

Assessing the Impact of Health Insurance on Household Financial Protection in Togo

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Abstract

Context: To facilitate financial access to care for the population, health insurance mechanisms have been established, in particular the National Health Insurance Institute, which covers civil servants and their dependents. In addition, other voluntary and community mechanisms have been developed. After several years of implementation, the level of catastrophic health expenditures among insured individuals shows that there is still a considerable level of financial risk associated with health care. This study aims to assess the impact of health insurance in Togo on insured populations. **Methodology:** The data used in this study come from the harmonized survey on household living conditions carried out in 2018 by the National Institute of Statistics, Economic and Demographic Studies. The propensity score matching method was used according to the following steps: estimation of propensity scores, verification of the conditional independence hypothesis (balancing property) and estimation of the average treatment effect on treated. Stata V14.2 software was used. **Findings:** The average effect of health insurance on household financial protection is -0.012 for the nearest neighbor method, -0.013 for the matching radius method, -0.015 for the Kernel and -0.016 for the stratification method. Results showed that health insurance contributes to reducing catastrophic health expenditures, but their effect remains very limited. This could be explained by the level of care package covered and the cost covered. **Conclusion:** Health insurance contributes to the reduction of catastrophic health expenses for households. However, it is important to widen the range of care covered and the cost covered. In addition, measures to extend this coverage to a larger proportion of the population will make it possible to have a greater impact.

Keywords

Impact, Health Insurance, Catastrophic Expenditure

1. Introduction

Equitable access to basic health care at a lower cost is an important factor of cohesion and social stability. Inequalities in health care provision have often been a source of social instability, especially among the most vulnerable and disadvantaged populations [1] [2] [3].

Ensuring that all people have access to affordable basic health care is one of the international goals of the Sustainable Development Goals (SDGs).

Togo has made this objective his own for several years by including it in his national health development plan during 2017-2022 [4]. To this end, the law introducing the compulsory health insurance scheme for civil servants and similar was adopted in February 2011, with the aim of improving access to care and reducing the financial risks associated with this care, particularly catastrophic health expenses.

Togo is a low-income country and is ranked 24th in Africa and 162nd in the world according to its Human Development Index (HDI) with a score of 0.539 [5]. The poverty rate is still high, estimated at 45.5% in 2018, characterized by inequalities, especially in rural areas where 58.8% of households lived below the poverty line [6].

The International Association of Insurance Supervisors (IAIS) defines micro-insurance as insurance for low-income people provided by a variety of institutions, run in accordance with generally accepted insurance core principles, and funded by premiums proportionate to the likelihood and cost of the risk involved. Microinsurance serves populations in the informal sector that are excluded from or not served by other insurance [7].

Micro health insurance contributes to health care utilisation and financial protection of its beneficiaries, by reducing out-of-pocket health expenditure, catastrophic health expenditure, and poverty [8] [9] [10].

The establishment of such mechanisms has reduced catastrophic health expenditure in several countries [11]-[15].

In Ghana, under the National Health Insurance Scheme (NHIS), the level of catastrophic health expenditure at the 40% threshold in the insured population is 2.9% while it is 4% in the uninsured population [16]. Under the same conditions, the NHIS led to a reduction in catastrophic health expenditure of between 0.5% and 1% depending on the thresholds used [17]. In 2009, 18.4% of insured individuals faced catastrophic health expenses compared to 36.1% of the uninsured. In 2017, this proportion was only 7.1% for the insured and 28.7% for the uninsured [9].

In Togo, as in other countries, there has been an increase in attendance at health facilities from 31% in 2013 to 63% in 2019 [18] [19]. Furthermore, regarding financial protection, there are very few studies in the Togolese context [20]. A

study on catastrophic health expenditure among insured individuals showed that at the 40% threshold, 9.71% of the population faced catastrophic health expenditure [20]. The evolution of out-of-pocket health expenditure (from 61.5% in 2017, 64.7% in 2018 and 66.2% in 2019) [21] shows that the effectiveness of these mechanisms in terms of their effect on financial protection remains limited. Furthermore, these results allow for an assessment of the current level of catastrophic health expenditure among insured populations, but do not provide enough information on the impact of health insurance mechanisms on beneficiaries.

Several studies have been carried out to show the impact of health insurance on financial protection, but they remain mostly observational or inconsistent, although quasi-experimental methods are gradually starting to be used in recent years [22] [23].

This study, therefore, aims to assess the impact of health insurance mechanisms on the financial protection of beneficiaries. It is one of the first studies to highlight the effect of health insurance mechanisms on financial protection in Togo and contributes to the literature on the subject.

2. Method

To estimate the impact of health insurance on financial protection (preventing from incurring a catastrophic health expenditure), the Propensity Score Matching (PSM) method was used.

Propensity Score Matching is a quantitative method of impact assessment. It was introduced in 1983 by Rosenbaum and Rubin [24].

In recent years, this method has been used by several authors to evaluate the impact of programmes [25] [26].

Propensity score matching involves matching each individual in the treatment group with one (or more) individual(s) in the control group whose propensity scores are as close as possible.

The practical implementation of the propensity score matching method is done in three main steps.

The first step is to estimate the propensity score. The propensity score is defined as the probability for an individual to receive treatment T based on observable characteristics X .

We then have $P(x) = P(T=1/X)$ where $T = \{0,1\}$ 1 if the household has health insurance and 0 otherwise.

The second step is to test the Conditional Independence Assumption, also known as the balancing condition.

It states that if the outcome variable Z is independent of the treatment exposure T conditional on the observed variables X , then Z is also independent of the treatment T conditional on the treatment propensity score distribution.

To satisfy this balancing condition, the right combination of observed variables X must be chosen. In fact, this hypothesis may be verified for one combination of observable variables and not for another. It is also necessary to limit oneself to the common support region. The area of common support or (over-

lap) is the area in which there are treated individuals who have the same (or almost the same) propensity score as the individuals in the comparison group. Thus: We admit that if $Z \perp T/X \Rightarrow Z \perp P(X)$ then $P(X) = P(T = 1/X)$ (1)

The third step is to calculate the Average Treatment Effect on Treated (ATT). If the balancing condition is met, then the average treatment effect on treated for a sample is equal to the difference in the average effect between the two groups; *i.e.* beneficiaries and non-beneficiaries. This translates into the following formula:

$$ATT = ((Z_1 - Z_0)/T = 1) = E\{(Z_1 - Z_0)/T = 1, P(X)\} \quad (2)$$

$$\text{Hence } ATT = E(Z_1/T_1; P(X)) - E(Z_0/T_0; P(X)) \quad (3)$$

To ensure the validity of the conditional independence assumption, several matching methods are used to estimate the average treatment effect on the treated. The most commonly used are:

- Nearest Neighbors Matching (NNM),
- Radius Matching (RM),
- Kernel Matching (KM) and
- Stratification Matching (SM).

The Nearest Neighbors Matching (NNM) method consists of matching an individual in the treatment group to one or more individuals in the control group whose propensity scores are as close as possible to the propensity score of that individual. Here, there is no possibility of discounting. This could lead to poor quality matches. To solve the problem, a discounted match is made: this is the Radius Matching (RM) method. In this method, each treated individual is matched with the untreated individual whose propensity score is in a predefined area of the propensity score (radius) of the treated individual. In the Kernel Matching (KM) method, all treated subjects are matched with an average weight of all control subjects inversely proportional to the distance between the propensity score of the treated and untreated units. Finally, the Stratification Matching (SM) method consists of dividing the propensity score into several blocks so that within each block, treated and untreated individuals have, on average, the same propensity score. The average treatment effect on the treated is obtained by averaging the average treatment effect of each block with weights given by the distribution of treated individuals across the blocks. The three matching methods allow for a robustness check of the evaluation. In this study, we used the computer program `pscore.do`, developed by Ichino and Becker [26] to estimate the effect of the mechanisms on household financial protection. Stata software version 14.2 was used for the estimates using data from the 2018 Harmonised Survey of Household Living Conditions (EHCVM).

3. Results

3.1. Descriptive Analysis of the Difference Test

The difference test compares the means of the characteristics of the two groups (treatment and control) to infer a relationship between them. The difference test

on the observable characteristics of the two groups was conducted to assess the similarity between the households of the two groups (control and treatment groups). **Table 1** below shows that the two groups are identical on a number of observable characteristics. However, there are significant differences in some variables such as: household size and region of origin.

3.2. Distribution of Propensity Scores between the Two Groups

According to **Figure 1**, the results of the common support propensity score distributions fall within the range [0.01; 0.15]. This figure shows that the propensity

Table 1. Test of difference between the two groups by observable characteristics.

Variables	Control groups	Treatment group	Test of difference between the two groups
Household size	1.72	1.62	-0.09***
Marital status	2.11	2.14	0.03
Education of the head of household	1.94	2.03	0.09
Age of head of household	2.49	2.53	0.03
Gender of head of household	1.26	1.26	0.000
Place of residence	0.36	0.41	0.36
Region	2.43	3.06	0.67***
Number of children under 5 years old	0.46	0.42	-0.04
Number of people over 60	0.21	0.23	0.021
Income quintile (indicative)	1.48	1.61	0.12

Note: ***: significant at 1%.

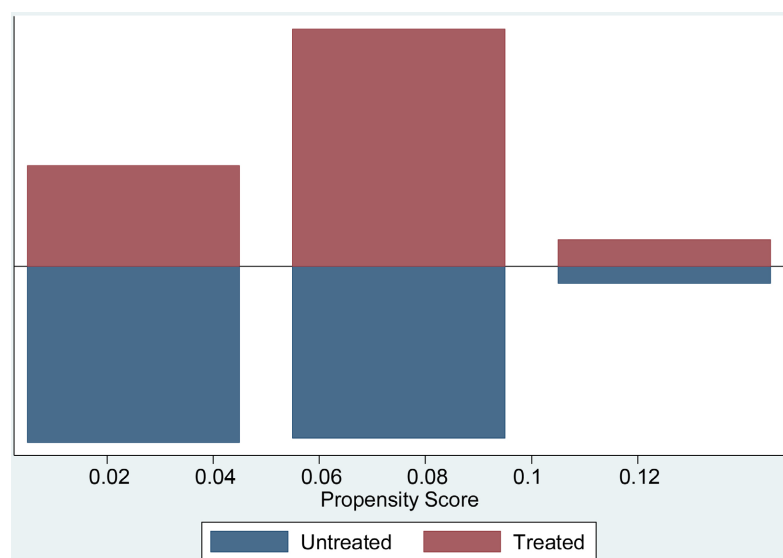


Figure 1. Distribution of propensity scores in the two groups.

scores have an overlapping distribution in the common support region for the treated and control groups. This overlap shows that each treated individual can be matched to at least one control individual.

3.3. Analysis of the Distribution of Propensity Scores before and after Treatment According to the Characteristics of the Variables

Figure 2 analyses a kernel density plot that estimates the underlying distributions of propensity scores before and after matching. Before matching, there is a difference in the distributions of the two groups. After matching, the distributions of the propensity scores are almost identical. Before, the curve for households with health insurance (treated group) is spread to the right compared to the control group (households without health insurance). After matching, there is no difference between the treatment and control groups. The two curves are almost merged and similar. It can be deduced that the matching between health insurance beneficiaries and non-beneficiaries was successful.

3.4. Result of the Analysis of the Impact of Health Insurance on Household Financial Protection

Table 2 shows that regardless of the method used, health insurance has a negative effect on the probability of incurring a catastrophic health expenditure. Indeed, having health insurance reduces the probability of incurring a catastrophic health expenditure by 1.2 points according to the nearest neighbour method, by 1.3 points according to the matching radius method, by 1.5 points according to the Kernel method and by 1.6 points according to the Stratification method. This

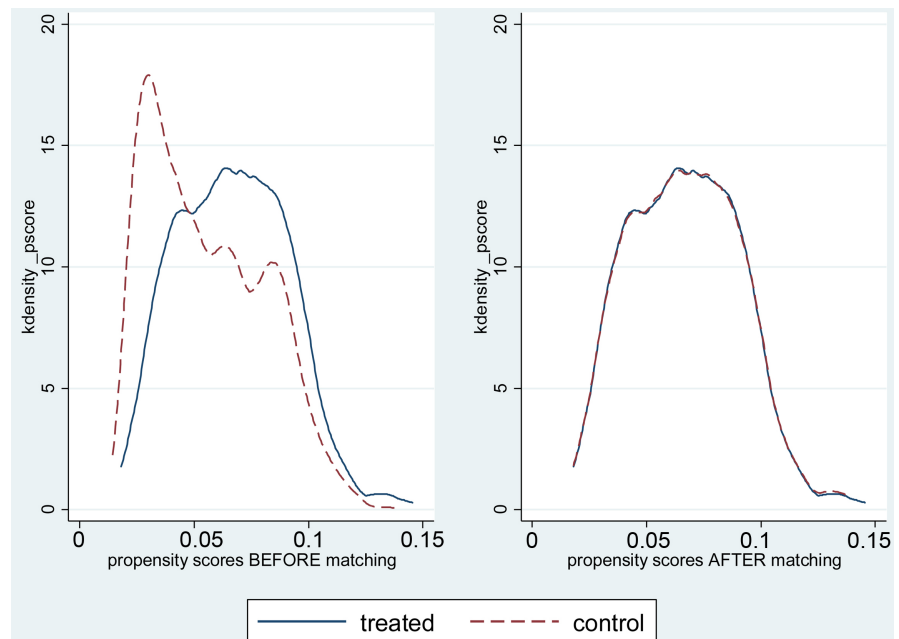


Figure 2. Distribution of pre- and post-treatment propensity scores by variable characteristics.

Table 2. Impact of health insurance on financial protection.

	Closest neighbour	Matching radius	Core/Kernel	Stratification
Number of treaties	329	326	329	329
Number of untreated	1153	5388	5483	5483
ATT	-0.012	-0.013	-0.015	-0.016
T-student	-0.488	-0.650	-0.715	-0.815

impact is located in the interval [1.2 - 1.6]. The values are, therefore, close, which confirms the hypothesis of conditional independence.

4. Discussions

The purpose of setting up health insurance mechanisms is to improve access to health care for the population but also to guarantee financial protection. This study reveals that health insurance mechanisms in Togo have an impact on household financial protection. Indeed, the probability of a household with health insurance having a catastrophic health expenditure is reduced by 1.2 to 1.6 points depending on the propensity score matching methods used. This same trend is observed in several studies: 4.3% reduction in the probability in Nigeria [27], 7.2% in Tanzania [28], and 23% in Ethiopia [29]. Compared to the results obtained in these countries, the impact on financial protection obtained in our study seems limited. Apart from the implementation of the health insurance scheme, it is important to ensure that the content of the benefit package and its level of coverage is consistent to guarantee effective financial protection. According to the 2017, 2018 and 2019 health accounts report [21] out of pocket as a proportion of current health expenditure represent 61.5% in 2017, 64.7% in 2018 and 66.2% in 2019. This high level of out of pocket by households can be explained by the low proportion of people with health insurance, but also by the high level of co-payments due to the low rate of coverage of care, especially the most expensive or those requiring hospitalisation. This observation was also made by Peng and Zhu [30] in China, where they find that it is necessary for mainly public insurance schemes to be strengthened to enable them to reduce the financial risk for inpatients. Expensive health care not covered by insurance can be a source of financial risk for especially poor households. It is necessary to integrate expensive care in the benefit package to meet the needs of the poor [31].

These low levels of coverage can limit or even render insensitive the effect of financial protection mechanisms, so that no difference in financial protection is observed between the insured and the uninsured. This is the case of the Family Security Grant Programme (PNBSF) in Senegal [32], the National Health Insurance in Lao PDR [33], and micro health insurance in Bangladesh [31]. For better financial protection of health insurance schemes, it is important to cover a large

proportion of the population on the one hand, and extend risk coverage to the most expensive care on the other. In order to guide decision-makers, it would be important to conduct further research to determine the threshold levels of coverage for a health insurance scheme in order to provide better financial protection for the population.

5. Conclusion

By assessing the impact of health insurance on financial protection in Togo, this study aims to assess the extent to which health insurance schemes protect the insured against catastrophic health expenditures. Our results show that these schemes contribute to reducing the probability of experiencing catastrophic health expenditures, but their impact remains weak. It is important that the care package covered and its level of coverage are substantial for more financial protection.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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