.0879	0.0099	0.0799

Standard errors in parenthesis, * significant at 10% level, ** significant at 5% level, *** significant at 1% level, no stars imply not significant. Standard errors clustered at Household within PSU level.

Table 7: OLS regressions with full sample for total, Public and Private University expenditures, with positive expenditures only.

	<i>Total</i>		<i>Public</i>		<i>Private</i>	
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Head Degree*year</i>	154.15 (261.7)	289.89 (308.52)	325.21 (261.93)	480.01** (230.98)	-697.28 (967.14)	-758.33 (939.63)
<i>Head Degree</i>	166.05 (203.56)	75.53 (250.9)	18.36 (177.27)	-76.81 (154.35)	438.55 (827.75)	232.99 (658.77)
<i>Year 2014</i>	243.07** (121.37)	336.88*** (113.78)	210.01* (113.90)	292.19*** (111.55)	269.12 (517.72)	543.57 (658.77)
<i>Income</i>		338.6*** (157.4)		297.38*** (90.85)		523.04 (317.4)
<i>Head Age</i>		-30.98 (91.22)		-28.39 (28.81)		-274.52 (164.02)
<i>Head Age2</i>		0.21 (28.04)		0.16 (0.24)		2.89 (1.72)
<i>Head Female</i>		623.04*** (205.74)		662.64*** (230.08)		105.06 (643.9)
<i>Head Married</i>		624.9** (298.2)		583.97*** (202.28)		2125** (994.87)
<i>Number of HH members</i>		94.64** (44.6)		132.20*** (45.18)		59.58 (274.9)
<i>Head not working</i>		68.63 (122.63)		71.92 (105.48)		322.93 (669.03)
<i>Constant</i>	892.03*** (96.42)	782.6 (764.6)	830.88*** (95.28)		1324.1*** (253.86)	5135 (3069)
<i>N</i>	413	413	368	368	45	45
<i>R2</i>	0.0255	0.0893	0.0333	0.1270	0.0124	0.1641

Standard errors in parenthesis, * significant at 10% level, ** significant at 5% level, *** significant at 1% level, no stars imply not significant. Standard errors clustered at Household within PSU level.