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Does Globalization improve Health in Sub-Saharan African countries?

Stéphane Mbiankeu Nguea
University of Dschang

Issidor Noumba
University of Yaoundé II-Soa

Armand Gilbert Noula
University of Dschang

Abstract

This paper empirically examines the effects of globalization on health in 32 Sub-Saharan African countries. It also investigates whether the effect of globalization on health depends on the income level of countries. In particular, the paper focus on three health indicators namely infant mortality rate, child mortality rate and life expectancy. The fixed effects regression models with Driscoll-Kraay standard errors is used to control cross-sectional and temporal dependence. The empirical results reveal that globalization reduces infant mortality rate and child mortality rate in SSA countries. Our findings also show that the effect of globalization depends on the country's level of income. The health improvement impact of globalization appears stronger in SSA low-income countries than in SSA middle-income countries.

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Contact: Stéphane Mbiankeu Nguea - s.nguea@yahoo.fr, Issidor Noumba - tonfeu_yombi2009@yahoo.com, Armand Gilbert Noula - armandgilbert@yahoo.fr.
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1. Introduction

Over the past two decades, significant progress has been made in the health sector in Sub-Saharan Africa (SSA). As indicated by the World Bank, the child mortality rate between 1990 and 2014 decreased from 180 to 84 deaths, the infant mortality rate dropped from 107 to 64, and life expectancy at birth increased from 49.94 to 56.43 between 1990 and 2012 (World Bank, 2017). Despite the progress made in the health sector during this period, the situation remains particularly alarming in Sub-Saharan Africa (United Nations, 2019). This could therefore jeopardize the achievement of the 2030 Agenda for Sustainable Development Goals (SDGs). However, the International Monetary Fund (IMF, 2001) has asserted that the integration into the world economy would be the driving force behind the economic growth in developing countries, resulting in development and poverty reduction.

Recent research suggests that globalization is a strong force which improves health outcomes in rich and poor countries (Jani et al., 2019; Olagunju et al., 2019). Its effects on health mediate through national income, cultural practices, inequality, knowledge and technology transfer, food imports, better access to proper sanitation, water facilities, and healthcare services for adults and children as well as environmental factors (Cornia and Panicciá, 2000; Deaton, 2004; Krishnakumar and Sarti, 2014). Despite these considerations and to the best of our knowledge, the specific case of SSA countries has not been studied. To fill this gap, the effects of globalization and its three components on health in Sub-Saharan African countries is investigated. We also describe how the relationship between globalization and health is affected by a country's level of income.

The relevance of our study is three-fold. First, the people's health in SSA countries is a major concern. In comparison to other region in the world, Sub-Saharan Africa has the lowest ratings for well-being and the lowest satisfaction with health care (Deaton and Tortora, 2015). Second, of all the world's regions SSA accounts for the highest mortality rate and the spending on health care is low; around $100 per capita, about half of which is spent in the private sector (UN-World Mortality, 2019; Deaton and Tortora, 2015). Third, SSA countries have experienced rapid globalization during the past two decades. SSA is the second fastest globalized region in Africa with an average globalization index of 41.97 during the period 2001–2012 (Ajidea et al., 2018). Such an increasing integration into the global system has potential health effects (Jani et al., 2019; Olagunju et al., 2019; Welander et al., 2015). The debate as to whether such effects are overall positive or negative in SSA is not resolved yet.

To achieve the objectives of the study, we use fixed-effects regressions with Driscoll-Kraay standard errors and analyse panel data covering 32 SSA countries over an extended period from 1990 to 2015. We use the KOF index of globalization as the measure of globalization level and our health indicators are infant mortality rate, child mortality rate and life expectancy. The results suggest that overall, social and political globalizations are positively associated with health in Sub-Saharan African countries. By contrast, economic globalization has no significant effect. Finally, the income level plays an important role in explaining some of the variation in the relationship between globalization and health in SSA countries.

The present study is organized into five sections. Section 2 presents the related literature. Section 3 presents 'Data and methodology'. Section 4 presents and discusses the main findings. Section 5 concludes and discusses the policy implications.

2. Literature Review

Although no generally accepted definition exists, globalization refers to the "increasing integration of societies in terms of economic, social, and political factors" (Bourguignon, 2002), and the process through which it occurs is clearly multidimensional in nature (Arribas et al., 2009). The process may be divided into three distinct but interrelated components: economic, social and political globalization (Dreher, 2006; Keohane and Nye, 2000).

Whether globalization is a positive or negative force in the world has been well discussed from both theoretical and empirical stand points. According to the trickle down mechanism, integration of a country into the world economy tends to increase national incomes and enables households to invest more in the health of their children. With the increase of national income, a country gets infrastructure built and just having access to primary healthcare makes a tangible impact on the health of the population (Dollar and Kraay, 2004; Pritchett and Summers, 1993). However, some critics emphasized the negative effects of economic globalization. When developing countries become more integrated into the world economy, inequality may increase because its benefits may accrue primarily to the well-off, the well-educated, and those with control over trade-related services (Foellmi and Oechslin, 2010; Wade, 2003).

Globalization's impact is not only through the economic component but also through it social dimension. Enhanced migration opportunities which increase the incentives for education (Stark, 2004), and flow of information, knowledge, ideas via the internet and tourism leading to better education of mothers may have positive impact on child health (Welander et al., 2015). The social dimension of globalization may also have a negative effect on health through the fast spreading of communicable diseases across countries [e.g., Ebola Virus, Corona Virus (Covid19) and Human Immunodeficiency Virus (HIV)].

The political globalization through participation in international organizations, such as United Nations, World Health Organization (WHO), United Nations Development Programme (UNDP), United Nations Children's Fund (UNICEF) and the World Bank may result in benefits for the health of developing countries. Accordingly, Dollar (2001) argues that increased international cooperation and political integration on strategies to combat communicable diseases could be positive for child health in developing countries. However, these international organizations are specifically criticized for exacerbating the socio-economic crisis in Africa (Stiglitz, 2002), and intruding in the domestic policies of developing countries (Wolf, 2004).

Empirical Studies on the relationship between globalization in its various aspects and health have been increasing over the recent years. The existing papers show positive effects of globalization on health but there is a lack of consensus regarding the effects of the specific types of globalization and regarding the level of income in the countries. Owen and Wu (2007) have analyzed the effect of trade openness on health indicators such as infant mortality rate and life expectancy. They found a positive impact of trade openness on health status. Their findings also suggested that benefits in terms of health improvement in less developed countries are higher than in developed countries. Likewise, Levine and Rothman (2006), Davies and Quinlivan (2006) found evidence of positive and significant effects of globalization on child health and human development respectively. In the study carried out by Deaton (2004), the results revealed that globalization might have positive effects on health status to an extent to which globalization promotes economic growth. Tsai (2007) investigated the relationship between globalization and human well-being on a sample of 112 countries (low, middle and high-income) between 1980 and 2000. Using the random effects estimations, the results showed that overall and political globalizations are positively related to Human Development Index. The results appear stronger in high-income countries. Bergh and Nilsson (2010) investigated how globalization was correlated with health. The dataset includes 92 countries over the period 1970-2005 (four-year averages). Using Panel Corrected Standard Errors (PCSE) method, the results show that overall and economic globalizations increase life expectancy. In a very similar study, Mukherjee and Krieckhaus (2011) analysed the effects of globalization on health in 132 countries over the period 1970-2007 (five-year intervals). The fixed effects estimations revealed that overall, economic and social globalizations are positively related to infant and child mortality rates, and life expectancy. This also holds for a sample of only non-OECD countries.

Recently, Krishnakumar and Sarti (2014) have examined the impact of globalization on human development. The dataset includes information on 274 countries from 1950 to 2012. They have equally discussed the impact on health where they found that greater integration in

international economy and participation in multilateral activities was beneficial for health quality across countries. Using panel data for 33 developing countries between 1970 and 2009, Welander et al. (2015) analyzed the relationship between globalization, democracy, and child health. They found that overall globalization with its three dimensions (economic, social, and political globalizations) reduce infant mortality. Jani et al. (2019) examined the impact of globalization on the health status of 113 countries by using panel data. The fixed effects analysis shows that globalization has a positive impact on infant mortality and life expectancy in developed, developing and less developed countries. Moreover, the pace of improvement in developed countries is faster, indicating mixed result between developed and underdeveloped world. In their study on the relationship between globalization, human capital and welfare, Olagunju et al. (2019) have used child and infant mortality rates as welfare proxies. The empirical results revealed that globalization with its three components reduce child and infant mortality rates, and that an increase in the stock of human capital in developing economies improves welfare outcomes. The finding also showed that political and social globalizations have more significant effects on the reduction of child and infant mortality rates than economic globalization.

3. Data and Methodology

3.1 Data

The current study uses panel data method to investigate the relationship between globalization and health. It uses annual data from 32 out of 48 Sub-Saharan African countries from years 1990 to 2015. The selected sample and the time period are dictated by the availability of relevant data. Infant mortality rate[1], Child mortality rate[2] and Life expectancy at birth[3] are used as measures of health. These indicators are frequently used as health indicators (Owen and Wu, 2007; Mukherjee and Krieckhaus, 2011; Cornia et al., 2008; Deaton, 2004).

The main independent variable in this study is the KOF index of globalization (Dreher, 2006; Dreher et al., 2008). The KOF index covers three dimensions of globalization: economic, social, and political globalizations, with equal weights. The overall globalization with its three dimensions are ranged from an index of 1 to 100, where higher values indicate higher levels of globalization. The overall level of globalization is an aggregate of all three dimensions.

Economic globalization index includes two sub-indexes which are actual flows of trade, foreign direct investments and restrictions on international economic activities.

Social globalization index includes three sub-indexes which are personal contact, information flows and cultural proximity.

Political globalization index includes number of embassies in a country, membership in international organizations, participation in UN Security Council Missions and international treaties. Table A2 in the Appendix presents details of the components of the KOF variables.

Although all three measures of globalization are correlated, the correlations are fairly weak. Economic and political globalizations explain only 5 per cent of the variance in each other, confirming that these two phenomena are more different than they are the same. Social and political globalizations explain 15 per cent of the variation in each other. The R^2 between economic and social globalization is higher, around 67 per cent, but in general these three variables measure different components of globalization (see Table A3 in the Appendix). Following Mukherjee and Krieckhaus (2011), we interpret a pattern of significant results as confirming a multi-faceted effect of globalization[4] on health.

The model includes a number of control variables frequently used in explaining the health status in developing countries. Real GDP per capita (PPP adjusted), human capital index based on

[1] Is the number of deaths per 1000 live births of children under 1 year of age.
[2] Is the number of deaths per 1000 live births of children under 5 years of age.
[3] Refers to the number of years a newborn infant would live if prevailing patterns of mortality at the time of his/her birth were to remain the same for the rest of his/her life.
[4] These three variables have been used separately in several studies (Mukherjee and Krieckhaus, 2011; Welander and al., 2015; Olagunju et al., 2019).

years of schooling and returns to education and the urban population expressed in % of the total population. The fertility rate, child immunization and improved sanitation facilities (% of population with access). The Table 1 presents descriptive statistics and data sources for all variables included in the empirical analysis.

Table 1. Summary Statistics

Variable	Obs.	Mean	Std. dev.	Min.	Max.	Source
Infant mortality rate	832	4.228	0.444	2.572	5.106	World Bank (2017)
Child mortality rate	832	4.668	0.539	2.660	5.795	World Bank (2017)
Life expectancy at birth	831	3.986	0.133	3.317	4.309	World Bank (2017)
Overall globalization	832	3.768	0.219	3.135	4.248	Dreher et al. (2008)
Economic globalization	832	3.704	0.254	2.915	4.411	Dreher et al. (2008)
Social globalization	832	3.471	0.403	2.237	4.294	Dreher et al. (2008)
Political globalization	832	3.978	0.287	3.051	4.489	Dreher et al. (2008)
Real GDP	832	9.781	1.208	7.177	13.774	Feenstra et al. (2015)
Human Capital	806	0.478	0.237	0.029	1.041	Feenstra et al. (2015)
Urban population	832	3.466	0.511	1.686	4.468	World Bank (2017)
Fertility rate	832	1.638	0.287	0.336	2.054	World Bank (2017)
Improved sanitation	815	3.182	0.672	1.360	4.534	World Bank (2017)
Child immunization	822	4.21	0.352	2.708	4.595	World Bank (2017)

Note: all variables are in the log form.

3.2 Model and estimation technique

We use the following panel data model:

$$H_{it} = \theta + \beta_1 GI_{it} + \beta_2 CV_{it} + a_i + v_{it} \quad (1)$$

H_{it} is the natural log of Health indicator (Infant mortality rate, Child mortality rate and Life expectancy) of country i for time period t; GI_{it} is the natural log of independent variable(s) used for globalization; CV_{it} is the natural log of relevant control variables like real GDP per capita, fertility rate, access to improved sanitation urban population and human capital; a_i is the unobserved time invariant individual effect; $\boldsymbol{v_{it}}$ is the error term.

In order to introduce the role of income level in the globalization–health relationship in SSA countries, we classified SSA countries into two samples: middle-income (15) and low-income (17) countries. The World Bank income level classification of the year 2018 is used for each country. Thus, we run a pooled regression on the 32 SSA countries and two separate regressions for low-income and middle-income countries.

We estimate Random Effects (RE) and Fixed Effects (FE) models and use Hausman (1978) test to decide which model is preferred. The results show that the FE model is more appropriate in our case. After this, data are tested for heteroskedasticity, serial correlation and cross-sectional dependence using Modified Wald test for group-wise heteroskedasticity (Baum, 2006), Woolridge's test for serial correlation (Wooldridge, 2002) and Pesaran (2004) test, respectively.

4. Results and discussions

As reported in Table 2, the results of post-estimation tests reveal that the group-wise heteroskedasticity, first-order correlation and cross-sectional dependence are present in the panel data. When the residuals are cross-sectionally correlated, standard error estimates are downward-biased. Since N>T, we use Driscoll and Kraay (1998) standard errors (Hoechle, 2007) that are robust to heteroskedasticity, serial correlation and cross-sectional dependence.

Table 2. Post-Estimations tests results.

Model 1		Model 2		Model 3	
Hausman test					
Chi2 (Prob > chi2)		Chi2 (Prob > chi2)		Chi2 (Prob > chi2)	
106.14 (0.000)		93.18 (0.000)		130.07 (0.000)	
FE		FE		FE	
Wooldridge test					
F-stat (Prob > F)		F-stat (Prob > F)		F-stat (Prob > F)	
2629.742 (0.000)		113.781 (0.000)		782.010 (0.001)	
Modified Wald test					
Chi2 (Prob > chi2)		Chi2 (Prob > chi2)		Chi2 (Prob > chi2)	
15426.31 (0.000)		5716.50 (0.000)		49722.53 (0.000)	
Pesaran's CD test					
CD Test	p-Value	CD Test	p-Value	CD Test	p-Value
25.692	0.000	32.297	0.000	19.920	0.000

Dependents variables for model (1), (2) and (3) are Infant mortality rate; Child mortality rate and Life expectancy respectively. Since we examine the globalization-health nexus, Overall globalization is used in the post-estimation tests.

4.1 Globalization and health in Sub-Saharan African countries

Tables 3 reports the estimation results for the regression specifications estimated with the infant mortality rate, the child mortality rate and life expectancy as dependent variables. Models (1)-(4) present the results of estimations when infant mortality rate is used, models (5)-(8) discuss the impact of globalization and its three dimensions on child mortality rate and models (9)-(12) report the results when life expectancy is used.

Models (1), (5) and (9) of Table 3 report the effects of overall globalization on health. Models (1) and (5) show that a 10% increase in the aggregate globalization would reduce infant mortality rate and child mortality rate by 4.68% and 4.80% respectively. This result lends support to the study of Olagunju et al. (2019) and Welander et al. (2015) who found that globalization reduces child mortality rate and infant mortality rate in developing countries. However, in model (9) the overall globalization has an insignificant impact on life expectancy.

Models (2)-(4), (6)-(8) and (10)-(12) of Table 3 report the estimation results of the relationship between three components of globalization and health in SSA countries. Based on the estimations in models (2), (6) and (10) the effect of economic globalization is not significant. Results, as reported in models (3) and (4), and (7) and (8) reveal that social and political globalizations are negatively associated with infant mortality rate and child mortality rate. These results suggest that an increase in the level of cross-cultural information flows, international tourism, adaptation to modern lifestyle, international cooperation could lead to a reduction in infant mortality rate and child mortality rate. These finding are in line with previous findings of Jani et al. (2019) and Olagunju el al. (2019). Model (11) reveals that the coefficient of social globalization is not significant. Contrary to expectations, model (12) shows that political globalization is associated with a reduction in life expectancy, suggesting that should a SSA country increases its level of political integration, it could result in a significant reduction in life expectancy at birth. A possible explanation for this is that many citizens in developing countries who leave abroad to study medicine never returned to serve their own countries, resulting in deterioration in health systems of those countries (Bundred and Levitt, 2000). The empirical findings confirm the significance of social and political globalizations as driving forces behind the positive impact of overall globalization on infant mortality and child mortality rate in SSA countries.

Turning to the control variables, we observe uniformities in the signs of the coefficients across models (1)-(12), albeit with different significance levels. The results reveal that a higher GDP per capita is associated with a reduction in infant mortality rate and child mortality rate, and an increase in life expectancy. The findings confirm the significance of economic development in

health improvement. The results are in line with the findings of Ha and Cain (2017) which reveal that GDP per capita significantly improves the welfare in developing countries. The coefficients of human capital have negative and significant signs across models (1)-(8), as well as positive and significant signs across models (9)-(12), revealing that the stock of knowledge is negatively associated with infant mortality rate and child mortality rate, and positively associated with life expectancy. These findings confirm the significance of education, especially maternal education, in improving infant health in SSA countries, as reported in the studies by Grépin and Bharadwaj (2015) for Zimbabwe and by Ashagidigbi et al. (2018) for Nigeria. The results also show that SSA economies that have access to improved sanitations improve health outcomes. The findings lend support to the results of Kamiya (2011). Child immunization status is negatively correlated with infant mortality and child mortality in model (1)-(8), while in model (9)-(12) child immunization is associated with an increase in life expectancy. The result is in line with the findings of Drabo (2010). Based on the estimation in model (1)-(12), an increase in urbanization is associated with fewer infant and child mortality rates, and a higher life expectancy. This is also consistent with the findings by Heyen-Perschon (2005). In addition, the results also reveal that fertility has an insignificant impact on the three health indicators into all the regressions.

Table 3: The effect of globalization on health in Sub-Saharan African countries.

	Infant Mortality Rate				Child Mortality rate				Life Expectancy			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Overall globalization	-0.468***				-0.480***				0.000			
	(0.077)				(0.106)				(0.025)			
Economic globalization		-0.010				-0.036				0.018		
		(0.048)				(0.065)				(0.020)		
Social globalization			-0.345***				-0.351***				0.003	
			(0.072)				(0.097)				(0.024)	
Political globalization				-0.178***				-0.155***				-0.043*
				(0.031)				(0.051)				(0.024)
Real GDP	-0.142***	-0.142***	-0.096***	-0.138***	-0.154***	-0.157***	-0.107***	-0.150***	0.021**	0.022**	0.020*	0.022**
	(0.017)	(0.016)	(0.019)	(0.016)	(0.022)	(0.020)	(0.025)	(0.021)	(0.009)	(0.009)	(0.010)	(0.010)
Urban population	-0.234***	-0.310***	-0.252***	-0.289***	-0.319***	-0.391***	-0.337***	-0.379***	0.391***	0.387***	0.390***	0.396***
	(0.047)	(0.058)	(0.066)	(0.055)	(0.063)	(0.069)	(0.083)	(0.070)	(0.065)	(0.064)	(0.065)	(0.065)
Human Capital	-0.729***	-0.958***	-0.644***	-0.883***	-1.043***	-1.272***	-0.959***	-1.214***	0.170**	0.166*	0.168*	0.189**
	(0.140)	(0.127)	(0.148)	(0.123)	(0.175)	(0.138)	(0.196)	(0.140)	(0.080)	(0.081)	(0.089)	(0.072)
Fertility rate	-0.148	0.031	-0.032	-0.082	-0.295	-0.119	-0.177	-0.210	0.183	0.188	0.184	0.155
	(0.277)	(0.275)	(0.287)	(0.305)	(0.365)	(0.356)	(0.379)	(0.394)	(0.143)	(0.143)	(0.144)	(0.135)
Improved sanitation	-0.042	-0.144***	-0.036	-0.096***	-0.083**	-0.186***	-0.078*	-0.146***	-0.003	-0.004	-0.004	0.008
	(0.029)	(0.028)	(0.024)	(0.022)	(0.035)	(0.030)	(0.039)	(0.029)	(0.015)	(0.018)	(0.014)	(0.015)
Child Immunization	-0.045***	-0.114***	-0.057**	-0.113***	-0.131***	-0.158***	-0.102**	-0.159***	0.051***	0.050***	0.051***	0.052***
	(0.025)	(0.026)	(0.024)	(0.025)	(0.038)	(0.040)	(0.036)	(0.039)	(0.012)	(0.011)	(0.013)	(0.012)
Const	9.286***	8.083***	7.959***	9.638***	10.894***	9.759***	9.534***	10.137***	1.845***	1.774***	1.846***	1.990***
	(0.470)	(0.338)	(0.503)	(0.515)	(0.571)	(0.423)	(0.650)	(0.678)	(0.480)	(0.498)	(0.475)	(0.454)
Observations	783	783	783	783	783	783	783	783	782	782	782	782
Countries	32	32	32	32	32	32	32	32	32	32	32	32
R^2 (within)	0.74	0.72	0.74	0.73	0.72	0.71	0.73	0.72	0.56	0.56	0.56	0.57
F statistic	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Notes: Standard errors in parentheses; Variables are in natural logarithm; *** significance at 1%; ** significance at 5%; *statistical significance at 10%.
Source: Authors' calculations.

4.2 Globalization and health in SSA low- and middle-income countries

Table 4 presents the empirical results of the relationship between globalization and health in SSA low- and middle-income countries. Table 6 has twelve models. Models (13)-(18) and models (19)-(24) report the results of regressions estimated in SSA low- and middle-income countries respectively. The main independent variable for models (13), (15) (17), (19), (21) and (23) is overall globalization. Economic, social and political globalizations are used as main independents variables for models (14), (16), (18), (20), (22) and (24).

With respect to the baseline model for low-income countries, the results show that the coefficients of overall, social and political globalizations are associated with reduction in child mortality rate and infant mortality rate, while economic globalization has an insignificant impact on child mortality rate and infant mortality rate. These results are broadly consistent with previous findings of Welander et al. (2015), Jani et al. (2019) and Olagunju et al. (2019) who found that aggregate, social and political globalizations are associated with lower infant mortality and child mortality in low- and middle-income countries. However, when life expectancy is employed as health indicator, overall and social globalizations have negative signs but only social globalization is statistically significant, suggesting that social globalization is associated with a reduction in life expectancy. The results lend support for the view that social globalization contributes negatively to developing countries' health (WHO, 2001; Kuo et al., 2003). In addition, the coefficients of economic and political globalizations are not significant. The findings provide the evidence to the argument about the significance of social and political integration in health improvement in SSA low-income countries. By comparing the significant coefficients for models of SSA low-income countries, the findings show that political globalization is the most important component of globalization process in the health improvement process.

As reported in middle-income models, the results reported in models (19) and (21) reveal that the coefficients of overall globalization are not significantly correlated with infant and child mortality rates, while in model (23) overall globalization is associated with a reduction in life expectancy. This result may potentially be attributed to the fact that several SSA middle-income countries have domestic constraints such as lower human capital, corruption, poor rule of law, unstable regime, etc., limiting the countries to explore and take the full of globalization. Similarly, our findings lend to the study by Alonso (2014), who reveal that most of the middle-income countries still face considerable vulnerabilities that affect their process of development. In models (20) and (22) the coefficient of social globalization is negatively correlated with infant mortality rate and child mortality rate, suggesting that should a SSA middle-income country increases its level of cross-cultural information flows, international tourism, etc., it could result in a significant reduction in infant mortality rate and child mortality rate. However, in model (24) the coefficient of social globalization is not significant. Similarly, as in models (20), (22) and (24), we find that the impact of economic globalization is negative, but only significant in model (24), indicating that the economic integration into world economy could result in a significant reduction in life expectancy at birth. As we can see in models (20), (22) and (24) political globalization has a negative and significant impact on the three health indicators, suggesting that an increase in the level of political globalization is associated with deterioration in the three health indicators. A possible explanation for this is that as country rises up its level of income per capita, grants overseas, aids and emergency assistance are reducing, all of which can improve aids. In some cases the international donors are closing their delegation in middle income countries[5]. Likewise, middle-income countries are more likely faced with financial crisis than low-income countries, as they are generally more integrate into international financial market,

[5] The Middle Income Countries can pay for their own development without recourse to aid or development cooperation (see Alonso at al., al 2014)

which could have adverse effects on the people's living conditions. With regard to the mixed results in the two sub-samples concerning the effect of political globalization on health, the positive effects of political globalization on infant and child mortality rates in the full sample may due to the fact that more than half of SSA countries understudied consists of low income countries.

By comparing the significant coefficient of the three dimension of the globalization process, the empirical findings show that social globalization has more significant effect in health improvement process in SSA middle-income countries. Finally, our results also reveal that benefits in terms of health improvement are higher for SSA low-income countries compared with SSA middle-income countries.

Table 4. Globalization and Health in SSA - Low income and Middle income countries.

	Low-Income						Middle-Income					
	Infant Mortality rate		Child mortality rate		Life expectancy		Infant Mortality rate		Child mortality rate		Life expectancy	
	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
Overall globalization	-0.201**		-0.197**		-0.040		0.042		0.202		-0.234***	
	(0.077)		(0.094)		(0.035)		(0.107)		(0.160)		(0.061)	
Economic globalization		0.064		0.049		0.021		0.053		0.082		-0.117***
		(0.050)		(0.067)		(0.016)		(0.077)		(0.103)		(0.034)
Social globalization		-0.106**		-0.068*		-0.085***		-0.289***		-0.308**		0.064
		(0.035)		(0.039)		(0.019)		(0.080)		(0.117)		(0.050)
Political globalization		-0.175**		-0.186***		0.008		0.205**		0.314***		-0.128***
		(0.041)		(0.060)		(0.031)		(0.082)		(0.102)		(0.037)
Real GDP	-0.297***	-0.279***	-0.345***	-0.332***	0.064***	0.072***	-0.079***	-0.041*	-0.095***	-0.054**	0.033**	0.022
	(0.038)	(0.044)	(0.039)	(0.045)	(0.016)	(0.016)	(0.024)	(0.022)	(0.025)	(0.025)	(0.014)	(0.016)
Urban population	0.041	-0.010	-0.001	-0.034	0.375***	0.369***	-0.010	0.041	0.119	0.164	-0.142*	-0.187*
	(0.058)	(0.046)	(0.081)	(0.067)	(0.057)	(0.052)	(0.113)	(0.167)	(0.121)	(0.210)	(0.082)	(0.095)
Human Capital	-0.919***	-0.810**	-0.197***	-1.100**	-0.022	-0.007	-1.004***	-0.795***	-1.539***	-1.264***	0.585***	0.494***
	(0.202)	(0.214)	(0.214)	(0.226)	(0.061)	(0.061)	(0.110)	(0.155)	(0.174)	(0.262)	(0.074)	(0.104)
Fertility rate	0.875***	0.842***	0.924***	0.901***	-0.167	-0.184*	-0.015	0.084	-0.179	-0.051	0.181	0.170
	(0.144)	(0.136)	(0.174)	(0.175)	(0.106)	(0.094)	(0.287)	(0.284)	(0.357)	(0.353)	(0.144)	(0.146)
Improved sanitation	-0.049	0.106**	0.078**	0.121**	-0.018	0.009	-0.220***	0.067	-0.098	-0.061	0.071*	0.071*
	(0.019)	(0.026)	(0.029)	(0.045)	(0.022)	(0.020)	(0.043)	(0.069)	(0.069)	(0.110)	(0.036)	(0.038)
Child Immunization	-0.064	-0.058	-0.127*	-0.126*	0.039**	0.049***	0.045	-0.167***	-0.245***	-0.179***	0.088***	0.066***
	(0.049)	(0.049)	(0.064)	(0.066)	(0.017)	(0.016)	(0.047)	(0.040)	(0.043)	(0.044)	0.014)	(0.017)
Const	6.655***	6.493***	7.929***	7.834***	2.498***	2.357***	6.147***	5.173	6.779***	5.750***	3.865	4.131***
	(0.609)	(0.595)	(0.725)	(0.713)	(0.334)	(0.210)	(0.567)	(0.532)	(0.720)	(0.599)	(0.313)	(0.326)
Observations	405	405	405	405	405	405	378	378	378	378	377	377
Countries	17	17	17	17	17	17	15	15	15	15	15	15
R^2 (within)	0.88	0.88	0.88	0.89	0.76	0.77	0.63	0.67	0.58	0.62	0.37	0.41
F statistic	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Notes: Standard errors in parentheses; Variables are in natural logarithm; *** significance at 1%; ** significance at 5%; *statistical significance at 10%.
Source: Authors' calculations.

5. Conclusion

This paper assesses the relationship between globalization and health in Sub-Saharan African countries. Annuals data are collected for a panel of 32 countries over the period 1990-2015. This study also checks whether the effects of globalization on health in SSA depend on the income level. We selected three health indicators namely infant mortality rate, child mortality rate and life expectancy. We used fixed effects with Driscoll-Kraay standard errors to estimate all the regressions.

First and foremost, at SSA countries level, overall globalization has positive effect on infant mortality rate and child mortality rate, suggesting that globalization is an important determinant of child and infant health, reducing infant mortality and child mortality. However, overall globalization has insignificant effect on life expectancy. Disaggregating globalization into its three components, the results reveal that social and political globalizations are negatively associated with infant mortality rate and child mortality rate, while their impact on life expectancy is insignificant. However, economic globalization has insignificant impact on the three health indicators. The findings reveal that political and social integration are the driving forces behind the positive and significant impact of globalization on health in SSA countries.

When we classified the SSA countries in low- and middle-income, our results show that overall, social and political globalizations decrease significantly infant mortality rate and child mortality rate in low-income countries. When life expectancy is used as dependent variable, only social globalization has a significant impact but with a negative sign. Further insights from our study reveal that political globalization contributes the most to the health improvement process in SSA low-income countries. In SSA middle-income countries, one cannot affirm that globalization is either 'good' or 'bad' for health. The overall globalization has insignificant impact on infant mortality rate and child mortality rate, while its impact is negative and significant on life expectancy. In addition, economic globalization is associated with reduction in life expectancy. While social globalization is associated with reduction in infant mortality rate and child mortality rate, political globalization has an adverse effect on the three health indicators. The results also indicate that real GDP, human capital, urbanization, access to improved sanitation and child immunization have significant effect on health, suggesting that they need to be taking into account during policy making.

The results have a number of policy implications for the SSA region. The positive effect of globalization on health as reported from estimations leads us to conclude that the experience of globalization process has come with a health benefits in SSA sub-region. Therefore, policymakers can, and should continue to advocate for the interests of the population, the signing of more international treaties, the promotion of information spreading, technology transfer, migration of people, cultural adaptations and the elimination of trade distorting policies and political discourse that affect health and socio-economic development at large. The insignificant health effect of economic globalization as reported by most of the estimations is due to the fact that more than half of SSA's export are crude oil and mining product that are not able to reap positive benefits from economic globalization including benefits that might contribute towards improving health. SSA countries should promote free trade within SSA and manufacturing sector that can increase employment and welfare. According to the adverse effect of political globalization in middle-income countries, developing cooperation should be helpful to reduce the adverse effects on the people's living conditions.

Finally, the study suffers from a number of caveats. First, considering that the effect of globalization is mixed when taking into account the income level, we suggest that future studies should examine the role of some other complementary policies in the relationship between globalization and health. In addition, due to the lack of reliable cross-national data, future studies can follow our general approach to re-examine these relationships when new data become available.

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