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# **The Effects of the 2008 Health Reform on Out-of-Pocket Health Expenditures in Turkey**

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## **Abstract**

The Turkish health care system has been subject to significant and critical changes and reforms since 2003. One of the important reform has been implemented in 2008 when the Green Card holders are entitled to the same services, without any fee, as those with public health insurance, such as the *Emekli Sandığı*, *BAĞKUR*, *SSK*. This study initially examines the characteristics of health insurance schemes, determinants of holding one of the health insurance schemes (public, private, green card, no-insurance) in Turkey. It further analyses the effect of 2008 reform on out of pocket expenditures (OOPEs). The study will be the first in the related literature analysing the effect of this reform especially on the OOPEs of green card holders. The analysis relies on a detailed micro-data level survey, TÜİK Household Budget Survey, over the period 2002-2011 and employs a difference-in-difference approach using a pseudo-panel based on propensity score matching. Initial results show that individuals who have public insurance are less inclined to face out-of-pocket health expenditures compared to those without health insurance and the Green Card holders. However, the difference of the OOPEs between the public health insurees and green card holders is reduced after the implementation of the 2008 reform.

**Keywords:** Difference-in-Difference Approach; Health Insurance Schemes; Health Reforms; Out-of-Pocket Expenditures; Propensity Score Matching Method; Pseudo-Panel Data; Turkey  
**JEL Codes:** I13, I14

## 1. Introduction

Healthcare in many developing countries, including those in Middle East and North Africa (MENA) region, is mainly funded and financed through out-of-pocket expenditures (OOPEs) by households (Akinci et al., 2014). OOPEs is a part of the private health expenditures which includes in-kind payments and perks to suppliers of pharmaceutical products, therapeutic appliances and other health related goods and services to health practitioners with purpose the enhancement of the individuals' health status (Garg and Karan, 2009). An important policy for a country's health care system is to provide financial protection from extreme OOPEs to assure impartial access to health care. In the absence of this policy, a household may be forced to spend large amounts on medical bills and treatment, and significant part of its time to treat and take care of a family member. OOPEs is of major concern for the policy makers, because of their multiple consequences to the household, the ill family members and the society overall.

The main impact of OOPEs is the incidence of catastrophic health expenditures, defined by the World Health Organization (WHO) as exceeding the 40 per cent of the household income. This incidence is linked to a depraved cycle of poorness because households have to cut their spending on other necessities, including food, clothing and children's education. In addition, the impact of OOPEs goes beyond the catastrophic health expenditures, where people do not use health services anymore, because they cannot afford the direct costs, including the expenses for medicines and consultation and the indirect costs, such as transportation (Gottret and Scieber, 2006; Anyanwu and Erhijakpar, 2007). Moreover, this has an additional impact on poverty and overall a negative effect on a country's growth and development. Therefore, a concern of the policy makers is to protect people from financial catastrophic health expenditures. This is the first study which examines the reform of 2008 the for Green Card (Yeşil Kart)<sup>1</sup> holders. The analysis accounts for socio-economic individual and household characteristics, such as education, wealth, marital status and area-location of the household.

In 2008, OOPEs were 17.4 per cent of the total expenditure on health care in Turkey (Turkish Statistical Institute, 2011). However, as a candidate country to European Union, the rate was higher than the rest of the EU countries, including Germany at 13 per cent, France at 7.6 per cent and United Kingdom at 11.2 per cent in the same year (OECD, 2010). Nevertheless, the health care system in Turkey has been restructured and has undergone health reforms since 2003, promoting the use of technology, delivering a high quality of health care, which in turn have affected the OOPEs. Apparently, the ratio was 22 per cent in

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<sup>1</sup> Green Card is an insurance plan for the poor who were unable to pay for healthcare which is provided by government without and fee or contribution.

2006 and was reduced at 15.4 per cent in 2012, while the respective percentage in 2012 was 12.9 per cent, 9 per cent and 7.5 per cent for Germany, United Kingdom and France respectively (OECD, 2014). To summarise, this study examines the determinants of health insurance schemes in Turkey, including socio-economic characteristics, barriers to health care access, health insurance coverage and type (social versus private) among others. Moreover, we evaluate the impact of the 2008 Turkish Health Reform on the OOPEs, between individuals who have public health insurance and those who belong in the Green Card program, employing a differences-in-differences (DID) framework.

Several studies have explored the OOPEs and have also focused on catastrophic health expenditures (Garg and Karan, 2009; Goudge et al., 2009; Chuma and Maina 2012; Rahman et al., 2013; da Silva et al., 2015). Documenting the determinants of health insurance schemes participation and OOPEs and evaluating the specific reform of 2008 can help the policy makers and public authorities at achieving universal health coverage, reducing poverty and the inequalities in health access. The results show that the gap in health expenditures between the public insurees and people participating in the Green Card program is reduced. Findings for a Turkish case study along with experiences from examples in other countries may provide guidance for policy makers to countries of the MENA region and not only.

The paper is structured as follows: Section 2 contains a brief description of the literature of OOPEs. Section 3 provides a brief description of the health reform of 2008. In section 4 we present the methodology, while in section 5 we describe the data used in the empirical work. In section 6, the empirical results are reported, while section 7 discusses the concluding remarks.

## **2. Literature Review**

In this section we briefly present the earlier literature related to this study. Numerous studies found that pharmaceutical products and medical services compose the main sources of OOPEs (Van Doorslaer et al., 2007; Mugisha et al., 2007; Barros and Bertoldi, 2008; Garg and Karan, 2009). The share of those expenses ranges between 25-65 per cent of the total OOPEs in low-middle income countries (Wagner et al., 2007). Evidence from the literature shows that households in Brazil and India spend respectively the 41 per cent and 65 per cent of their household income on medicines (Barros and Bertoldi, 2008; Garg and Karan, 2009), while the share of OOPEs on medicines in Burkina Faso and Vietnam ranges between 80-88 per cent (Mugisha et al, 2007; Wagstaff, 2007). Moreover, the largest inequities are reported for low income groups, where the poorest households spend proportionally more on

medicines than the richest families (Wagner et al., 2007). Knaul et al. (2006) found that medicines is the most important component of the health expenditures regarding the low-income households accounting to almost 50 per cent of the catastrophic health expenditures in the first quintile (the poorest households), while they amount less than 20 per cent in the quintile of the richest households. Concluding, health systems that require lower OOPes for health care offer better protection to the poor against catastrophic health spending.

Regarding Turkey, Brown et al. (2012) examined the determinants of OOPes using a Probit binary model during the period 2002-2008. One of the most important findings of their research is that insurance coverage may secure households from the risky results of catastrophic health expenditures. In this study, we expand the period of analysis over the years 2002-2011, and we also take into consideration different insurance schemes. The amount of OOPes may vary according to insurance type. As Green Card holders officially did not have the same benefits as the enrollees in other public health insurance schemes (SSK, Emekli Sandığı, BAĞ-KUR) before 2008<sup>2</sup>, it is more probably that they were spending more on OOPes and were more inclined to face catastrophic expenditures. Brown et al. (2012) followed Sartori's (2003) approach to solve the selection bias<sup>3</sup> problem, while our study employs the propensity score matching (PSM) to account for selection bias as an alternative approach for causal inference.

Moreover, we analyse and compare the impact of 2008 health reform on OOPes between public health insurees and Green Card holders. Using the Household Budget Survey in 2003-2006, Erus and Aktakke (2012) examined the impact of the 2003 health reforms on OOPe. The authors found that health expenditures are decreased and the impact varies with income level. Aran and Hentschel (2012) examined the impact of the Green Card program, which was expanded rapidly between 2003 and 2008 when the number of Green Card beneficiaries increased nearly four-fold. They explored the impact on the protection of healthcare utilization of Turkish people, defined by whether individuals decreased the use of preventive and curative care facilities and services. The authors found significant effects where Green Card holders reduced actually both forms of care. However, our study adds to the earlier literature by examining the effects of the 2008 health reform on OOPes for Green Card holders. We apply a Differences-in-Differences (DID) analysis considering the periods before

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<sup>2</sup> Prior to 2006, there were three public social security institutions in Turkey SSK (covering private sector employees), Emekli Sandığı (covering government employees) and BAĞKUR (covering the self-employed). In 2006, the government merged the formal social security system under the umbrella of SGK (Social Security Institution). The members of the Green Card scheme have officially obtained the same benefits as beneficiaries in other health insurance schemes only in 2008 (Erus and Aktakke, 2012; OECD, 2008)

<sup>3</sup> Selection bias problem may occur if poor households prefer do not use or do not seek health care because of affordability concerns.

and after the 2008 health reform, and the macroeconomics shocks of the economic crisis of 2008.

### **3. The Health Reform of 2008**

In Turkey the Health Transformation Program (HTP) initially took place in 2003. One main characteristic of the HTP is the expansion of the health coverage for the Green Card holders. Within HTP, health care services and pharmaceutical expenses are covered by the state. Moreover, the policy makers incorporated a reduction on VAT that resulted to significant discounts of pharmaceutical and medical products and services, and consequently reduced the burden for public and citizens. Overall, the HTP was successful in terms of health coverage expansion in the whole population, and especially the poor people. Furthermore, the HTP reform has considerably improved the access to health services and to transportation points (Chakraborty, 2009). However, a pre-requisite of the reform implementation was the preparation and establishment of a universal health insurance law. Within this law, all health insurance schemes were combined into one. While it was adopted by the Turkish Grand National Assembly in 2006, it was not before 2008 that its implementation officially started.

In addition, HTP has strengthened the preventive health care, mother-child health care services and the family medicine program. The latter is a program which was spread out in the whole country and its purpose is the understanding of modern health, such as lifestyle, health diet and others. Furthermore, HTP tried to expand the coverage in both formal health sector insurance schemes (SSK, Emekli Sandığı and BAĞKUR) and the Green Card program. Finally, the Green Card Holders since 2008 enjoy the same benefits with the enrollees in other health insurance schemes. More specifically, the contribution to the formal health sector insurance schemes was expanded from 59 per cent in 2003 of the population to 69 per cent in 2008, while the number of Green Card beneficiaries was increased from 2.5 million to 9.5 million over the same period. While previous studies so far analysed the effects of 2003 and 2006 reforms, this paper contributes to the earlier literature by evaluating the impact of the 2008 reform on OOPEs and OOPECTP following a DID framework.

### **4. Methodology**

#### 4.1 OOPEs and OOPECTP

The calculation of the OOPEs and OOPECTP involves the following steps (Xu, 2005). First, we calculate the poverty line (PL) and the household subsistence spending (SE). More specifically, SE refers to the minimum requirement for a household that is necessary to maintain the basic standards of living. Various poverty indicators have been developed in the earlier literature, but none of them is perfect. This depends on the place, location, country and the period of study. However, following the methodology by Xu (2005) we use the food share of the total household expenditures to estimate PL. We define PL as the food expenditure share that ranges within the 45<sup>th</sup> and 55<sup>th</sup> percentile of the total sample. Then the equivalence household scale is taken:

$$eqsize_h = hsize_h^\beta \quad (1)$$

Earlier studies have estimated parameter  $\beta$  using household surveys of 59 countries, and they found it to be equal at 0.56 (Xu, 2005). The next step is to divide the household food expenditure ( $foodex_h$ ) by the equivalent household size to get the equivalised food expenditures ( $eqfood_h$ ):

$$eqfood_h = \frac{foodex_h}{eqsize_h} \quad (2)$$

Next we take the food expenditure shares over the total household expenditure which range between the 45<sup>th</sup> and 55<sup>th</sup> percentile across the whole sample. We define them as  $foodex_{45}$  and  $foodex_{55}$ . In the following step, we calculate the weighted average of food expenditure in the 45<sup>th</sup> to 55<sup>th</sup> percentile spectrum. To get the subsistence expenditure per capita we use the following formula:

$$PL = \frac{\sum w_h \cdot eqfood_h}{\sum w_h} \quad \text{for } foodex_{45} < foodex_h < foodex_{55} \quad (3)$$

Then the subsistence expenditure (SE) for each household is:

$$SE_h = PL \cdot eqsize_h \quad (4)$$

The household is defined as poor when the total household expenditure is lower than its subsistence spending (SE):

$$\begin{aligned} poor_h &= 1 \text{ if } exp_h < SE_h \\ poor_h &= 0 \text{ if } exp_h \geq SE_h \end{aligned} \quad (5)$$

The next steps involve the calculation for OOPEs. First, we estimate the household capacity to pay (CTP) and we define it as a household non-subsistence spending. We have:

$$\begin{aligned} CTP_h &= exp_h - SE_h \text{ if } SE_h \leq foodex_h \\ CTP_h &= exp_h - foodex_h \text{ if } SE_h > foodex_h \end{aligned} \quad (6)$$

The out-of-pocket expenditures over the capacity to pay (OOPECTP) are defined as the ratio of OOPEs over the CTP and it is:

$$OOPE\_CTP = \frac{OOPE_h}{CTP_h} \quad (7)$$

#### 4.2 Determinants of the OOPECTP

In the first section we examine the determinants of the health insurance schemes. We estimate the following regression:

$$HI_{i,h,j,t} = \beta_0 + \beta_1 \log(y)_{i,h,j,t} + \gamma'Z_{i,h,j,t} + A_j + \theta_t + A_jT + \varepsilon_{i,h,j,t} \quad (8)$$

$HI$  denotes the health insurance scheme for the individual  $i$  in household  $h$ , area-location  $j$  and in time  $t$ . Since the dependent variable is categorical, taking four values-public, private, Green Card and no insurance- we make use of the multinomial Logit model. The variable  $\log(y)$  is the logarithm of the household income. However, the regression examines also the wealth index, which is expressed as a combination of material. More specifically, the index is a function of household ownership of a number of “goods” such a microwave, a television, a car, a video, a freezer, a dishwasher, central heating and second house. Vector  $\mathbf{Z}$  includes the rest of the explanatory variables, such as gender, age, education, marital status, household size, employment status, and others. Also, we include in the analysis barriers to health care access, such as the difficulties to access the health centres due to the long distance and lack of infrastructure and transportation. Set  $A_j$  controls for area,  $\theta_t$  controls for time-year of the



survey, while  $A_jT$  is a wave area specific trend which controls for time-invariant unobserved characteristics in the area.

#### 4.3 Differences-in-Differences (DID) Regression

One issue in our analysis is the selection bias coming from the self-selection on health expenditures and the possible heterogeneity between individuals who have either social security or not. One candidate model, for addressing the selection bias, is the Heckman two-stage procedure. This procedure consists of two equations. First, the equation that describes the relationship between the outcome of interest  $y_i$  (i.e. the OOPes) and a vector of covariates  $X_i$ , and second, the selection equation, that relates the binary participation decision into a health insurance program  $D_i$  and a vector of covariates  $Z_i$ . However, since Heckman model may present biases (see Elwert and Winship for more details on Heckman model and endogenous selection bias) we prefer to apply a propensity score matching (Rosenbaum and Rubin, 1983). There are various reasons why we have not estimated the Heckman model. First, in the PSM approaches, the assumption of constant additive treatment effects across individuals to be held is not required, as is enforced in the Heckman selection procedure. In this case, heterogeneous treatment effects are allowed and can be retrieved via sub-group analysis. In other words, the procedure involves the selection of the main groups of interest and then we re-apply the matching procedure within the specific group. This shows the flexibility of the PSM for studying and evaluating the effects of programs and interventions on groups of particular interest. Another important advantage of PSM is that matching algorithms and estimators account for the common support problem, as treatment effects can only be estimated within the common support. Third, PSM procedures do not require functional form assumptions for the outcome equation, because are non-parametric procedures. On the other hand, regression methods, including Heckman model, impose assumptions of the relationship forms which may not be always accurate or true. PSM avoids these restrictions and it can be useful, because functional forms are not always justified by the data or the economic theory (Dehejia and Wahba, 1998; Smith and Todd, 2005). The DID regression is:

$$OOPE_{i,h,j,t} = \beta_1 Treat + \beta_2 Post + \beta_3 Treat * Post + \gamma' Z_{i,h,j,t} + A_j + \theta_t + A_jT + \varepsilon_{i,h,j,t} \quad (9)$$

The regression is defined as in (8), while  $Treat$  is the treatment variable taking value 1 for those who are treated from the reform and 0 otherwise. Because the reform of 2008 mainly

concerns the poor and disadvantaged people, we define as the treated group the Green Card holders. Therefore, variable *Treat* takes value 1 for the Green Card holders and 0 otherwise (public health insurance). *Post* is the period dummy, taking value 1 if the period refers to 2008 and after and 0 for the years before 2008. The interaction term *Treat\*Post* is the DID estimator. A negative and significant sign of the DID estimator, implies that the OOPes are reduced in the treatment group after the reform relative to the untreated-control group. Moreover, the data allow us to control for the effects of the reform after the economic and financial crisis of 2008.

Since the estimates may suffer from selection bias, the regressions are based on a pseudo-panel analysis using propensity score matching and taking individual fixed effects on the matched sample. The reason of considering matching comes from the fact that those who are eligible for Green Card may have significant different characteristics than the individuals and their households who have public health insurance. The most important difference is the income, since employed and richer individuals are more inclined to public health insurance coverage. In addition, the two groups may be different prior to the study in other characteristics, including age, marital status, education and employment status. For instance, more educated people have better opportunities to the labour market and higher earning potentials that are associated with higher probabilities of having a health insurance, public or private, and therefore, holding a protection against OOPes. On the contrary, unemployed and disabled are more inclined to belong to the low-income groups and poor social classes that are eligible for the Green Card program.

Matching has become a popular approach for the estimation of treatment effects and causal inference. It is widely applied for the evaluation of a variety of policies and is used in diverse fields of studies, exploring labour, health and environmental policies. The first problem that arises in many situations, including the analysis in this study, is the effect of the health reform of 2008 on the treated group and the investigation of the difference on the outcomes of interest between the treated and the control group. One very common approach is to obtain the mean outcome both groups or to apply a DID analysis as is the equation (9). However, we regard that there is a selection bias problem, as we mentioned earlier, that some individuals are more likely to engage in the public health insurance system for various reasons. Thus, the matching approach is one possible solution to the selection issue and statistical literature shows a close link to the experimental context. The main idea is to find a group of non-treated individuals (public health insurance in this case) who share similar individual and household characteristics with the treated or the participant in the program (the ones who are Green Card

holders). If this is done efficiently, then the differences in the outcome of interest of the selected groups can be attributed to the health reform.

#### 4.4 Propensity Score Matching

The estimated propensity scores of the matching on participants and non participants will be  $p(x) \equiv P(C=1|x)$ . Rosenbaum und Rubin (1983) show that if the Conditional Independence Assumption (CIA) holds then:

$$E[y_0 | p(x), C = 1] = E[y_0 | p(x), C = 0] \quad (10)$$

Hence, matching of participants and non participants based on propensity scores is sufficient. We use the Mahalanobis algorithm, while other algorithms give almost identical results, including the kernel and the nearest neighbour. Nevertheless, we discuss the assumptions of the matching process.

**Conditional Independence Assumption:** The first possible and most important identification strategy assumed in the propensity score matching is the CIA. This assumption implies that given a set of observable covariates  $X$  which are not affected by the policy or the treatment, the potential outcomes of interest are independent of the treatment assignment. In other words, CIA implies that the selection is solely based on the observable characteristics and that all the variables influencing the treated or policy assignment and the potential outcomes of interest are observed by the researcher. For the purpose of this study we assume that the CIA holds. The unconfoundedness is:

$$y_0, y_1 \perp\!\!\!\perp D | X, \forall X \quad (11)$$

Relation (11) implies that the the potential outcomes are independent from the treatment assignment given a set of covariates  $X$ . The unconfoundedness based on the propensity score can be written as:

$$y_0, y_1 \perp\!\!\!\perp D | P(X), \forall X \quad (12)$$

Nevertheless, there are issues and drawbacks using PSM procedures. The first is the issue of unobservables that are not included into the matching process and into the DID analysis. The second is the assumption that the covariates included into the matching process are enough to create comparable treated and control groups. However, the majority of the econometric models suffer from these issues. For example, there are unobservable characteristics in randomized trial experiments and natural experiments. These unobservables then may affect the outcomes and the efficiency of the matching process. Regarding the second issue, many models may not control for various variables, and therefore the regressions may present plausible, over-control, confounding and selections biases.

**Common Support:** This is another requirement besides the independence, which rules out the phenomenon of the perfect predictability of the  $D$  given a set of covariates  $X$ .

$$0 < P(D = 1 | X) < 1 \tag{13}$$

**Variable choice:** Another important element of the matching process refers to the inclusion or exclusion of the covariates in the propensity score models. According to the CIA, the outcome variable of interest must be independent of the treatment conditional on the propensity score. Therefore, the implementation of matching requires that the set of the covariates  $X$  should credibly satisfy this condition. According to Heckman et al. (1997), omitted variables can create bias in regression estimates, and only variables that affect simultaneously the insurance scheme choice and the outcome variable should be added in the regression. The justification of the variables choice in our study comes from the fact that these covariates are observed before and after the participation and they can influence both outcome and the participation in the policy program, which is the Green Card. Age, education level, marital and job status and area are some of the variables used into the matching process that can influence both OOPEs and the program choice.

## 5. Data

In this study we make use of micro-level data derived from the Turkish Household Budget Survey (HBS), available from the Turkish Statistical Institute (TUIJ), over the period 2002 - 2011. The survey includes rich and detailed information for three main groups of variables: variables relating to household assets (e.g. type of dwelling owned, ownership of durables and

transportation vehicles), consumption spending (e.g. food and health expenditure), and variables related to individuals (e.g. age, marital status, employment status and education among others).

In table 1 we present the summary statistics for the main variables of interest, such as the OOPEs and OOPECTP, health insurance, and for the main control variables, including education, marital status and household income among others. In panel A of the table 1 the continuous variables are shown. We should notice that there are extreme values, regarding household income, as it can be seen by the minimum and maximum values. Nevertheless, after the PSM procedure the maximum value is reduced at 200,000 TL. The majority of the sample has public health insurance at 63.10%, while only 6.76% is privately insured. A high percentage of the population is Green Card holders at 13.24% and the 16.91% has no health insurance. The 64.98 per cent of the sample is married followed by the singles at 28.95 per cent. Also, we should note that the minimum respondent's age included in the analysis is 15 years old. The majority of the people have completed at maximum the primary school, while only the 4.25 per cent has finished a university degree. Most of the respondents stated that do not confront limited activities to work or to activities they usually do because of mental or physical health problems at 94.74 per cent. We observe that almost the 70 per cent of the sample finds the access to health centres and transportation points easy.

In table 2 we show the associations among the main variables of interest. We observe that household income is positively related to both private and public health insurance schemes and negatively to Green Card holders and no-insured respondents. From table 2 we can conclude that the educated and wealthier households are more likely to have either a public or private health insurance. Regarding the household size, we observe a negative relationship with the education income and the participation in the public or private insurance scheme. On the contrary, a positive correlation between the family size, the Green Card scheme and no health insurance is illustrated. Similarly, we can see that the wealthier households and the more educated people are located in the urban areas. Also, the household size is smaller in the urban areas. From the above associations we overall conclude that richer, more educated people, located in urban areas are more likely to have social security, public or private, as usually those areas offer more labour opportunities, especially for educated people, and higher earning potentials, expressed by the household income. Following the earlier literature (Van Doorslaer et al., 2007; Mugisha et al., 2007; Barros and Bertoldi, 2008; Erus and Aktakke, 2012; Brown et al., 2014) the regressions control for various individual and household characteristics, including gender, age, education level, household income, marital and job status, occupation industry code, rural versus urban area, difficulties in access to

transportation points and health centres. These controls are useful, since they may cause the capability and the decision of a person or household to participate in a specific type of health insurance.

(Insert Tables 1-2)

## **6. Empirical Results**

### **6.1 Determinants of Health Insurance Schemes**

In this section we present the empirical results about the determinants of the health insurance scheme selection. In table 3 we report the Multinomial Logit model (8) estimates choosing as a base reference the public health insurance, since is the most frequent category. Therefore, the coefficients are interpreted as probability occurrences of participating in a specific health insurance scheme in relation to the base category, which is the public health insurance. Gender is not significant regarding the choice between public and private, but women are less likely to have no insurance or are less likely to be Green Card holders according to columns (2)-(3). This can be explained by the fact that even women who are not employed are entitled to public health coverage through the employment status of their husbands. Taking the exponential of the coefficients we find that the probability that women will participate in the Green Card scheme or to non-health insurance is lower by 0.58-0.60 relative to the males, keeping all the other variables constant. A similar interpretation is followed for the remained coefficients. For instance, the education coefficients are insignificant for the private insurance, implying that the education level between the public and the private health insurees is not different. On the other hand, the education coefficients are significant and negative in the case of Green Card and no-insurance and the relationship is monotonic. This indicates that more educated people are less likely to be uninsured or to participate in the Green Card scheme relative to the illiterate people. The same holds for the wealthier households, and the households that are located in urban areas and their access to health services and transportation points is easy. The latter can be explained by its interrelationship with urban area where generally the access is easier and there is a variety of health supply options. We observe a negative relationship for the widowed, while a positive relationship is shown for the divorced people, implying that are more likely to choose the private, Green Card scheme or be uninsured than the reference category, which is the singles. Nevertheless, there is a strong heterogeneity among the samples examined as it was expected.

We derive the same conclusion for the household size. Regarding the employment status we see that is significant only in the case of the Green Card and it is positive. This shows that unemployed people are more likely to belong to the Green cad scheme compared with the employed. The results overall are consistent with the study by Brown et al. (2014); however our analysis is expanded in such a way that we explore all the health insurance types, including the accessibility to health centres and transportation and wealth. Moreover, we extend our analysis using a DID approach to evaluate the effectiveness of the health reform of 2008. We considered various algorithms, including kernel and nearest neighbour, and the results remain robust. In this study the matched sample employed has been derived by the Mahalanobis metric algorithm.

(Insert Table 3)

In table 4 we present the average Treatment Effects on OOPEs and OOPECTP using the matched sample after the PSM procedure. We observe that while married individuals and wealthier households spend more on OOPEs, expressed by the household income and wealth index, they spend less on OOPECTP, indicating that have more capacity and capabilities to afford the health related expenses. On the other hand, widowed and divorced spend on average more on OOPECTP, showing that are more vulnerable groups than married and singles and they need more attention and protection against health related costs. The education is insignificant regarding the regression of OOPE, but it becomes negative and significant in the case of OOPECTP and it illustrates a monotonic relationship. This is in line with the wealth, where more educated people have more earning potentials than uneducated and poorer social groups. The same holds for the unemployed individuals, who spend more on both OOPEs and OOPECTP. Green Card holders overall pay more on both OOPEs and OOPECTP than the public health insurees over the period we examine. In table 5, the average effects of other health insurance scheme groups are reported. The results show that those who have a private health insurance spend on average 14 Turkish Liras (TL) more than those with public health coverage, while those without health insurance coverage pay on average 6 TL more than the respondents who have either public or private health insurance. In addition, the OOPECTP levels are higher for uninsured people. On the other hand, the Green Card holders spend lower amounts on OOPECTP than the uninsured respondents by 12.5 TL. We should notice that we do not show the estimated coefficients for the rest of the socio-economic factors, as we presented them in table 4, because the conclusions remain the same.

(Insert Tables 4-5)

In table 6 the test of the propensity score matching considering various health insurance classes are reported. In the majority of the estimates the groups share similar characteristics. However, the marital status is significantly different among the groups examined, except for the Green Card holders versus those with no health insurance. Other differences include the education level in the no insurance versus private-public groups and the urban area in the no insurance versus Green Card groups. The propensity score matching results follow the CIA, as we discussed earlier in the methodology section and it is based on the observable variables. However, we should note that the matching process is associated with drawbacks, since the individuals-agents may choose the insurance type based on unobservable characteristics like trust, quality of family support, relations and togetherness and the individual and family medical history, which information is not available in the survey. Nevertheless, the estimates are not significantly different with the unmatched sample, as the analysis is relied on a quasi-experimental approach, which is the health reform of 2008. Moreover, this approach along with the randomized trial experiments and the natural experiments present the common problems related to the difficulty of accounting also for unobservable characteristics.

(Insert Table 6)

## 6.2 Differences-in-Differences (DID) on Health Reforms

In this section, we show the estimates of the DID framework which is applied to evaluate the effects of 2008 health reform. The treatment group is the Green Card holders, while the control group includes those who have public health insurance. We should note that those who are uninsured or have private health coverage are not included, because the health reform in 2008 refers to changes that are applied to Green Card holders, who are entitled to the same services and benefits with those who have public health insurance coverage (OECD, 2008). In panels A and B of table 7 we report the DID estimates respectively for the OOPECTP and OOPEs. In both cases, the results show that there is no difference between the treated and control group. While the OOPEs increased after 2007, a decrease in OOPECTP is recorded. Overall, an increase on health expenditures may mark a risk, but the increase of OOPECTP is more crucial, since it signals the capacity or capability of the household to meet the health related costs. In other words, an increase of OOPEs does not always imply a risk, as long as, the household is capable to meet the expenses. Concluding in both cases, the OOPECTP and



OOPEs levels between the treated and the control group are reduced due to the health reform of 2008. In addition, in panels C and D we present the placebo tests for the DID, taking 2007 as the placebo year, implying that our estimates are robust, since the DID coefficient is insignificant. The same conclusions are derived if we set up 2006 or another year as placebo.

(Insert Table 7)

In figures 1-2 we illustrate the parallel trend assumption respectively for OOPEs and OOPECTP. The figures confirm our estimates. For instance, we saw an increasing trend for OOPEs after 2007 which is suggested by the line for the control group which is increasing after 2007. However, as we can observe in figure 2, the OOPECTP actually decrease, especially in the treated group.

In figure 3 we present the histogram for the OOPEs. It becomes obvious that the distribution is skewed, while the histogram for the logarithm of the OOPEs is presented in figure 4. Similarly, the same conclusion is derived by the figures 5-6 for the OOPEs over the capacity to pay. For this reason we re-estimate the DID regressions are considering the dependent variables in logarithms. In table 8 we report the DID estimates for the OOPECTP and OOPEs. Based on the DID coefficient in both cases the difference in the OOPECTP and OOPEs between the treated and control group is reduced respectively by 21 and 26 per cent.

(Insert Table 8)

(Insert Figures 1-6)

However, we should notice that the study undergoes from major drawbacks. The first and more important disadvantage is the use of repeated cross-sectional data, where we are unable to follow the same individuals and households across time and therefore, this limitation does not allow us to include their history into a fixed effects model. Even though, panel data models suffer more from attrition and non-response issues, relative to the cross-sectional surveys, still we cannot account for unobserved heterogeneity within and between the respondents. Second, PSM procedures rely on certain and strict assumptions, that we discussed earlier in the methodology section, which may not always hold.

## **7. Conclusions**

The first aim of this study was to explore the most important factors that determine individuals' and households' capability of participating in a specific health insurance scheme.

Second, we have examined the effects of the health insurance types on OOPes and OOPeCTP. The findings show that in all cases, public health insurance offers a protection to the households regarding the OOPes. In addition, those who are Green Card holders spend less on OOPes in comparison with the uninsured people. Next, the study have explored the effects of the health reform in 2008, where Green Card holders are entitled to the same health services and benefits with the public health insurees. In addition, after 2008 there have been significant improvements on the infrastructure of health centres and a large expansion of the emergency services in the rural areas (OECD, 2008). The findings show that the health expenditures between the treated group-the Green Card holders- and the control group –public health insurance- are reduced. This indicates that the expansion of the Green Card scheme in 2008 was a successful policy that has reduced the gap in the health expenditures. The results also show that besides the socio-economic characteristics that were examined in previous studies, such as age, employment and income among others, the accessibility level to health centres and transportation points is another critical factor. Since many people need a private transportation, when the accessibility to public transportation is difficult or inconvenient, and the distance to health centres and their accessibility level is low, the OOPes are likely higher. Future research studies may explore the impact of the 2008 health reform on other outcomes, such as health status, standard of livings and well-being considering a group analysis, including gender, disabled and age groups.

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This work was based on data from the Household Budget Survey during period 2002-2011 provided by the Turkish Statistical Institute (TURKSTAT). The data are the copyright of TURKSTAT. The use of the data in this work does not imply the endorsement of TURKSTAT in relation to the interpretation or analysis of the data.

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**Table 1. Summary statistics**

Continuous Variables					
	Mean	Standard Deviation	Minimum	Maximum	
Household Income	16,181.76	18,985.36	110	799,709.1	
OOPE	1,920.352	5,853.015	2.5	59,822	
OOPECTP	0.0385	0.0668	0	0.9303	
Age	39.433	16.560	16	99	
Household Size	2.4575	4.9598	1	16	
Categorical Variables					
	Male	Female			
Gender	48.63	51.37			
	Public	Private	Green Card	No Health insurance	
Health Insurance	63.09	6.76	13.24	16.91	
	Single	Married	Widowed/Widower	Divorced	
Marital Status	28.95	64.98	4.76	1.31	
	Illiterate	Literate-not completed school	Primary School	Primary Education	Secondary School
Education Level	11.25	21.94	31.74	8.66	5.74
	High School	Senior High School	College	University	
Education Level	10.16	4.19	2.06	4.25	
	Yes	No			
Health Problems	5.26	94.74			
	Owner	Tenant	Lodging	Other	
House Tenure	68.26	21.54	1.57	8.64	
	Yes	No			
Employed	43.50	56.50			
	Very Difficult	Difficult	Easy	Very Easy	
Access to Health centres	7.73	22.88	54.32	15.07	
	Very Difficult	Difficult	Easy	Very Easy	
Access to Transportation Points	7.10	20.42	55.66	16.82	
	Urban	Rural			
Area	65.98	34.02			

**Table 2. Correlation Matrix**

	Public Health Insurance	Private Health Insurance	Green Card Holders	No Health Insurance	Household Income	Education	Household Size
Private Health Insurance	-0.3522*** (0.000)						
Green Card Holders	-0.5107*** (0.000)	-0.1052*** (0.000)					
No Health Insurance	-0.5897*** (0.000)	-0.1215*** (0.000)	-0.1762*** (0.000)				
Household Income	0.0413*** (0.000)	0.0101*** (0.000)	-0.0988*** (0.000)	-0.0415*** (0.000)			
Education	0.2021*** (0.000)	0.0034** (0.0432)	-0.1999*** (0.0432)	-0.0848*** (0.0432)	0.2445*** (0.000)		
Household Size	-0.3047*** (0.000)	-0.0366*** (0.000)	0.2402*** (0.000)	0.1999*** (0.000)	-0.0228*** (0.000)	-0.2226*** (0.000)	
Urban Area	0.1822*** (0.000)	0.0192*** (0.000)	-0.1665*** (0.000)	-0.1006*** (0.000)	0.0991 (0.000)	0.1686*** (0.000)	-0.1645** (0.000)

P-values in parentheses, \*\*\* p&lt;0.01

**Table 3.** Multinomial Logit Equations and Determinants of Different Types of Health Insurance

<b>VARIABLES</b>	<b>(1)</b>	<b>(2)</b>	<b>(3)</b>
	<b>Private</b>	<b>Green Card</b>	<b>No Insurance</b>
Gender (Female)	0.0358 (0.0541)	-0.4623*** (0.0263)	-0.4703*** (0.0241)
Age	-0.01834*** (0.0024)	-0.0218*** (0.0011)	-0.0267*** (0.0011)
Logarithm of Household Income	- 0.3941*** (0.0406)	-0.7882*** (0.0207)	-0.4294*** (0.0182)
Marital Status (Never Married)			
Marital Status-Married	0.1874** (0.0732)	-0.4317*** (0.0387)	-0.7699*** (0.0333)
Marital Status-Widowed	-0.3787** (0.1743)	-0.2462*** (0.0643)	-0.9910*** (0.0741)
Marital Status-Divorced	0.4311** (0.1852)	0.3551*** (0.0899)	0.3881*** (0.0711)
Education Level (reference Illiterate)			
Education Level-Not completed school	0.1246 (0.1210)	-0.4248*** (0.0446)	-0.1214** (0.0542)
Education Level-Primary School	-0.0034 (0.0968)	-0.9758*** (0.0363)	-0.0927** (0.0422)
Education Level-Primary Education	0.0031 (0.1303)	-1.3827*** (0.0535)	-0.7979*** (0.0555)
Education Level-Secondary School	-0.0219 (0.1356)	-1.2864*** (0.0617)	-0.1553*** (0.0576)
Education Level-High School	0.1870 (0.1256)	-1.5654*** (0.0608)	-0.2846*** (0.0541)
Education Level-Senior School	-0.1413 (0.1447)	-1.9004*** (0.0756)	-0.4491*** (0.0595)
Education Level-College	-0.2588 (0.1891)	-2.5696*** (0.1557)	-0.6321*** (0.0799)
Education Level-University	0.5348*** (0.1332)	-2.9642*** (0.1711)	-0.5965*** (0.0727)
Employed (No)	-0.0572 (0.0539)	0.2244*** (0.0265)	0.0134 (0.0253)
Household Size	0.1119*** (0.0114)	0.2622*** (0.0055)	0.1478*** (0.0054)
Wealth	-0.1079*** (0.0259)	-0.5249*** (0.0096)	-0.3189*** (0.0099)
Access to Health centres (reference very difficult)			
Access to Health centres-Difficult	0.0269 (0.1501)	-0.1508** (0.0614)	0.0196 (0.0641)
Access to Health centres-Easily	-0.0109 (0.1551)	-0.0877 (0.0621)	0.0087 (0.0648)
Access to Health centres-Very Easily	0.0935 (0.1925)	-0.1860*** (0.0880)	-0.0707 (0.0862)
Access to Transportation Points (reference very difficult)			
Access to Transportation Points-Difficult	-0.1711 (0.1531)	0.0821 (0.0642)	-0.1203* (0.0659)
Access to Transportation Points-Easily	-0.2941* (0.1560)	-0.0141 (0.0638)	-0.1237* (0.0653)
Access to Transportation Points-Very Easily	-0.4016** (0.1932)	-0.0932* (0.0471)	-0.1736** (0.0842)
Urban Area	-0.2335*** (0.0591)	- 0.2913*** (0.0286)	-0.1983*** (0.0269)
Observations	113,458		
Wald chi square	19,957.26 [0.000]		

Robust standard errors in parentheses, p-values within brackets \*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

**Table 4.** Propensity Score and Average Treatment Effects on Health Expenditures and OOPECTP for Green Card and Public Health Insurance

<b>VARIABLES</b>	<b>(1)</b>	<b>(2)</b>
	<b>OOPEs</b>	<b>OOPECTP</b>
Dummy-Green Card Vs Public	14.662*** (4.708)	0.0057*** (0.0017)
Gender (Female)	0.1934 (0.1626)	0.0064*** (0.0010)
Age	0.1331* (0.0563)	0.0009 (0.0031)
Logarithm of Household Income	10.302*** (1.806)	-0.0032** (0.0015)
Marital Status (Never Married)		
Marital Status-Married	6.4621* (3.788)	-0.4317*** (0.0387)
Marital Status-Widowed	5.6931 (6.012)	0.0137*** (0.0025)
Marital Status-Divorced	21.675** (10.1852)	0.0168** (0.0076)
Education Level (reference Illiterate)		
Education Level-Not completed school	3.6112 (3.088)	-0.0096 (0.0381)
Education Level-Primary School	0.2839 (4.077)	-0.0018 (0.0056)
Education Level-Primary Education	3.7775 (6.288)	-0.0045 (0.0051)
Education Level-Secondary School	-3.9010 (5.408)	-0.0102** (0.0043)
Education Level-High School	1.5753 (7.783)	-0.0131*** (0.0021)
Education Level-Senior School	-5.5282 (6.997)	-0.0173*** (0.0028)
Education Level-College	1.9397 (5.748)	-0.0078* (0.0043)
Education Level-University	2.5914 (4.479)	-0.0183*** (0.0048)
Employed (No)	2.6522** (1.325)	0.0023** (0.0011)
Household Size	0.6865*** (0.1808)	0.0009 (0.0014)
Wealth	1.4566*** (0.3470)	-0.0010*** (0.0004)
Urban Area	-2.1622*** (0.0591)	-0.0074** (0.0033)
Observations	20,163	20,163
R Square	0.1033	0.1061

Robust standard errors in parentheses, p-values within brackets \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 5.** Propensity Score and Average Treatment Effects on OOPEs and OOPECTP for other Types of Health Insurance

<b>VARIABLES</b>	<b>OOPEs</b>	<b>OOPECTP</b>
Green Card Vs Public	14.662*** (4.708)	0.0057*** (0.0017)
No-Insurance Vs Public-Private	6.6725*** (1.141)	0.0039*** (0.0008)
Green Card Vs No-Insurance	-12.409*** (2.191)	-0.0063*** (0.0016)

Robust standard errors in parentheses, \*\*\* p<0.01

**Table 6.** Test for Propensity Score before and After Matching

	Green Card Vs Public	No Insurance Vs Public-Private	Green Card Vs No-Insurance
<b>Gender</b>	0.66 (0.507)	1.33 (0.184)	-0.86 (0.391)
<b>Age</b>	-1.17 (0.244)	1.54 (0.115)	-1.51 (0.123)
<b>Household Income</b>	-0.44 (0.662)	1.30 (0.172)	0.91 (0.361)
<b>Marital Status</b>	-1.99* (0.092)	-1.79* (0.073)	-5.25 (0.000)
<b>Education level</b>	1.43 (0.112)	1.76** (0.081)	-0.34 (0.731)
<b>Employed</b>	-2.42** (0.024)	-1.36 (0.173)	-0.31 (0.759)
<b>Household Size</b>	0.92 (0.355)	2.23 (0.026)	-1.61 (0.108)
<b>Wealth</b>	0.34 (0.732)	1.02 (0.293)	-1.57 (0.113)
<b>Urban area</b>	-0.96 (0.338)	1.17 (0.266)	2.00** (0.045)

Standard Errors in parentheses, \*\* p<0.05, \* p<0.1

**Table 7.** DID for OOPECTP and OOPEs and various cases

	Coefficients		Coefficients
<b>Panel A: Green Card Vs Public Health and OOPECTP</b>		<b>Panel B: Green Card Vs Public Health and OOPEs</b>	
Treat (1 for Green Card, 0 for Public Health Insurance)	0.0106 (0.507)	Treat (1 for Green Card, 0 for Public1) Health Insurance	19.944 (17.002)
Post-Period (1 for 2008 and after)	-0.0783*** (0.0150)	Post-Period (1 for 2008 and after)	27.540** (13.292)
Treat*Post-Period	-0.0294** (0.0142)	Treat*Post-Period	-34.691** (19.377)
No. Observations	20,555	No. Observations	20,555
R Square	0.1305	R Square	0.1427
<b>Panel C: Green Card Vs Public Health Placebo OOPECTP test 2007</b>		<b>Panel D: Green Card Vs Public Health Placebo OOPEs test 2007</b>	
Treat (1 for Green Card, 0 for Public Health Insurance)	0.0043 (0.106)	Treat (1 for Green Card, 0 for Public1) Health Insurance	22.571 (21.533)
Post-Period (1 for 2007 and after)	-0.0431*** (0.0113)	Post-Period (1 for 2008 and after)	30.700 (25.445)
Treat*Post-Period	-0.0058 (0.0142)	Treat*Post-Period	-27.972 (22.842)
No. Observations	20,555	No. Observations	20,555
R Square	0.0834	R Square	0.0729

Robust standard errors in parentheses, \*\*\* p<0.01, \*\* p<0.05

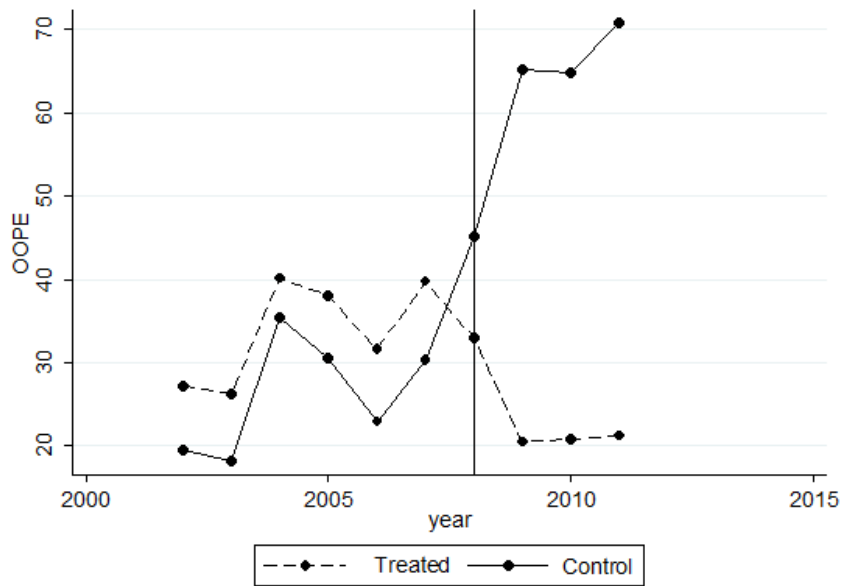


**Table 8.** DID for Logarithms of OOPECTP and OOPEs

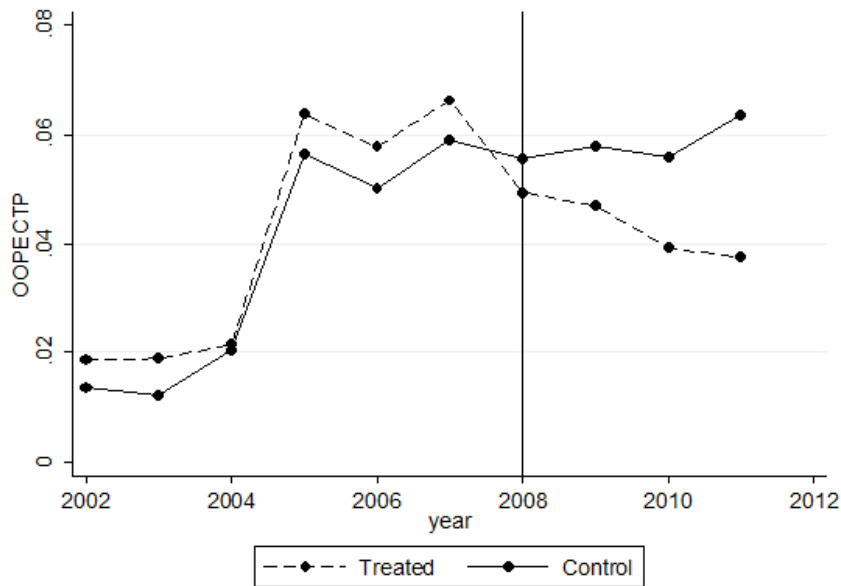
	Coefficients		Coefficients
<b>Panel A: Green Card Vs Public Health and OOPECTP</b>		<b>Panel B: Green Card Vs Public Health and OOPEs</b>	
Treat (1 for Green Card, 0 for Public Health Insurance)	0.0446 (0.106)	Treat (1 for Green Card, 0 for Public1) Health Insurance	0.1670 (0.212)
Post-Period (1 for 2008 and after)	-0.1082*** (0.0310)	Post-Period (1 for 2008 and after)	0.7074* (0.378)
Treat*Post-Period	0.2129** (0.0982)	Treat*Post-Period	-0.2602** (0.130)
No. Observations	19,798	No. Observations	19,798
R Square	0.1266	R Square	0.8773

Robust standard errors in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

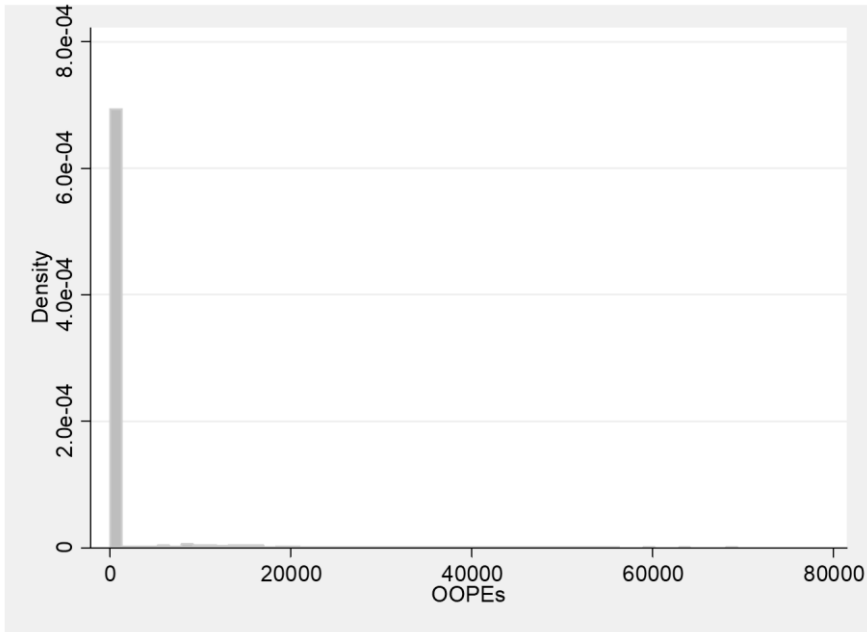
**Figure 1.** Parallel Trend Assumption for OOPEs



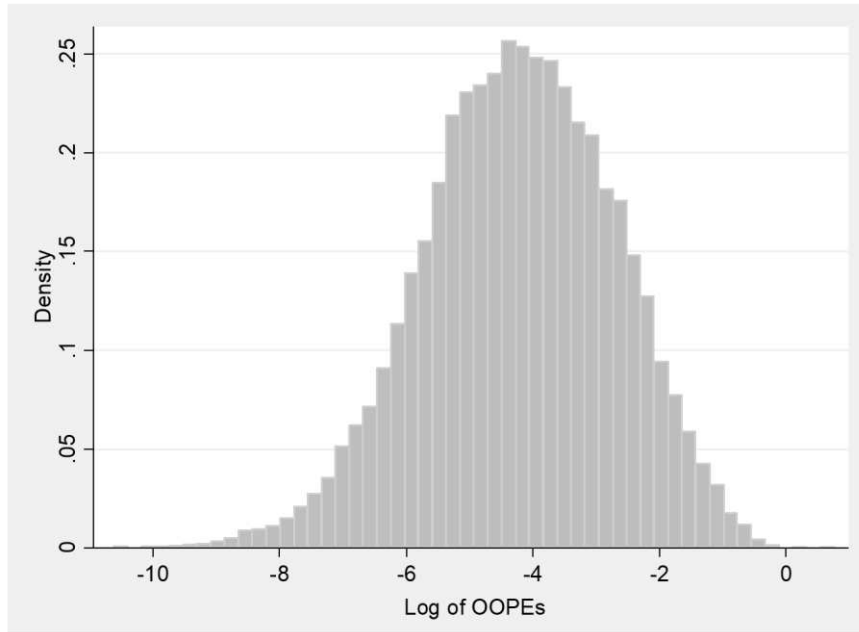
**Figure 2.** Parallel Trend Assumption for OOPECTP



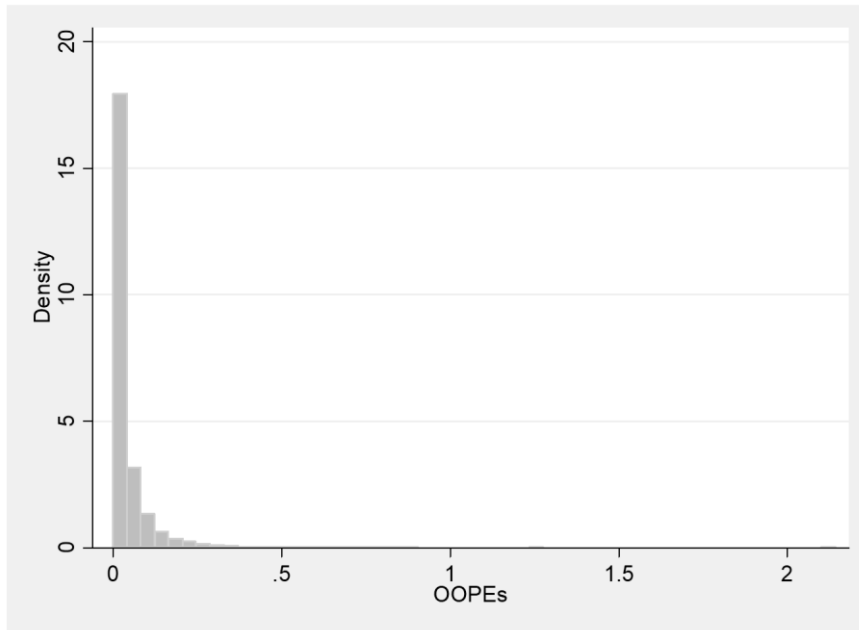
**Figure 3.** Histogram for OOPes



**Figure 4.** Histogram for Logarithm of OOPes



**Figure 5.** Histogram for OOPEs over the Capacity to Pay



**Figure 6.** Histogram for the Logarithm of OOPEs over the Capacity to Pay

