Original Paper

Effects of the Quality of Governance on Domestic Government Health Spending in West Africa Economic and Monetary Union Countries

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Abstract

Government health spending is an important source of sustainable health funding in order to attain the health-related Sustainable Development Goals (SDGs). In low and middle-income countries, domestic government per capita spending on health needed to ensure universal coverage with the most essential health services is estimated at $112 according to Stenberg et al. (2017). In 2015, in West Africa Economic and Monetary Union (WAEMU), average domestic government spending on health per capita was $26 (about one quarter of all health spending), far short of the $112 target. The purpose of this paper is to analyze the determinants of domestic government health spending with emphasis on the quality of governance. We used panel data from the eight WAEMU member states covering the period 2000-2015 and the generalized least squares method for empirical investigation. The results show that an improvement in the quality of governance increases domestic government health spending. The study suggests the policy-makers of the WAEMU member state to improve the quality of governance in order to increase domestic government health spending and allow people to access essential health services and enjoy a better state of health.

Keywords

quality of governance, domestic government health spending, health, WAEMU

1. Introduction

Progress toward universal health care in developing countries require sustained increases in public spending on health. In these countries, an increase in domestic public financing of health spending is crucial for the sustainability of health programs and vital for improving the health of the population (Lu et al., 2010). Domestically financed government health spending can facilitate the accessibility of health care by the poor sections of the population, improve the quality of health care and increase the use of health services (Besstremyannaya, 2009; Dhoro, Chidoko, Sakuhuni, & Gwaindepi, 2011; Sirag, Nor, & Abdullah, 2017). To move towards universal health coverage, assessments have estimated the adequate amount of care needed by each state to guarantee a minimum package of health services to each citizen. In this sense, Stenberg et al. (2017) estimated that low-income countries must allocate to each person, through domestic public resources, an amount of 112 $US per capita per year to ensure a minimum package of care. This amount corresponds to 5% of Gross Domestic Product (GDP) according to McIntyre, Meheus and Rottingen (2017). In addition to these benchmarks, African Heads of state pledged to Abuja in 2001 to allocate at least 15% of their yearly budgets to the health sector (African Union, 2001).

West African Economic and Monetary Union (WAEMU) consists of eight countries: Benin, Burkina Faso, Côte d'Ivoire, Guinea-Bissau, Mali, Niger, Senegal and Togo. They are struggling to meet these standards for allocating public resources to health sector. In 2015, world development indicators reveal that domestic government health spending per capita was 26 $US (World Bank, 2018a). These domestic government health spending equate 25% of health spending (compared to 27% in the year 2000) and 1.4% of GDP. Meanwhile, domestic government health spending in 2015 represented 35% of health spending in Sub-Saharan Africa and 59% in the world.

Thus, domestic government health spending is insufficient to meet the growing health needs of communicable and non-communicable diseases. In 2015, according to health, nutrition and population data (World Bank, 2018b), more than half (57%) of deaths in WAEMU countries were caused by infectious diseases and maternity conditions compared with 33% for non-communicable diseases. The health personnel needed to provide adequate care to the WAEMU's population according to WHO standards remain insufficient. In fact, the number of skilled workers per 10,000 inhabitants varies between 1.6 and 7.5. This is below the 44.5 agents per 10,000 inhabitants required to reach adequate coverage of primary health care interventions identified as primary for achieving health goals under the SDG 3 according to High-Level Commission on Health Employment and Economic Growth (2016). Similarly, in half of WAEMU member states (Guinea Bissau, Mali, Niger and Togo), more than 50% of women continue to give birth without the assistance of qualified personnel. Moreover, in the WAEMU, access to quality essential health services remains problematic. Between 32% and 44% of these so-called essential services under universal health coverage are covered according to the World Health Statistics 2018 (World Health Organization, 2018). These statistics indicate that access to health services remains low and less than half of the services deemed essential for the population are satisfied.

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This shortage hinders the efforts of these countries to meet the minimum health care needs of their population, especially vulnerable groups. Therefore, it is important to study the determinants of public health spending whose understanding is essential for effective health policies (Dhoro, Chidoko, Sakuhuni, & Gwaindepi, 2011; Tandon, Fleisher, Li, & Yap, 2014; Braendle & Colombier, 2016). If the authors for so long have laid emphasis on economic variables (Newhouse, 1977), empirical assessments increasingly point out the crucial role played by the quality of governance in financing of government health spending (Besstremyannaya, 2009; Sirag, Nor, & Abdullah, 2017). However, the inadequacy of public spending on health accommodates a weak governance. In WAEMU, the average of each of the six dimensions of World Bank World governance indicators is negative over the period 2000-2015. This situation raises a question: What is the effect of the quality of governance on domestic government health spending in WAEMU? The objective of this study is to analyze the effect of the quality of governance on the level of domestic government health spending in WAEMU. To this end, we hypothesize that an improvement in the quality of governance favors an increase in domestic government health spending.

The remainder of the paper is organized as follows. The section 2 reviews the theoretical and empirical literature. In section 3, the model, data and estimation technique are presented. Section 4 presents the summary statistics and discusses the empirical results. The last section summarizes the major findings of paper and gives some policy implications.

2. Literature Review

In this section, a review of theoretical literature and empirical work on the link between the quality of governance and health spending are discussed.

2.1 Theoretical Framework

What is the level of total government spending and how is it distributed among the different sectors of economy? According to Tandon, Fleisher, Li and Yap (2014), two theoretical approaches answer these interrogations: a normative approach and a positive approach.

The normative approach analysis determines the optimal form of resource allocation in a country. This approach proceeds from a cost-benefit analysis. The government finances its expenses from revenues whose collection generates costs. As a result, public spending should be undertaken as long as the benefits from such spending exceed the costs of raising revenues for each sector. In terms of allocating resources across sectors, sectors should compete for the allocation of scarce resources up to the point where the marginal benefit of an additional resource unit of spending is equal across sectors. From this point of view, market failures (the presence of externalities, the public good nature of certain health interventions and the presence of extensive information asymmetries) and equity-related considerations in society are the main reasons for government intervention in the health sector (Musgrove, 1996; Jack, 1999). However, if these arguments reasons prevail for health sector, they are equally applicable to other sectors including education. These arguments are therefore not enough to favor a budgetary arbitrage for the benefit of health sector. Thus, in a perspective of redefining government's priorities, this theory

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implies that health sector would need to demonstrate that the social benefits of additional public spending exceed the costs of financing this increase in spending. These costs include both the additional direct costs of generating additional revenue and the opportunity cost of relinquishing financing from other sectors. In this approach, the government is seen as a benevolent social planner who, by choosing the optimal level of health care, maximizes social well-being. Despite the logic behind this approach, it offers limited utility in understanding why some governments allocate more resources to the health sector than others. Indeed, the assumption that government would act on behalf of general interest is questioned by the theory of public choice whose pioneers are Buchanan and Tullock (1962). For these authors, individuals on the political arena (ruling elite) are not different from other individuals and are guided to make decisions in their own interest. In this perspective, the state is conceived as a mechanism through which three categories of institutional actors -the politician, the bureaucrat and the elector- guided by rationality, seek to maximize their personal utility and not the general interest. The interaction of the optimization behavior of the three actors results in the size and structure of public spending. The politician is motivated by the conquest and exercise of power in order to gain personal benefits associated with power exercise. His ultimate goal is to be elected, then re-elected and to keep on maximizing his gain. In doing so, he will maximize his chances of being elected or re-elected by adopting a strategy of exchanging, with targeted categories of voters, voting intentions in his favor against promises of state intervention in their favor. For his part, the elector chooses the politician he deems most likely to implement policies that will be favorable to him and less expensive in terms of taxes. As for the bureaucrat, he implements the decisions of political elites. But given the potential information benefits and the discretionary powers that he has, he is inclined to pursue his own goal. In this dynamic, his strategy is to obtain the highest budget for his office in order to maximize his utility function (upward mobility, revenue growth and responsibility), and take advantage of the information gap. This optimization is done under the conditions of the institutions and constraints set by the institutional framework in which the actors operate.

The potential for rent creation varies with government sectors and the existence of private agendas at the state level to the detriment of the general interest creates distortions in the allocation of public spending (Hessami, 2014). The sectors conducive to corrupt transactions and for which the rent exists and can be easily extracted and concealed are prioritized. This is the case for sectors whose production of goods and services requires high technology and are offered in non-competitive markets (Mauro, 1998; Hessami, 2014) . This prioritization is to the detriment of sectors such as education and health that offer fewer opportunities for rent-seeking, especially when institutions are weak and bad governance prevails (Mauro, 1998; Croix & Delavallade, 2007).

Conversely, good governance favors the allocation of public spending to health in a context where health is a priority for population. In a context of good governance, the budget process leading to the allocation of public resources across sectors is transparent and participatory. Transparency and participation reduce information asymmetries and allow more equal access to information on budget spending between

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citizens (taxpayers and voters) on the one hand, and politicians and bureaucrats on the other. As a result, opportunities for politicians and bureaucrats to serve narrow interest groups at the expense of the majority are diminishing. The search for rent is then minimized and the decisions taken by the authorities are in line with the priorities of the populations, thus favoring the general interest (Hooda, 2016). In these conditions, in a situation where the provision of quality health services is long-awaited by a large part of the population, as is the case of developing countries, governments will be more inclined to prioritize health sector in budget arbitrations. Thus, virtuous governance leads to an allocation of public spending in favor of health sector in countries where health problems are of concern to the population.

2.2 Empirical Review

Several studies have explored the relationship between the quality of governance and public resources allocated to health sector. These investigations cut across mixed samples, developed or developing countries exclusively and report divergent findings.

In respect of mixed samples, Delavallade (2006) assessed the effect of corruption on the composition of government spending in a sample of 64 countries with data covering the period 1996-2001. Using three stage least squares method, the author showed that corruption reduces the share of social spending, such as education, health, and social protection, in total government spending. This conclusion is confirmed by Croix and Delavallade (2007) who, basing on a mixed samples of 63 countries, showed that corruption is unfavorable for public funding of human capital-generating sectors, including health. They argued that countries with high levels of corruption invest more in physical capital and housing, rent-generating sectors, and less in human capital such as health and education. Education and health sectors provide less rent-seeking opportunities for public servants and the government compared to other components of public spending (Mauro, 1998). In the same vein, Sirag et al. (2017) explored the determinants of public health spending in a sample of 177 developed and developing countries. They used dynamic panel data analysis and found that government effectiveness and corruption control are fundamental for the allocation of public spending to health sector. Liang and Mirelman (2014) examined the impact of socio-political factors on government health financing in 120 developed and developing countries from 1995 to 2010. By applying a fixed-effects two-stage least squares regression method, they suggested that democratic accountability has a diminishing positive correlation with government health spending, and that levels of government health spending are higher when government is more stable. They found in addition that corruption is associated with less government health spending in developing countries, but with higher government health spending in developed countries. The importance of good governance for health budgeting is confirmed by Farag et al. (2012). In investigating a sample of 173 countries over the period 1995-2006, they reported that voice and accountability has a significant positive influence on mobilizing more resources for health.

The link between the quality of governance and public health spending has been the subject of empirical investigations in developed countries. In this context, Baraldi (2008) and Jajkowicz and Drobiszová (2015) have respectively shown in a sample of 20 Italian regions and 21 member state of the OECD that

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corruption reduces the share of public spending devoted to education and health sectors in favor of other sectors such as general services. This result is confirmed by the work of Liu and Mikesell (2014) who, using microeconomic data of the United States covering the period 1997-2008, showed that the most corrupted states allocate a tiny proportion of the budget to health, hospitals and well-being. In investigating empirically a sample of 18 OECD member states, Potrafke (2010) found that politicians act opportunely by increasing public spending on health during the election years. Because health system is a particularly sensitive issue for voters, politicians in power can increase their popularity and therefore their chances of being re-elected by additional spending in the health field. In a case study, Besstremyannaya (2009) examined the Russian health system and suggested that institutional inefficiencies are a major handicap to improving and sustaining the funding of public health programs.

While the above studies highlight a positive link between the quality of governance and the level of public health spending, others relativize its role. In this wave, Hessami (2014), basing on data of 29 OECD member states over the period 1996-2009, concluded that a higher level of corruption is associated with an increase in the share of spending on health and environmental protection. For this author, this counterintuitive result can be explained by the preponderance of high-technology equipment in health sector. In most cases, this equipment is supplied in an oligopolistic and sometimes monopolistic market. This market situation makes the price of these equipments less transparent because they are known only by specialists, hence the existence of a high rent that is easily concealable. In view of these characteristics, political leaders and officials are tempted to increase the share of the budget devoted to health in order to derive associated rents. Conducting investigations into the United State case, Cordis (2014) reinforces Hessami's conclusion. His study found that a high level of corruption, rather than a reduction, increases the share of public health spending. This finding is also the conclusion reached by Lagravinese and Paradiso (2014). In a case study of 21 administrative jurisdictions in Italy over the period 1998-2008, the authors revealed that corruption increases public spending on health, including pharmaceutical spending and private hospital spending.

Several studies have been conducted to look into the effect of the quality of governance on public health spending in developing countries. Hashem (2014), in a study based on a sample of 13 Arab countries over the period 1998-2008, found that corruption appears to modify the structure of public spending in favor of defense and energy at the expense of social sectors like education and health. The author argues that public spending on health and education curbs down as the level of corruption increases. In the same vein, Gibson (2018) examines the determinants of public health spending in the Arab League member states between 1996 and 2014. He shows that the effectiveness of government has a positive influence on public health spending.

In the case of Africa, Fosu (2008), using five-year averages data of 35 sub-Saharan African countries over the period 1975-1994, concluded that the improvement of the quality of governance, approximated by constraint on the government executive, tends to shift the budget in favor of health sector. Similarly, Mathonnat (2010), using data covering 46 sub-Saharan African countries over the period 1998-2004,

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showed, after an econometric estimation by the fixed effects method, that corruption exerts a significant negative influence on budgetary trade-offs in favor of health sector. He revealed that public health spending as a percentage of total public spending or in dollars per capita falls with the level of corruption. Ramashamole and Thamae (2015) confirm this result from a case study on Lesotho. Using data covering the period 1980-2011 and the fully modified least squares method, the authors found that political instability is negatively associated with public health spending. These results are in line with those obtained by Kumah and Brazys (2016) in an empirical evaluation of a sample of 46 to 48 African countries. They established that public accountability, approximated by the presence of political opposition and or civil society, transparency and independence of the judiciary, favors an increase in public health spending in relation to GDP.

In contrast to the studies listed above, another strand of the literature has failed to show a significant relationship between the quality of governance and public health spending in developing countries. Imoughele and Ismaila (2013), estimating an error-correction model from Nigeria's data covering the period 1986-2010, revealed that political instability has no significant influence on public health resources. This result was reinforced by that of Olawunmi (2014) who found that political instability does not have a statistically significant impact on public spending allocated to the health sector in Nigeria between 1990 and 2012.

In sum, these empirical work revealed contrasting results about the effect of the quality of governance on public health spending. This overview of the empirical literature has also revealed that empirical evaluations of WAEMU member states are limited. However, the state of governance in these countries is not rosy and the level of public health spending in the countries remains low, despite the efforts made. Similarly, domestic public health spending, even if it is not a sufficient condition, is still necessary to improve the health status of populations, since the provision of health care be it preventive or curative implies a cost. This situation, coupled with the controversial empirical literature and weaknesses of the health systems in WAEMU member states, legitimizes an empirical assessment of the effect of the quality of governance on fiscal arbitrage in favor of the health sector. This assessment requires the adoption of an appropriate methodology, hence the purpose of the following section.

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3. Model, Data and Estimation Technique

3.1 Model Specification and Choice of Variables

3.1.1 Model Specification

Our empirical approach is based on public health spending determinants models developed in Africa and developing countries by Murthy and Okunade (2009), Farag et al. (2012) and Imoughele and Ismaila (2013). To examine the effect of the quality of governance on domestic public health spending in WAEMU member state, we propose a panel data log-log specification in which coefficients are interpreted as elasticities as follows:

$$\log \text{DGHS}_{it} = \beta_o + \beta_1 \log \text{Gov} + \beta_2 \log \text{GDP}_{it} + \beta_3 \log \text{GHA}_{it} + \beta_4 \log FC_{it} + \beta_5 \log TBI_{it} +$$
$$\beta_6 \log DP_{it} + \varepsilon_{it} \ (1) \quad \text{where}$$

DGHS stands for domestic government health spending per capita in $US in PPP

Gov represents the quality of governance indicator

GDP means gross domestic product per capita in $US in PPP

GHA is health assistance spending transiting trough government

FC equals fiscal capacity;

TBI refers to tuberculosis incidence

DP is the proportion of dependent population

ε_{it} is the error term; **i** represents the country and **t** the period.

3.1.2 Choice of Variables

The dependent variable is domestic public health spending per capita. It is used to capture the state efforts in investing for the health of the population. Under universal health coverage, a minimum package of healthcare equivalent to 112 $US per capita per year is required in low-income countries (Stenberg et al., 2017). This indicator is a better measure of the priority that health authorities place on health in relation to the share of the state budget allocated to the sector, as the allocated budget can increase while per capita spending decreases (Mathonnat, 2010).

The explanatory variables are the quality of governance, the income, the development assistance for health sector, a demographic factor, the fiscal capacity and the epidemiological profile.

▪ The Quality of Governance

The operational definition of governance used for the empirical analysis is that of the World Bank proposed by Kaufmann, Kraay and Zoido-Lobatón (1999). For these authors, governance consists of "*the traditions and institutions by which authority in a country is exercised*". This definition includes the process by which governments are selected, monitored and replaced; the capacity of the government to effectively formulate and implement sound policies; and the respect of citizens and the state for the institutions that govern economic and social interactions among them. The methodology for constructing the world governance indicators of the World Bank has been criticized in the literature in different aspects. It does not allow comparisons over time and between countries, the lack of theoretical underpinnings and the aggregation process (Thomas, 2010; Fukuyama, 2016). Despite these criticisms,

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the indicators are widely used in the empirical literature. The six broad dimensions of governance taken into account are: voice and accountability, political stability and absence of violence/terrorism, government effectiveness, regulatory quality, rule of law and corruption control. Each measure ranges from -2.5 (weak governance) to +2.5 (strong governance) and a higher score indicates a better rating.

Each of the six indicators measures a particular aspect of the quality of governance and does not capture the other dimensions. However, governance is a multidimensional concept and the use of one dimension does not make it possible to define the whole concept (Fukuyama, 2016). Using one indicator while ignoring others may lead to omitted variables bias (Keho, 2012). Besides, the use of all these indicators in an econometric equation can lead to multicollinearity problems because these variables may be highly correlated. To deal with these econometric problems, we conduct Principal Components Analysis (PCA) to determine whether these indicators can be measured by a synthetic indicator. PCA is a multivariate analysis technique, which transforms original measured data into new uncorrelated variables called principal components.

The use of PCA requires the factorability of the initial variables that is the heterogeneity of data. This condition can be verified in three ways: correlation analysis, Bartlett's test of sphericity and Kaiser-Meyer-Olkin (KMO) index.When initial variables are strongly correlated or the correlation matrix determinant is sufficiently weak, the use of PCA is fully justified. Bartlett's test of sphericity consists in checking the extent to which the correlation matrix diverges significantly from the identity matrix. Taking the form of a chi 2, it tests the null hypothesis that the matrix of correlations is an identity matrix and that there is no relationship between the variables. The null hypothesis rejection indicates the existence of correlation between the variables and bases the relevance of the PCA. As far as KMO index is concerned, it indicates the degree of influence of the other variables on the correlation between two variables. It indicates to what extent the chosen set of variables is a coherent set and makes it possible to constitute one or more adequate measures of a given concept.

The correlation analysis shows that all the six variables are correlated at 1% level. Similarly, the determinant of correlation matrix is very small (0.002), confirming the strong correlation between variables and justifying the construction of governance single index. In addition, the p-value associated with Bartlett's sphericity test is 0.000. The alternative hypothesis of correlation between variables is therefore accepted, indicating that the data lend themselves to the PCA. In addition, the KMO index stood at 0.848 indicating the adequacy of the PCA. These different tests confirm the heterogeneity of the data and establish the relevance of PCA use.

PCA results are reported in Table 1.

Table 1. Principal Component Analysis Results

Principal component	1	2	3	4	5	6
corruption control	0.418	-0.347	0.392	0.322	-0.571	0.347
gouvernement effectiveness	0.430	-0.183	-0.419	0.603	0.209	-0.444
political stability	0.293	0.832	0.369	0.265	0.115	0.007
regulatory quality	0.425	-0.309	0.320	-0.257	0.710	0.222
rule of law	0.446	0.032	0.095	-0.574	-0.316	-0.600
voice and accountability	0.416	0.233	-0.649	-0.254	-0.110	0.521
Eigenvalues	4.491	0.801	0.326	0.165	0.120	0.943
% of variance	74.85	13.36	5.45	2.76	2.01	1.57
Cumulative %	74.85	88.82	93.66	96.42	98.43	100

Source: Computed by authors from the World development indicators (World Bank, 2018a).

From this Table, it appears that the first principal component alone explains 74.85% of the total variance and the information from the original variables. Following the Kaiser criterion, it is used for the determination of the single index, obtained by making a linear combination of the six dimensions of governance, each of which is weighted.

The index has been rescaled to assume values between 1 and 6, allowing the use of logarithm. This rescaling of the governance indicators for practical needs is often meet in the literature notably in the works of Keho (2012), McGuire (2013) and Karyani et al. (2015).

▪ The Income

The empirical literature on the link between per capita income level and public health spending has revealed a positive relationship between these two variables. This positive link is obtained not only in the case of mixed panels (Fan & Savedoff, 2014; Sirag, Nor, & Abdullah, 2017), but also in empirical evaluations applied to developed countries (Bose, 2015) as well as in cases studies of developing countries (Farag et al., 2012). In addition to the positive effect of per capita income, the above mentioned studies state that health is a necessity good. In line with this empirical literature, GDP per capita in $US in Parity Purchasing Power (PPP) is taken into account as a control variable. A positive coefficient is expected, reflecting the idea that the more a country is developed, the more it allocates resources to the health sector.

▪ The Development Assistance for Health Sector

Most donor countries of official development assistance, by targeting the health sector, implicitly or sometimes explicitly wish to increase public health spending. In doing so, they want beneficiary governments to maintain their level of health spending by receiving the aid (Dieleman & Hanlon, 2014). However, given the multiplicity of recipient governments' priorities, the aid can often crowd out public

health spending. In this case, by loosening the fiscal constraint, aid can encourage recipient countries to reallocate domestic resources among other sectors.

Empirical literature on the link between development assistance for health sector and public health spending has provided controversial results. Some authors have highlighted a substitution effect between domestic public health spending and health aid (Xu, Saksena, & Holly, 2011; Dieleman & Hanlon, 2014), while other studies have found that development assistance for health has a positive effect on public health spending (Dhoro, Chidoko, Sakuhuni, & Gwaindepi, 2011).

In the context of support for the financing of the health sector in developing countries by developed countries, the latter are dealing with several actors. They support the governments of developing countries directly, but they often go through non-governmental organizations. In this work, aid to health is approximated by development assistance granted to health and transiting through the government as a percentage of total development assistance for health. During the period 2000-2015, this aid through the Union's governments accounted for 76% of development assistance for health. In view of the priority of the health sector for populations revealed by the 2014/2015 Afrobarometer survey and the difficulties encountered by the countries of the Union in complying with the benchmark for domestic financing of health through public resources, we hypothesized a positive association between government health spending and development assistance for health.

▪   The Demographic Factors

Demographic factors play an important role in the growth of health spending. Indeed, vulnerable strata of society such as children and old people need more health care. As a result, the higher the proportion of these people, the more public spending is needed to meet their needs. In this study, the proportion of adults over 65 years and children under 15 years is selected to represent the effects of demographic factors on domestic government health spending, which is also expected to be positive.

▪   The Fiscal Capacity

In the empirical literature on the determinants of public health spending, fiscal capacity is considered as a relevant variable. It is often measured by public spending as a proportion of GDP (Xu, Saksena, & Holly, 2011; Fan & Savedoff, 2014) or public spending as a percentage of GDP, excluding health spending (Dieleman & Hanlon, 2014). However, the approximation of fiscal capacity by public spending as a proportion of GDP is questioned by some authors such as Hooda (2016). This author estimates that a country's ability to generate resources through revenues is more appropriate for measuring its fiscal capacity. In line with Hooda (2016), fiscal capacity in WAEMU member states is measured by public revenue as a share of the GDP. These revenues consist of direct taxes on income and profits, indirect taxes, taxes on foreign trade and other taxes, non-tax revenues and natural resource rents. Fiscal capacity is expected to have a positive effect on domestic public health spending in WAEMU.

▪   The Epidemiological Profile

The epidemiological profile is often included as a covariate in health spending regressions. A sick population needs more health care which requires more resources. Several indicators reflecting the

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epidemiological profile have been used in the empirical literature. Commonly used indicators are the prevalence rate of HIV-AIDS (Lu et al., 2010), the incidence of tuberculosis (Xu, Saksena, & Holly, 2011; Sirag, Nor, & Abdullah, 2017), the maternal mortality rate (Murthy & Okunade, 2009) and the under-five mortality rate (Hooda, 2016). Empirical results reveal that these variables are generally insignificant to account for government health spending (Murthy & Okunade, 2009; Lu et al., 2010; Xu, Saksena, & Holly, 2011; Hooda, 2016; Sirag, Nor, & Abdullah, 2017).

In most WAEMU member states, with an average incidence rate per 1,000 people at risk of 276.67 in 2015 according to health, nutrition and population statistics (World Bank, 2018b), malaria is one of deadliest diseases. In 2017, for example, the statistics revealed that malaria was the first cause of death in three countries (Burkina Faso, Niger and Togo), the second cause of death in two countries (Benin and Mali) and the 4th and 8th cause of death respectively in Côte d'Ivoire and Senegal. Given this situation, malaria incidence rate appears to be the best indicator to capture the epidemiological profile in WAEMU. However, existing data only partially cover the selected study period. Thus, in the absence of data on malaria, the epidemiological profile is approximated by the incidence of tuberculosis. It measures the estimated number of new cases and relapse of tuberculosis in a given year, expressed per 100,000 inhabitants. In 2015, the average incidence rate of tuberculosis was 122.25 per 100,000 inhabitants. Tuberculosis is a communicable disease that was among the top ten causes of death, all ages combined in 2017 in seven of the eight WAEMU member states. Similarly, tuberculosis is one of the diseases to be addressed by the 2030s under the Sustainable Development Goals (SDGs). As the incidence of tuberculosis is considered to be a factor in increasing health spending, a positive relationship is expected between this variable and domestic public health spending.

3.2 Source of Data and Method of Analysis

3.2.1 Source of Data

The empirical investigation uses annual time series data covering the period 2000-2015 for the eight WAEMU member states. The choice of this period is explained by the availability of data on domestic government health spending.

The data used for the econometric evaluation derive from several sources. Domestic government health spending, health aid, the proportion of dependent population and the incidence of tuberculosis are taken from health, nutrition and population database of World Bank (2018b). GDP per capita and the quality of governance are from world development indicators database of World Bank (2018a). Countries' fiscal capacity is obtained from African economic outlook of African Development Bank (2017).

3.2.2 Analysis Method

In this study, the Generalized Least Squares (GLS) estimator with specific controls for error term autocorrelation and heteroscedasticity is used for empirical investigation. Generally, in stationary panels, Hausman test allows to choose between the two principles approaches applying in the modeling of panel data (fixed effects or random effects models), the most appropriate estimator. However, according to Greene (2012), failure to account for heterogeneity even when the fixed effects model is appropriate

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makes Ordinary Least Square (OLS) estimator inconsistent. Likewise, in the case of the random effects model, although the ordinary least square estimator may be consistent, it tends to underestimate its true variance. The GLS estimator is efficient whereas the OLS estimator is not. In addition, in the event of autocorrelation of errors and heteroscedasticity, the OLS estimators obtained by the method are unbiased but are not at minimum variance (Bourbonnais, 2015). Under these conditions, the unbiased linear estimator of minimum variance is GLS estimator, also called the Aitken estimator (Gujarati, 2004; Bourbonnais, 2015). Similarly, the OLS estimator, whether corrected for heteroscedasticity or not, consistently overestimates standard deviations obtained from GLS, a most robust estimator. With OLS estimator, a coefficient can be declared statistically insignificant even though in fact (based on the more robust GLS estimator) it may be (Gujarati, 2004).

4. Empirical Results

Empirical results and discussion will be presented in two stages. As a first step, unit root tests are performed to determine the order of integration of the variables. The model validity is also tested through the Wald test. In a second step, the empirical results from the estimates are presented and discussed. But before that, it seems appropriate to present the main descriptive statistics of the variables.

4.1 Summary Statistics

Table 2 below summarizes some descriptive statistics of the variables used over the period 2000-2015.

Table 2. Descriptive Statistics

Variables	Observations	Average	Standard déviation	Minimum	Maximum
Domestic government health spending per capita ($ US in PPP)	128	20.265	8.624	4.567	41.382
Gouvernance WGI	128	-1.342	0.721	-2.468	0.113
GDP per capita ($US in PPP)	128	1552.174	583.050	597.19	3451.88
Government Health Aid (% of total health aid)	128	76.123	20.019	15.831	99.364
Fiscal Capacity (Public revenue in % of GDP)	127	15.225	3.431	7.578	23.190
Tuberculosis Incidence (per 100.000 inhabitants)	128	142.390	104.161	52	387
Dependent Population (% of totale population)	128	47.879	2.111	44.570	52.755

Source: Authors' computation from data.

These statistics suggest an average score of the synthetic quality of governance indicator of -1.34 on a scale of -2.5 to 2.5, with -2.5 reflecting poor quality governance and 2.5 better governance. The state of governance is weak in the Union during the period under review.

Domestic government health spending per capita PPP ranged from 8.62 $US to 41.36 $US, with an average of US $ 20.26. During the period 2000-2015, public aid to health through the Union's governments accounted for 76% of the aid granted to the sector. Over the period 2000-2015, average GDP per capita in WAEMU member states was 1552.17 $US in PPP and government revenue averaged 15.22% of GDP.

The incidence of tuberculosis per 100,000 inhabitants of WAEMU averaged 142 during the same period. The most vulnerable people to the disease, composed of young people (aged 15) and old people (over 65) accounted for 47.87% of the total population over the period 2000-2015.

4.2 Variables Stationarity Test and Validity of the Model

4.2.1 Unit Root Tests

The tests of Maddala and Wu (1999) and Choi (2002) are used to verify the stationarity of variables. Table 3 below summarizes the results of stationarity tests carried out.

Table 3. Results from Unit Root Tests

| Variables | Level | | | | First Difference | | | | Conclusion |
| | MW | Choi | | | MW | Choi | | | |
		Z	L*	Pm		Z	L*	Pm	
log(dghs)	37.173 *** (0.002)	-2.840 *** (0.002)	-3.657 *** (0.000)	3.743 *** (0.000)					I (0)
log(GDP per capita)	24.493 * (0.079)	-1.161 (0.122)	-1.247 (0.109)	1.501 * (0.066)	117.40 *** (0.000)	-8.09 *** (0.000)	-11.48 *** (0.000)	17.72 *** (0.000)	I (1)
log(Wgi)	30.481 ** (0.015)	-1.474 * (0.070)	-1.810 ** (0.038)	2.559 *** (0.005)					I (0)
log(Fiscal Capacity)	27.763 ** (0.033)	-1.609 * (0.053)	-1.762 ** (0.042)	2.079 ** (0. 018)					I (0)
log(Dependent Population)	50.992 ** (0.017)	-3.288 *** (0.000)	-3.011 *** (0.001)	16.530 *** (0.00)					I (0)

log(Tuberculosis Incidence)	111.062 *** (0.000)	-4.161 *** (0.000)	-9.052 *** (0.000)	2.374 *** (0.008)		I (0)
log(Government Health Aid)	30.481 ** (0.015)	-1.474 * (0.070)	-1.810 ** (0.038)	2.559 *** (0.005)		I (0)

Note. Figures in parenthesis are p-value. ***, ** and * denotes the stationarity at 1%, 5% and 10% level.

Source: Authors computation.

I (0) and I (1) mean that the variable is stationary at level and at first difference respectively.

The stationarity result of the variables of the model gives the same conclusions as well with the test of Maddala and Wu (1999) than with that of Choi (2002). Apart from the per capita GDP which is stationary in first difference (integrated of order 1), the other variables are stationary at level. Since GDP per capita is integrated of order 1, its first difference will be considered in the estimates.

4.2.2 Wald Test

The Wald test is a test of overall significance of the coefficients. The null hypothesis considers a joint nullity of the coefficients. The results of this test are provided in the last row of Table 4 below. Since the p-value is less than 1%, the null hypothesis is rejected, indicating that the parameters are not jointly null. As a result, the model is adequate.

4.3 Presentation and Discussion of Empirical Results

4.3.1 Baseline Estimate Results

The results of baseline models are shown in Table 4.

Table 4. Baseline Results

Dependent Variable:	**logarithm of Domestic Government Health Spending per Capita**	**logarithm of Domestic Government Health Spending as a share of GDP**
log (WGI Single Index)	0.211*** (0.000)	0.197*** (0.000)
log (GDP per capita)	0.325*** (0.000)	0.689*** (0.000)
log (Government Health Aid)	0.308* (0.069)	0.290** (0.032)
log (Fiscal Capacity)	0.488*** (0.001)	0.536*** (0.000)
log(Tuberculosis Incidence)	0.405***	0.406***

	(0.000)	(0.000)
log (dependent population)	-0.011	-0.011
	(0.456)	(0.437)
Constante	-2.207*	2.360**
	(0.068)	(0.032)
Number of Countries	8	8
Prob > CHI2	0.000	0.000

Note. Figures in parentheses are p-values.

***, ** and *denote significance at 1%, 5% and 10% respectively.

Source: Authors' Estimation.

The estimation reveals that the coefficient associated with the governance indicator is positive and significant at 1% level. An improvement in the quality of governance, reflected in an increase in the composite indicator of 1% contributes, all things being equal, to an increase in domestic public health spending per person of 0.21%. The positive effect of the quality of governance improvement on domestic public health spending remains valid if domestic public health spending as a share of GDP is used as an alternative dependent variable instead of domestic public health spending per capita. This result is theoretically expected. In a context of virtuous governance, resource allocation decisions are based on people's concerns and priorities (Hooda, 2016). Health problems are one of the major concerns of the population and additional investment in health is a priority according to the Afrobarometer survey conducted in 2015 in WAEMU member states (Armah-Attoh, Selormey, & Houessou, 2016). In these conditions, an improvement in the quality of governance results in an increase in public health spending. The result from this study is consistent with the previous studies, which showed that more corruption penalizes government health spending (Delavallade, 2006; Croix & Delavallade, 2007; Baraldi, 2008; Mathonnat, 2010; Hashem, 2014; Jajkowicz & Drobiszová, 2015). Similarly, the result is in line with the authors who found that government effectiveness, political stability and constraint on government increase public health spending (Fosu, 2008; Ramashamole & Thamae, 2015; Sirag, Nor, & Abdullah, 2017). In the same vein, the result consolidates that of the authors who have shown that voice and accountability are conducive to increasing public health spending by domestic resources (Farag et al., 2012).

However, our study infirmed the conclusion from previous studies that public health spending increases with poor governance, including a high level of corruption, particularly in developed countries (Cordis, 2014; Hessami, 2014). Moreover, it challenges the authors' findings that governance factors have no statistically significant effect on public health spending (Imoughele & Ismaila, 2013; Olawunmi, 2014). Most control variables have the expected signs. GDP per capita has a positive coefficient equal to 0.32 and is significant at the 1% level, meaning that GDP increases led to increased government health

spending. All other things being equal, an increase in per capita GDP by 1% is associated with 0.32% in government health spending per capita. This result reflects the fact that the more countries develop, the more they are able to allocate more resources to health. In 2015 for example, according to world development indicators (World Bank, 2018a), high-income countries had public health spending per capita of 3.370 $US in parity purchasing power compared with 20 $US in parity purchasing power for low-income country. In addition, the empirical result indicates that income elasticity of government health spending is less than one, suggesting that public provision of health care in WAEMU is considered as a necessity. This result is in line with those obtained in panel studies of developing countries led by Farag et al. (2012) and Zimbabwe's case by Dhoro et al. (2011).

External funds for health that passe through the government has a positive and significant coefficient at the 10% level, suggesting a complementary with public health spending in WAEMU member states. In WAEMU, despite the plurality of priorities, this assistance complements domestic resources to finance health systems. This result consolidates the conclusion of Dhoro et al. (2011) about the complementarity between external fund for health and government health spending in Zimbabwe. However, it contrasts with that obtained by Lu et al. (2010) who found that in developing countries, health assistance reduces government health spending.

Fiscal capacity coefficient is positive and significant at 1% level supporting the view that the level of government health spending increase with the improvement of fiscal capacity. An increase in public revenue as a proportion of GDP of 1% induces, ceteris paribus, increase in public health spending per capita of 0.48%. This result is in line with theoretical expectations and corroborates evidence from the health determinant literature in which the same indicator is used to approximate fiscal capacity in sub-Saharan Africa and Indian states (Mathonnat, 2010; Hooda, 2016).

Results also indicates that the incidence of tuberculosis increases public domestic health spending. Its coefficient is positive and significant at the 1% level. An increase in the incidence of the disease by 1% leads, all things being equal, to an increase in public health spending per capita of 0.40%. This result is in line with the idea that more resources are needed to support a sick population. In particular, the treatment of infectious diseases such as tuberculosis is the responsibility of the government with regard to the negative externalities that these can generate through the contagion of a healthy person by a patient. In this respect, the larger the population is affected, the more the state injects resources to limit contagion.

The proportion of dependent population has no significant effect on domestic public health spending. This vulnerable group constitutes almost half of WAEMU's population. As a result, it was expected that an increase in this population would be an increase factor of government health spending. This result is therefore out of step with the theoretical expectations. The explanation that can be given is that little attention has been paid to the budget allocation to this part of the population during the period under review. The result is consistent with the findings that in developing countries, population structure has no influence on public health spending (Fosu, 2008; Sirag, Nor, & Abdullah, 2017).

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4.3.2 Robustness Checks

In this subsection, we conducted additional analyzes to confirm the robustness of our findings in baseline model by using alternatives measures of governance quality. We constructed two synthetic governance indicators from International Country Risk Guide (ICRG) and Country Policy and Institutional Assessment (CPIA) databases. We use PCA method to build an ICRG synthetic indicator with six governance dimensions: quality of bureaucracy, corruption, rule of law, democratic accountability, investment profile and government stability. In the estimate that takes this variable into account, if the period 2000-2015 was respected, the sample is composed of 7 countries, excluding Benin for lack of data. We also use CPIA public sector management and institutions' component to conceive a composite indicator in order to test the robustness of baseline result. The public sector management and institutions cluster includes property rights and rule-based governance, quality of budgetary and financial management, efficiency of revenue mobilization, quality of public administration and transparency, accountability and corruption in the public sector. Data on these variables are available over the period 2005-2015. Data covering the eight countries of the Union for this period are used for the robustness test. The results of the estimates are shown in Table 5 below.

Table 5. Robustness Checks with ICRG and CPIA Synthetic Governance Indicators

Dependent Variable: Logarithm of Government Domestic Health Spending per Capita		
log (ICRG Single Index)	0.256***	
	(0.000)	
log(CPIA single Index)		0.937***
		(0.000)
log (GDP_per capita)	0.713***	0.476***
	(0.000)	(0.000)
log (Government Health Aid)	0.098***	0.112
	(0.003)	(0.814)
log (Fiscal_Capacity)	0.682***	0.471***
	(0.003)	(0.0000)
log(Tuberculosis Incidence)	0.241***	0.326***
	(0.000)	(0.000)
log (dependent_population)	-0.079	0.004
	(0.508)	(0.899)
Constante	-5.769***	-5.209***
	(0.000)	(0.000)
Number of countries	7	8
Prob > CHI2	0.000	0.000

Note. Figures in parentheses are p-values are in parentheses.

***, ** and *denote significance at 1%, 5% and 10% respectively.

Source: Authors' Estimation.

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The coefficients of composite governance indicators of ICRG and CPIA are both positive and significant at 1% level. These results mean that an improvement in the quality of governance contributes to an increase in government domestic health spending per person. These results confirm that of the baseline model.

5. Conclusion

Domestic government health spending, despite an increase during the period 2000-2015 in West Africa Economic and Monetary Union, remains low to ensure the minimum healthcare for the entire population. Similarly, the quality of governance is low. On the basis of these observations, this article aimed to evaluate the effect of the quality of governance on domestic public health spending. Using generalized least squares estimator, the results show that a better quality of governance increases domestic government health spending. In addition to governance quality, external funds for health transiting through governments, GDP per capita, fiscal capacity and the incidence of tuberculosis are the most determinants of domestic government health spending. Our research reveals that healthcare far from being a luxury good in the Union, is a necessity good. The proportion of the dependent population has no effect on domestic public health spending.

In terms of policy implication, our study suggests the policy-makers of the WAEMU member states to improve the quality of governance in order to increase government health spending and allow people to have access to better healthcare and enjoy a better state of health.

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