Health Insurance and Child Health Outcomes in West Africa

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Abstract- In developing countries, the health status of millions of kids is affected by financial problems arising from unexpected out-of-pocket health expenditures. Therefore, the aim of this paper is to assess the impact of health insurance on child health outcomes using a panel of 10 West African countries over the period from 2005 to 2015. After controlling for income, education and the 2014-2016 Ebola outbreak experienced in the sub-region, it is found that the compulsory as well as the voluntary health insurance schemes significantly increase life expectancy at birth and significantly decrease both the under-five and the neonatal mortality rates. Therefore, it is recommended that public health authorities organize sensitization campaigns to educate the population and create awareness about the benefits of health insurance. They should also reinforce the compulsory health insurance scheme and create incentives for the development of the voluntary one.

Index Terms- Compulsory health insurance, voluntary health insurance, child health outcomes

I. Introduction

As revealed by Escobar et al. (2010), developing countries are associated with health systems impaired by inefficiency, inequitable access, inadequate funding, and poor quality services; putting at stake the lives of more than 2 billion people. Each year, these vulnerable adults and kids account for 92% of global deaths from communicable diseases, 68% of deaths from non-communicable illnesses, and 80% of deaths from injuries. Furthermore, more than 150 million of these people often experience financial problems arising from unexpected out-of-pocket health expenditures.

The magnitude of these public health issues calls for prompt and decisive measures to be taken. Among the solutions proposed by the scientific community, the increase of public health expenditures and the implementation of health insurance stand out as key measures that can help bring about the structural change needed in developing countries. Indeed, it is argued that health insurance offers a financial protection against impoverishing medical expenses, improves the access to timely and quality medical care, and ultimately leads to better health outcomes (Bovbjerg et al., 2007; Bernstein et al., 2010; Escobar et al., 2010; OECD, 2016; Bonfrer et al., 2016; Sommers et al., 2017). Furthermore, for the vulnerable people afflicted by low incomes, suffering from chronic medical conditions or living in environments characterized by endemic diseases, the effects of health insurance could even be magnified.

Given that a substantial part of these vulnerable people live in sub-Saharan Africa in general and West Africa in particular, this paper aims to assess the impact of health insurance on their health status. Thus, based on data availability, a panel of 10 West African countries is selected to cover the period from 2005 to 2015. Both the compulsory and the voluntary health insurance schemes account for health insurance while life expectancy at birth, the under-five mortality rate and the neonatal mortality rate account for child health outcomes. The paper contributes to the existing literature by assuming that in the case of West African countries, the nexus between health insurance and child health outcomes could be altered by income, education, and the Ebola outbreak of 2014-2016.

The remainder of the paper is organized as follows: the literature related to the effects of health expenditures in general and health insurance in particular on health outcomes is reviewed in section 2. The methodology is presented in section 3 while the main findings are reported and discussed in section 4. Finally, the paper is concluded in section 5 with some policy recommendations.

II. Literature Review

The effects of health expenditures in general and health insurance in particular on health outcomes have inspired numerous studies; with these studies paying a special attention to developing countries because of their relatively poor health systems. Thus, Anyanwu and Erhijakpor (2007) analyze the nexus between health expenditures and health outcomes using a data related to 47 African countries from 1999 to 2004. Controlling for income, the number of physicians, urbanization, education, HIV prevalence and the ethnolinguistic characteristics of those countries, they find that total as well as government expenditure on health significantly improve health outcomes. The study also reveals that the control variables have a significant impact on health outcomes and the researchers conclude that non-expenditure factors should be taken into consideration in the improvement of health systems in Africa.

Novignon et al. (2012) study the effect of public and private health expenditures on health status using a panel of 44 sub-Saharan African countries between 1995 and 2010. After running a fixed as well as a random effects model, they find that both public and private health expenditures have a positive and significant impact on health outcomes. The paper also reveals that compared to private health expenditures, public spending has a greater impact on health outcomes.

Paying attention to developed countries, Kim et al. (2013) analyze the impact of government health expenditures on health outcomes. Using a mixed-effect model on a sample of 17 OECD countries between 1973 and 2000, the paper reveals that government health expenditures significantly improve health outcomes in those countries. Indeed, they find that government health expenditures are negatively associated with infant mortality rate and positively associated with life expectancy.

Bonfrer et al. (2016) study the effects of the Ghanaian National Health Insurance Scheme on maternal and infant health. On a sample of 2002 children and 1959 mothers, they apply propensity score matching and analyze health outcomes before and after the implementation of the NHIS. The study reveals that the NHIS significantly increases the proportion of pregnancies with at least 4 antenatal care visits, attended deliveries as well as caesarian sections. Indeed, they find that in the wake of the NHIS, those health outcomes increased by 7%, 10% and 6% respectively.

Escobar et al. (2010) study the impact of health insurance in 7 low and middle-income countries (Namibia, Ghana, Costa Rica, Peru, Indonesia, rural China and Colombia) and argue that despite the heterogeneity in design, target groups, coverage, and financing mechanism, health insurance improves health by easing the access to health care. They reveal that in all those countries, uninsured people are more likely to be denied access to treatment or to rely on self-medication. Those people also benefit less from preventive care, and their out-of-pocket expenditures represent a higher share of their total income. In Colombia for instance, it is found that people with health insurance are 41% more likely to go for preventive care. In Ghana, insured mothers pay 90% less for prenatal and delivery care while in China, self-treatment is 30% lower for the insured population.

III. Methodology

A. Data

Assessing the impact of health insurance on child health outcomes, the paper uses annual data collected from the World Health Organization and the World Bank. Based on data availability, 10 West African countries[1] are selected to cover the period from 2005 to 2015. Health insurance is proxied by two variables: the first variable (compulsory insurance) represents the yearly amount spent by households on any health insurance policy made compulsory by public authorities; while, the second variable (voluntary insurance) represents the amount spent by households on any non-compulsory health insurance policy. Both proxies of health insurance are expressed as percentages of current health expenditure. As for child health outcome, it is proxied by life expectancy at birth, the under-five mortality rate and the neonatal mortality rate.

Three control variables are included in the analysis because they could alter the nexus between health insurance and child health outcomes. The first variable (the growth rate of the GDP per capita) captures the average income of the population and it is assumed that people with higher income are more likely to buy health insurance for their kids. The second variable (the percentage of primary school enrollment) accounts for basic education because it is assumed that educated people are more favorable to health insurance. As for the last control variable, it is a dummy variable designed to account for the Ebola outbreak experienced in West Africa from 2014 to 2016. This dummy variable is included because it is assumed that the Ebola outbreak could have both increased the demand for health insurance and deteriorated health outcomes in the region.

B. Econometric model

The model used is given by the following equation:

$$HO_{it} = \alpha_1 + \alpha_2 CHI_{it} + \alpha_3 VHI_{it} + \alpha_4 Inc_{it} + \alpha_5 Edu_{it} + \alpha_6 Ebola_{it} + Trend_t + \delta_i + \epsilon_{it} \quad (1)$$

Where HO_{it} stands for the three proxies of health outcome for country i in time t; CHI_{it} and VHI_{it} represent the compulsory, and the voluntary health insurance schemes respectively; Inc_{it}, Edu_{it}, and $Ebola_{it}$ stand for income, education, and the Ebola outbreak respectively. Finally, $Trend_t$ stands for the time trend, δ_i represents country-specific fixed effects, ϵ_{it} is the residual and $\alpha_a \ (a = 1, \ldots, 6)$ are the parameters to be estimated.

The model is estimated using the generalized least squares (GLS) method to address the issues related to heteroskedasticity and serial correlation inherent to the data. Finally, robust standard errors are generated using the bootstrapping technique with 1000 replicates.

IV. Results

The results reported in Table 1 reveal that both the compulsory and the voluntary health insurance schemes significantly increase life expectancy at birth. Indeed, a 10 percent increase in the amount allocated to either of those insurance schemes could increase life expectancy by 7 years. The table also reveals that the level of income has a negative and insignificant impact on life expectancy. Such a negative impact is contrary to expectations but could be due to the fact that in its early stages, economic development is often associated with some flaws (pollution and environmental degradation) that could reduce life expectancy. This is particularly relevant for West African countries because most of those economies are still in the early stages of development, moving toward their industrial revolution.

[1] Those ten countries are: Benin, Cabo Verde, Ivory Coast, Ghana, Guinea, Guinea Bissau, Mali, Niger, Nigeria and Senegal.

Table 1. The impact of health insurance on life expectancy at birth

	Coef.	Boot. Std. Err.	Prob
CHI	0.724***	0.075	0.000
VHI	0.770***	0.067	0.000
Inc	-0.139	0.089	0.118
Edu	0.003	0.014	0.808
Ebola	-0.489	0.555	0.379
Cons.	56.370***	1.945	0.000
Wald Chi^2 (7)	386.24		
Prob > Chi^2	0.000		
Obs.	110		
Adj. R^2	0.6152		

Source: Authors' estimations

Note: * Denotes significance at the 10% level; ** denotes significance at the 5% level; and *** denotes significance at the 1% level. A time trend and country-specific fixed effects were included in the analysis but are not reported.

As for Education and Ebola, they both exhibit the expected sign but are both insignificant. Indeed, education is positively associated with life expectancy as it could incite people to subscribe to health insurance while the lethal nature of Ebola could explain its negative impact on life expectancy.

Paying attention to the under-five mortality rate, it is found that both the compulsory and the voluntary health insurance significantly reduce it. Thus, a 10 percent increase in either health insurance scheme could reduce the under-five mortality rate by more than 50 per 1000. Moreover, it should be noted that the effect of the compulsory health insurance is more pronounced than that of the voluntary one. Table 2 also reveals that the level of income still exhibits a counter-intuitive sign while education is negatively associated with the under-five mortality rate. As for Ebola, it tends to increase the mortality rate as expected but its effect not significant. The effect of Ebola not being significant could be due to the fact that among the ten West African countries included in the panel, the World Health Organization (2016) classifies only Guinea as a center for the 2014-2016 outbreak.

Table 2. The impact of health insurance on the under-five mortality rate

	Coef.	Boot. Std. Err.	Prob
CHI	-5.492***	0.292	0.000
VHI	-5.253***	0.315	0.000
Inc	0.590	0.446	0.186
Edu	-0.079	0.094	0.399
Ebola	4.136	3.442	0.230
Cons.	149.384***	12.331	0.000
Wald Chi^2 (7)	1270.99		
Prob > Chi^2	0.000		
Obs.	110		
Adj. R^2	0.7322		

Source: Authors' estimations

Note: * Denotes significance at the 10% level; ** denotes significance at the 5% level; and *** denotes significance at the 1% level. A time trend and country-specific fixed effects were included in the analysis but are not reported.

Finally, in the case of the neonatal mortality rate, it is still found that both the compulsory and the voluntary health insurance schemes significantly improve child health outcome. Indeed, a 10 percent increase in the funds allocated to either health insurance could reduce the neonatal mortality rate by at least 14 per 1000. Contrary to the previous case, it is the voluntary health insurance that has the greatest effect on the neonatal mortality rate. Table 3 also reveals that the level of income and education have a counter-intuitive sign while Ebola leads to an increase in the mortality rate as expected.

Table 3. The impact of health insurance on the neonatal mortality rate

	Coef.	Boot. Std. Err.	Prob
CHI	-1.426***	0.137	0.000
VHI	-1.785***	0.165	0.000
Inc	0.076	0.204	0.707
Edu	0.191***	0.052	0.000
Ebola	1.479	1.769	0.403
Cons.	26.862***	8.354	0.001
Wald Chi^2 (7)	424.25		
Prob > Chi^2	0.000		
Obs.	110		
Adj. R^2	0.4855		

Source: Authors' estimations

Note: * Denotes significance at the 10% level; ** denotes significance at the 5% level; and *** denotes significance at the 1% level. A time trend and country-specific fixed effects were included in the analysis but are not reported.

V. Conclusion

Assessing the effects of health insurance on child health outcomes while controlling for income, education and the 2014-2016 Ebola outbreak experienced in West Africa, it is found that the compulsory as well as the voluntary health insurance schemes significantly increase life expectancy at birth. It is also found that both of those insurance schemes significantly decrease the under-five and the neonatal mortality rates. These findings are in line with Bovbjerg et al. (2007), Bernstein et al. (2010), Escobar et al. (2010), OECD (2016), Bonfrer et al. (2016) and Sommers et al. (2017) as they support the argument that health insurance improves health outcomes.

It is therefore recommended that public health authorities organize sensitization campaigns to educate the population and create awareness about the benefits of health insurance. They should also reinforce the compulsory health insurance scheme and create incentives for the development of the voluntary one.

Finally, it could be argued after the OECD (2016) that universal health coverage is within reach for many developing countries if they can implement the necessary fiscal cave-out and channel out-of-pocket expenditures to a pooled funding for health.

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