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Does Fiscal Decentralization Improve the Delivery of Public Health Services in Cameroon?

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Abstract

The objective of this research is to analyze the effect of fiscal decentralization on the provision of health services at the level of Decentralized Territorial Collectivities (CTDs) in Cameroon. To this end, econometric modeling using generalized least squares (GLS), the Driscoll and Kraay estimator, and Lewbel's instrumental variables estimator will be employed. Is being called upon in a panel of 107 municipalities for the period 2010-2020, the investigations revealed that fiscal decentralization significantly and positively improves the delivery of public health services in Cameroon. An increase of one unit in fiscal decentralization leads to a significant increase in the number of integrated health centers (IHCs) as well as the number of buildings constructed in Cameroonian municipalities. It is therefore desirable that public authorities continue to promote fiscal decentralization, while emphasizing the health expenditures necessary for human capital development.

Keywords

Cameroon, Health, Fiscal Decentralization

1. Introduction

From the early 1990s, many developing countries undertook a series of reforms as part of a general process of institutional decentralization. The work of Hababa et al. (2021) revealed that the need to prioritize decentralization as a relevant new mode of territorial governance stemmed from the inefficiency of the central level of regulation and arbitration. In short, centralized systems were flawed: inadequate responses to needs, bureaucratic inefficiency, slowness to implement change,

and limited effectiveness. Therefore, the architecture of decentralization was based on the coherence between the efficiency of ensuring the delivery of public services, the democratic imperative, and the optimal territorial level for managing public action. Decentralization was generally associated with a transfer of powers, responsibilities, and functions from the central government to local public entities (Lovan et al., 2017). The *design* of fiscal decentralisation adopted in this article: *"allocation of a power to vote on local tax rates which gives local structures the possibility of making expenditures and tax levies within the limits of their locality* " (Saltman & Bankauskaite, 2006), is part of the perspective of strengthening the power and autonomy of local elected officials vis-à-vis the State (Pasquier et al., 2020).

In the health sector, fiscal decentralization aims primarily to ensure greater access to healthcare services for the population and their participation in defining and managing health priorities (Soura & Coulibaly, 2014). Discussions on decentralizing public services are generally accompanied by discussions on how to achieve an inclusive and holistic healthcare offering, particularly for populations, especially those affected by poverty and deprivation. In this regard, fiscal decentralization could enable the provision of healthcare services that respond to the evolving needs and preferences of local populations, as it is generally aligned with public health objectives and local action on the determinants of health (Learmonth & Curtis, 2013).

The option of decentralizing the public health system is further emphasized by its crucial importance to all sectors of development and human progress. As a producer of intangible added value, in that it enhances national human capital, health constitutes a lever for the economic and social development of any society (El Khider & Imichoui, 2020). In this respect, fiscal decentralization can be argued as an opportunity for the country to revitalize this sector and address the shortcomings of a centuries-old centralized system suffering from deficiencies and disparities in resource allocation at the national level. Following this logic, the literature favors this mode of governance, suggesting it serves as a foundation for increasing the supply of mechanisms that allow for better coordination and integration of healthcare services, rationalization of costs, combating inequalities in service provision across the country, and ensuring more efficient delivery of health services (El Khider & Imichoui, 2020). The process is also understood as requiring the bringing of public decision-making closer to the citizen and results in increasing capacities for action for local authorities (LAs), considered as the solution to address health inequalities (Eliot et al., 2017).

In Cameroon, fiscal decentralization has been in effect since 2010, dubbed the "*Year of Decentralization,*" through the initial transfer of powers to local and regional authorities (CTDs). In reality, this represents the strengthening of municipal governance, which is manifested by the ability of these local authorities to undertake investments in various sectors, including healthcare, thanks to allocated budgets and revenues from various taxes and levies. In this context, municipal

councils become key players in developing socio-health infrastructure capable of meeting the primary healthcare needs of the population. The Cameroonian authorities' commitment to decentralizing public health services to local and regional authorities has led to the construction of numerous health centers (CSIs) by local structures. However, tangible evidence of the effectiveness of fiscal decentralization remains unclear.

As an illustration, the Cameroonian health sector exhibits significant territorial inequities in terms of funding contributions, access to care, and health outcomes. Since 2001, the share of the state budget allocated to health has varied between 5.5% and 7%, far short of the Abuja Declaration. which recommends allocating 15% of the annual budget to healthcare, based on a life expectancy estimated at 57.3 years in 2015 and 56 years in 2017 (Republic of Cameroon and United Nations Development Programme, 2020). In the Central region, for example, 40% of doctors practice in areas where only about 18% of the population lives, and the Adamawa region, one of the areas with the most detrimental socio-economic profiles, employs only 8% of doctors (World Bank, 2013). According to the WHO (World Health Organization), households contribute nearly 83% of healthcare costs, access to healthcare services is at 2.19 facilities per 10,000 inhabitants, and approximately 1 doctor per 10,400 inhabitants. The trend emerging from these statistics reveals the country's limited capacity to meet the socio-health needs of the population and to contribute to the development of productive human capital.

The added value of our research lies, among other things, in the measurement of health. *Unlike* the indicators generally used, such as life expectancy at birth, mortality rates for children under one to five years old, and maternal mortality rates, we use the number of health centers (CSI) in municipalities and the number of buildings constructed within those centers. These variables clearly reflect the degree of access to healthcare for the population. Furthermore, the study incorporates two additional indicators: the number of consultations and the number of hospitalizations in Integrated Health Centers (CSI) and District Medical Centers (CMA), in order to examine the approach to meeting the population's healthcare needs. These indicators were chosen firstly because they align with the specific competencies of the local and regional health authorities (CTD). Secondly, they are contingent on the available data. And thirdly, by their nature and functions, they constitute drivers of economic development, as aptly demonstrated by Nchofoung et al. (2022) and Ramey (2020). The specificity of this research also lies in the representativeness of its sample (107 municipalities). Studies addressing these aspects in Cameroon use a small sample size (Fouopi Djiogap et al., 2024; Onana & Tchitchoua, 2020). Furthermore, the combination of econometric modeling based on CGM regression, the Driscoll-Kraay estimator, and Lewbel's instrumental variables estimator is quite innovative compared to the estimation techniques used in previous work in this field (Sanogo, 2018; Adams et al., 2014; Galiani et al., 2008; Barankay & Lockwood, 2007).

The article is structured in five sections. After the first, which is devoted to the

introduction, the second reviews the literature. The third presents the methodological approach, while the fourth focuses on the presentation and discussion of the results. Finally, the fifth presents the conclusion and recommendations.

2. Fiscal Decentralization and the Provision of Health Services: A Literature Review

The concept of fiscal decentralization is rooted in the theory of local public finance in general and is based on Hayek's theory of fiscal federalism (1945) in particular. This latter school of thought highlights the reducing effect that the decentralization of public finances has on the information asymmetry between political decision-makers and citizens at the local level. The development of the local level reflects the desire to bring the management of public services closer to users, in order to offer a response more tailored to their needs. This is because fiscal decentralization fosters closer ties between public policy decision-makers and citizens through the principle of proximity. According to this principle, local authorities are better positioned to efficiently provide public goods to their residents than the central government (Oates, 1972; Hayek, 1948).

From an economic perspective, fiscal decentralization rests on its potential for economic efficiency because local authorities are able to provide better services thanks to proximity and informational advantages of the Oates (1972) and Hayek (1948) type. Regarding these advantages, many liberal-leaning authors argue that local decision-makers, compared to central authorities, *have* access to better information about local conditions. This advantage enables them to better tailor services and public spending patterns to local needs and preferences. *All things being equal,* this informational rent should improve the efficiency and quality of services to citizens (Dick-Sagoe, 2020; Winchester & King, 2018; Channa & Faguet, 2016; Oates, 1972; Musgrave, 1959; Tiebout, 1956). From this perspective, many authors have observed that reducing pressure on central finances, lowering the budget deficit, increasing resource mobilization, and improving public sector efficiency require fiscal decentralization (Kessing et al., 2020; Thanh & Canh, 2020; Pasichnyi et al., 2019; Bird & Vaillancourt, 1999; Oates, 1993).

Fiscal decentralization is also considered a means of promoting intergovernmental competition. A key element of this theoretical suggestion is the principle of preference adequacy, which posits that locally provided public goods and services better reflect local specificities and citizens' preferences (Channa & Faguet, 2016; Faguet, 2014; Oates, 1972; Tiebout, 1956). *In* this respect, decentralization encourages subnational governments to be more effective in increasing access to basic public services (Hounsounon, 2016; Dafflon & Madiès, 2008; Salmon, 1987). This argument lies in the potential efficiency gains achieved by mitigating information asymmetries and better adapting programs to the diverse needs, preferences, and characteristics of local providers. This reasoning echoes Litvack and Seddon (2000); Seabright (1996); De Tocqueville (1968); Tiebout (1956) and Hayek (1948) who consider that fiscal decentralization allows for greater infor-

mational symmetry between political decision-makers and residents.

It is therefore on the basis of these theoretical premises that fiscal decentralization is likely to contribute to improving the public health service provision within local authorities. However, it should be noted that the positions taken by these classically oriented researchers are not without their critics. What other positions would be, for that matter? Since truth emerges from discussion, other researchers involved in the debate on the effects of fiscal decentralization on the provision of public services take the opposite view. They believe, rather, that it is not always favorable to the provision of and access to basic social services (Sumah et al., 2016; Pal & Roy, 2010; Prud'homme, 1995; Oates, 1972).

A rich and burgeoning body of empirical literature highlights the relationship between fiscal decentralization and the provision of health services. For example, in a study across 36 federal states on fiscal decentralization and access to social services in Nigeria, Dada (2015) demonstrates that fiscal decentralization has a positive effect on health. The author measures health by the infant mortality rate. This measure also supported the findings of Habibi et al. (2003). Covering the period 1970-1994, these authors These findings reveal that decentralization reduces the infant mortality rate in Argentina. This implies that decentralization improves access to healthcare. This result is consistent with the conclusions of Faguet and Sanchez (2014). Working with 95% of Colombian municipalities, they demonstrated that decentralization improves access to healthcare for the poor. Onana and Tchitchoua (2020) also found that decentralization improves access to healthcare for populations in Cameroon.

However, a group of authors indicate that it is difficult to obtain the theoretical benefits of fiscal decentralization in the areas of socio-economic development, improved delivery of education and health services, and increased accountability in developing countries. (Lewis & Smoke, 2017; Martínez-Vázquez et al., 2017). An application of this postulate is highlighted by authors such as Amoussouga and Dedehouanou (2015), who showed, based on a study conducted on a sample of 25 municipalities between 2003 and 2009, using a fixed-effects model, that financial decentralization does not improve access to healthcare for the population in Benin. The authors measured financial decentralization by the share of local government revenue in total revenue (the share of local own-source revenue in total state revenue). Adam et al. (2014), in their study on fiscal decentralization and public sector efficiency in the provision of public services in 21 OECD countries, showed that there is an inverse U-shaped relationship between fiscal decentralization and public sector efficiency in the provision of public services. For Farooq (2023), he concludes that decentralization has no effect on health in Pakistan. Similarly, the work carried out by Olatona and Olomola (2015), studies of 36 federal states in Nigeria between 1999 and 2012, highlights no effect of fiscal decentralization on health.

The results observed thus contradict the theoretical suggestions of fiscal federalism, according to which the decentralization of public finances is a driver of ef-

ficiency in resource allocation, an important factor in access to local public services. It should, in this sense, induce inter-jurisdictional competition, leading to a more adequate supply of public goods and services, as well as an incentive to implement more effective public policies (Oates, 1972; Musgrave, 1959; Tiebout, 1956; Hayek, 1945). Kosycarz et al. (2023), in this regard, they demonstrate that fiscal decentralization reduces the technical efficiency of health services in Polish hospital regions. On the other hand, Chani et al. (2014) showed that inequalities in access to education do not have statistically significant effects on income inequality in Pakistan. Castelló-Climent et al. (2014) concluded in their analysis that high inequalities in the distribution of human capital worldwide have hardly exacerbated disparities between individuals' incomes. Analyzing the degree of population satisfaction with health services, Antón et al. (2014) found no impact of decentralization on changes in the satisfaction of populations' health needs. This conclusion aligns with the idea of Khaleghian (2004). According to this view, the effects of fiscal decentralization on public services are mixed and depend on a country's income level. Low-income decentralized countries are making progress in health compared to centralized government systems. Middle-income countries have the opposite effect and exhibit lower coverage rates for decentralized government systems. Similarly, in education, the study by Hanushek and Woessman (2013) demonstrates that the effect depends on the level of development. Bird and Wallich (1993) aptly remind us that the relationship between financial decentralization and access to public services is complex and obviously stems from the socio-economic circumstances of each country. In this dynamic, human capital must first reflect a country's economic structure before improvements in its level can generate positive effects on development and economic growth. *Conversely,* the expansion of education and healthcare risks causing macroeconomic imbalances within the country (Cadil et al., 2014; Ramos et al., 2012).

3. Methodological Approach

This section presents the data sources, the selection and description of the variables, as well as the econometric approach used.

3.1. Data Sources and Variable Description

3.1.1. Data Sources

The budget data comes from administrative accounts obtained from the Directorate of Decentralized Territorial Communities of the former Ministry of Territorial Administration and Decentralization (MINATD), the Ministry of Decentralization and Local Development (MINDDEVEL), and the Special Fund for Intercommunal Equipment and Intervention (FEICOM). Information on social infrastructure comes from the Municipal Development Plans of the selected municipalities, available at http://www.pndp.gov/, and from the directories of the Ministry of Public Health (MINSANTE). Data on the number of consultations and hospitalizations comes from the Health Information Unit (CIS) of MINSANTE.

The study covers a sample of 107 municipalities in the country from 2010 to 2020. The decentralized basis includes 107 municipalities. Health indicators are observed in 80 municipalities. The remaining 27 municipalities have no health data. The two bases were margined, which shows the difference in observations in the descriptive statistics table. For the econometric analysis, we selected the 80 municipalities with health observations to avoid missing data.

The choice of these municipalities and the study period is explained by the availability of data. In addition, statistical data collected from the aforementioned ministerial institutions, based on data from national surveys and/or field studies, also served as a working basis. These sources of information were prioritized because they were considered closer to reality.

3.1.2. Description of Variables

1) Dependent variable

Our dependent variable is access to healthcare. It will be captured using three indicators. First, the number of Integrated Health Centers (CSI) in the municipalities (SANTE1). This variable was used by Onana and Tchitchoua (2020) to measure the effect of decentralization on access to basic social services in Cameroon. Second, the number of people seen at CSIs and Community Health Centers (CMA) (SANTE2), and finally, third, the number of people hospitalized in these health facilities (SANTE3). These last indicators are included in the analysis to measure the effect of fiscal decentralization on the healthcare demand of local populations.

2) Independent variable

Our independent variable is fiscal decentralization. It is measured by the share of a municipality's expenditures in total municipal expenditures (DécD). This indicator was developed by the World Bank to measure fiscal decentralization and has been used by a number of authors to assess the effect of decentralization on access to health (Fouopi Djiogap et al., 2024; Onana & Tchitchoua, 2020; Sanogo, 2018; Caldeira, 2011).

To better explain access to healthcare, we will use a number of control variables represented by a set of characteristics of municipalities clearly identified from various empirical studies; these are:

Term of office: This is the length of time allotted to a mayor to perform their duties within a municipal administration. Some literature reveals that mayors in their second term spend significantly less on infrastructure, manage their budgets less prudently, and provide public services no more or less effectively than their first-term counterparts (Lewis et al., 2020). Thus, we considered a dummy variable that equals 1 if the mayor is in their second term and 0 if they are in their first term;

Population: This represents the number of inhabitants within a municipality. A change in this will lead mayors to mobilize more resources and invest in the construction and provision of health facilities. This variable has long been used in the literature (Marlow, 1988);

Political affiliation: This reflects the membership or proximity of a mayor or the municipal executive to the ruling party. The literature helpfully reveals that a municipality that actively supports the government tends to receive more transfers from it (Miguel & Zaidi, 2003; Cox & McCubbins, 1986). These additional transfers should be used to improve the efficiency of public service delivery. These variable equals 1 if the municipal executive belongs to the presidential majority and 0 otherwise.

3.2. Method of Analysis

The simplified empirical model proposed by Fouopi Djiogap et al. (2024) and Rodden (2002) is used to assess the relationship between fiscal decentralization and the provision of health services within Cameroonian municipalities. We specify the static model as follows:

$$Sant_{i,t} = \beta_0 + \beta_1 \mathrm{Dec}D_{i,t} + \beta_2 X_{i,t} + \mu_i + \nu_t + \varepsilon_{i,t} \quad (1)$$

$\mathrm{Sante}_{i,t}$ This refers to the matrix of variables that capture access to healthcare. $\mathrm{Dec}_{i,t}$ It also refers to fiscal decentralization and $X_{i,t}$ the vector of control variables including mandate, population, and political affiliation. μ_i are the specific effects of the unobserved municipalities and ν_t takes into account the specific temporal effect common to all municipalities. $\varepsilon_{i,t}$ is the error term.

3.3. Estimations Techniques

We apply several empirical estimation techniques to estimate the relationship described in Equation (1). First, we implement a regression of the CGMs of fiscal decentralization on health service provision, controlling for several of its potential determinants. Second, we use Driscoll and Kraay (1998) to handle the cross-sectional dependency problem. Finally, we apply the instrumental variable estimator of Lewbel (2012).

We begin this exercise by applying GCMs. The use of this technique is justified by the existence of the heteroscedasticity problem of residual variance and the autocorrelation problem of residuals. Next, we apply the Driscoll and Kraay (1998) estimator. As Baltagi (2008) points out, the advantages of panel data are "*more informative data, more variability, less collinearity between variables, more degrees of freedom, and greater efficiency.*" One of the main limitations of macro panel data is the dependence between countries, which can lead to misleading inference. To overcome this drawback, we first test cross-sectional dependence/contemporary correlation using Pesaran's (2015) CD test. The hypotheses of this test are formulated as follows H_0: errors have weak cross-sectional dependence versus H_1: errors have strong cross-sectional dependence. Validating this test requires rejecting the null hypothesis of weak cross-sectional dependence. Therefore, if the null hypothesis is rejected, the appropriate estimator for capturing the effect of fiscal decentralization on healthcare delivery is the Driscoll-Kraay estimator. Furthermore, the Driscoll-Kraay standard errors are consistent with heteroscedasticity and autocorrelation. In other words, this estimator also addresses

the problem of heteroscedasticity and autocorrelation of the errors and is robust to general forms of cross-sectional and temporal dependence (Hoechle, 2007).

4. Econometric Results

The discussion of the results focuses on the main descriptive statistics and econometric analyses.

4.1. Descriptive Analysis

Table 1 below presents the main descriptive statistics.

Table 1. Descriptive statistics.

Variable	Obs	Average	Standard deviation	Min	Max
Health	870	1.228	1.467	0	7
Decentralization	1177	1.309	0.584	0	0.04
Population	1177	123,088.65	177,574.01	3204	1,341,198

Source: Authors.

An examination of this table shows that there is an average of one Community Health Center (CSI) per municipality. However, this trend masks inter-municipal disparities. Specifically, some municipalities have no CSI at all, while others have up to seven. The ratio of total municipal expenditure to total municipal expenditure reflects these inequalities. While some municipalities have a minimum ratio of 0.002, others *have* a maximum ratio of 0.04. This scenario reveals disparities in financial resources allocated to these territorial entities, which could have a significant impact on the provision of healthcare. We observe that this ratio barely reaches 0.1. This implies that the degree of autonomy of municipalities remains low in Cameroon, taking into account our sample. It can also be noted that mayors received an average of one term, despite some municipalities where the mayors served up to two terms. This table also shows population variation between jurisdictions, but with an average of approximately 123,088 inhabitants. The lowest population is 3204 inhabitants, while the highest is 1,341,198 inhabitants.

Table 2 presents the correlation matrix.

Table 2. Correlation matrix

Variables	(1)	(2)	(3)
(1) Health	1000		
(2) Dec	0.122	1000	
(3) Population	0.061	0.242	1000

Source: Authors.

Reading this matrix shows that there is on the one hand a positive correlation

between fiscal decentralization, mandate, population and political affiliation and health and on the other hand, a negative correlation between conflict, sex and the health variable of human capital.

4.2. Presentation and Discussion of the Results

4.2.1. Basic Results

The basic results are presented in Table 3 and Table 4 below. Table 3 shows the results obtained from calculating the correlations between the variables using GCMs. The use of this econometric technique provides at least two advantages (Maynard, 2003). On the one hand, it allows us to obtain relatively unbiased, consistent, and efficient estimators in the presence of lagged variables. On the other hand, it allows us to correct for the simultaneity bias between the variables of interest and the control (Wooldridge, 2013).

Table 3. Results with generalized least squares

VARIABLES	Dependent variable: Health			
	(1)	(2)	(3)	(4)
Decentralization	0.277***	0.269***	0.256***	0.264***
	(0.039)	(0.037)	(0.038)	(0.039)
Mandate		0.346***	0.340***	0.325***
		(0.054)	(0.055)	(0.053)
Population			0.070***	0.111***
			(0.008)	(0.011)
AP				0.159***
				(0.022)
Constant	1.091***	0.639***	0.316**	0.010
	(0.016)	(0.075)	(0.110)	(0.148)
Observations	870	870	870	870
R-squared	0.015	0.027	0.027	0.029
Municipality number	80	80	80	80
F	49.79	37.18	122.0	207.9
r2	0.0148	0.0269	0.0275	0.0291

Standard errors in parentheses, ***p < 0.01, **p < 0.05, *p < 0.1. Source: Authors.

Table 3 shows that there is a significant positive effect of decentralization at the 1% threshold on access to healthcare. However, this estimation technique does not account for the potential cross-sectional dependency in our model. Therefore, after using general growth modeling (GGM), we employ the Driscoll-Kraay estimation technique. This technique addresses the cross-sectional dependency issue. To confirm the presence of cross-sectional dependency, we performed the Pesaran

(2015) test. The results presented in the appendix allow us to reject the null hypothesis (H0) of independence. This indicates a dependency between municipalities. This technique was used by Fouopi Djiogap et al. (2024) in their study on decentralization and access to education and healthcare services in Cameroon. The results are presented in **Table 4** below. In this model, we introduce time-specific and commune-specific effects and a default delay which is usually 2.

Table 4. Results by driscoll and kraay.

VARIABLES	Dependent variable: Health			
	(1)	(2)	(3)	(4)
Decentralization	2.781***	2.701***	2.512***	2,554***
	(0.400)	(0.374)	(0.403)	(0.401)
Mandate		0.346***	0.339***	0.321***
		(0.054)	(0.055)	(0.054)
Population			0.090***	0.153***
			(0.016)	(0.023)
AP				0.175***
				(0.026)
Constant	1.068***	0.618***	0.231	−0.173
	(0.023)	(0.080)	(0.128)	(0.183)
Observations	870	870	870	870
R-squared	0.015	0.027	0.028	0.030
Municipalities	80	80	80	80
Common fixed effect	Yes	Yes	Yes	Yes
Fixed time effect	Yes	Yes	Yes	Yes
Fisher	49.79	37.18	122.0	207.9
lag	2	2	2	2

Standard errors in parentheses, ***p < 0.01, **p < 0.05, *p < 0.1. Source: Authors.

Column 1 of **Table 4** shows a bivariate relationship between decentralization and health. The results reveal that decentralization has a positive and significant effect at the 1% level on health, as measured by the number of integrated health centers (IHCs) in municipalities. More specifically, a one-point increase in decentralization leads to a 0.277-point increase in the number of IHCs. This indicates that greater resource mobilization by municipalities will promote the construction of IHCs for the benefit of the population. Consequently, the population will have improved access to healthcare.

Based on the theoretical premises of federalism, competition between municipalities should improve the match between supply and demand in healthcare. The

results obtained are consistent with a number of empirical studies identified in the literature analyzing the effect of decentralization on health.

Dada (2015), in a study on decentralization and access to social services in Nigeria, found that decentralization has a positive effect on health in 36 federal states. The author measured health by the infant mortality rate. Similarly, Faguet and Sanchez (2014), working with 95% of Colombian municipalities, demonstrated that decentralization improves access to health services for the poor. Habibi et al. (2003) revealed that decentralization reduces the infant mortality rate. This implies that decentralization improved access to health in Argentina between 1970 and 1994. Onana and Tchitchoua (2020) also found that decentralization improves access to healthcare for populations in Cameroon.

However, these results contradict the work of authors such as Amoussouga and Dedehouanou (2015), who showed that decentralization does not improve access to healthcare for populations in Benin. Adam et al. (2014), in their study on fiscal decentralization and public sector efficiency in the delivery of public services in 21 OECD countries, showed that there is an inverse U-shaped relationship between fiscal decentralization and public sector efficiency in the delivery of public services. The study by Farooq (2023), a study in Pakistan concluded that decentralization has no effect on health. A study of 36 federal states in Nigeria between 1999 and 2012 by Olatona and Olomola (2015) has established that decentralization had no effect on health.

We observe that all the control variables used in our model have a positive and significant effect at the 1% level on health. The number of terms a mayor serves influences the number of Integrated Health Centers (IHCs) in municipalities. The results reveal that municipalities where mayors are serving their second term or more have more IHCs compared to municipalities with mayors serving their first term. This can be interpreted as an act of recognition for the mayor's re-election. During campaigns, people tend to express their needs to the various candidates. Those who wish to run again must respond favorably to the needs of the population, which builds trust. If the population is satisfied, they will always give them their vote. A one-percentage-point increase in the population leads to a change in the number of IHCs of 0.111 (4). This implies that local decision-makers, when building hospitals, should take into account the population growth of the locality, given that people migrate to localities that offer more local public services. These results corroborate the "voting with the feet" model developed by Tiebout in 1956. According to this model, people consider a number of social factors when choosing their residential location. They have complete information about the services offered by municipalities and will therefore tend to move to municipalities that meet their needs. The political affiliation of mayors also plays an important role in the provision of social services. According to our results, municipalities with mayors close to the ruling party have more social infrastructure built compared to municipalities whose mayors are in the opposition. The literature suggests that mayors who are allied with or close to the ruling party tend to receive more state

transfers than opposition mayors. These additional resources will benefit the population.

4.2.2. Robustness Analysis

The robustness analysis of the results is done in four steps: the first involves a change in estimation technique to address the endogeneity problem, the second involves adding additional control variables, the third also involves changing the health and decentralization measures, and the fourth involves introducing the health service demand variable into the basic model.

1) Change in estimation technique and consideration of the endogeneity problem

Although previous results confirm the hypothesis that decentralization promotes better healthcare delivery, it would be worthwhile to test the robustness of these results using a different method. Therefore, we extend our robustness analyses using the two-stage instrumental variables (IV-2SLS) method. The search for a truly exogenous instrument has been identified in the literature as the main challenge of the instrumental variables approach. To remain consistent with the exogeneity criteria, the instrument must affect health exclusively by having an effect on decentralization (Baum et al., 2012). Given the difficulty in finding a perfectly exogenous instrument, we draw on recent literature and use the instrumental variable estimation technique proposed by Lewbel (2012). When traditional identifying information is unavailable, the 2SLS method proposed by Lewbel (2012) is crucial for identifying structural parameters in regression models with endogenous or weakly quantified variables. Furthermore, the method of Lewbel (2012) does not require satisfying an exclusion requirement because it uses internally generated instruments based on a heteroscedastic covariance restriction to prove causality. The residuals of the auxiliary equation are multiplied by each external variable in mean-centered form to construct the internal instruments.

Unlike DMCs, Lewbel's methods offer internally constructed instruments generated from the residuals of the auxiliary equation, which are multiplied by each of the included exogenous variables in mean-centered form (Ngounou et al., 2024; Lewbel, 2012). We use fiscal decentralization as the endogenous regressor. The generated internal instruments are one-period lagged health and the term of municipal executives. As the exogenous variable, we use one-period lagged decentralization. To validate the instrument, certain diagnostic tests are required. The p-value of the Kleibergen-Paap (2006) rk LM statistic is used for the under-identification test. The null hypothesis of this test states that the structural equation is under-identified. The p-values (columns 1 to 3) in **Table 5** suggest that the hypothesis is rejected, implying that each structural equation is identified. For the weak instrument test, the Kleibergen-Paap (2006) Wald F rk statistic is used. This test statistic is appropriate when the standard errors and statistics are cluster-robust (Baum et al., 2007), which is the case in our model. To determine if the instrument is exogenous, we use Hansen's (1982) restriction overidentification test. The null hypothesis of this test states that excluded instruments are exogenous,

meaning that these instruments are correlated with the error term in the second-stage regression. The estimation results are summarized in Table 5.

Table 5. Model estimation using Lewbel's IV-2sls.

VARIABLES	Dependent variable: Health		
	(1)	(2)	(3)
Decentralization	4.811***	2.718***	1.919**
	(0.909)	(0.827)	(0.813)
Mandate	−1.546***	−1.701***	−1.266***
	(0.478)	(0.446)	(0.439)
Population		3.157***	2.221***
		(0.479)	(0.449)
AP			−4.363***
			(0.685)
Constant	8.794***	−5.171**	2.612
	(0.756)	(2.083)	(2.190)
Observations	790	790	790
R-squared	0.034	0.119	0.193
Kleibergen-Paap rk LM statistic	0.000	0.000	0.000
Kleibergen-Paap rk Wald F statistic	150.4	153.9	114.18
Hansen J statistics	0.632	0.808	0.195

Standard errors in parentheses, ***p < 0.01, **p < 0.05, *p < 0.1. Source: Authors.

Consistent with the findings of Driscoll and Kraay, the coefficient associated with decentralization is positive and statistically significant, with a magnitude suggesting that increased decentralization enhances health service delivery. The results from this new estimation reveal the same trend as those obtained previously. Specifically, a one-point increase in decentralization leads to a 4.811-point improvement in health (1). Regarding the control variables, mandate and political affiliation became negative. Population still has a positive and significant effect on health.

2) Adding Additional Variables

Table 6 presents the results after adding the additional control variables.

Analysis of the information in Table 6 reveals that decentralization consistently has a positive and significant effect at the 1% level on health in all models except model (2), which has a significance level of 5%. A one-point increase in decentralization leads to an expansion of the number of CSIs by 0.290 points (5).

The additional control variables included in the basic model are corruption, conflict, and the gender of the mayors. According to Prud'homme (1995), close ties between local decision-makers and the population can foster corruption or

Table 6. Adding control variables using driscoll and kraay.

VARIABLES	Dependent variable: Health						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Decentralization	0.277***	1.694**	0.256***	0.264***	0.290***	0.281***	0.281***
	(0.039)	(0.702)	(0.038)	(0.039)	(0.030)	(0.029)	(0.036)
Mandate		−1.235**	0.340***	0.325***	0.324***	0.307***	0.307***
		(0.429)	(0.055)	(0.053)	(0.045)	(0.040)	(0.032)
Population			0.070***	0.111***	0.129***	0.180***	0.180***
			(0.008)	(0.011)	(0.013)	(0.014)	(0.013)
AP				0.159***	0.152***	0.184***	0.184***
				(0.022)	(0.027)	(0.036)	(0.047)
Corruption					0.465**	0.478**	0.478**
					(0.165)	(0.164)	(0.162)
Conflict						−0.328***	−0.328***
						(0.029)	(0.012)
Sex							−0.009
							(0.400)
Constant	1.091***	9.894***	0.316**	0.010	−0.493***	−0.728***	−0.720
	(0.016)	(0.426)	(0.110)	(0.148)	(0.149)	(0.150)	(0.407)
Observations	870	870	870	870	870	870	870
R-squared	0.015	0.037	0.027	0.029	0.039	0.041	0.041
No. Municipalities	80	80	80	80	80	80	80

Standard errors in parentheses, ***p < 0.01, **p < 0.05, *p < 0.1. Source: Authors.

favoritism toward certain groups and individuals. Consequently, available resources may not be used to help the population, hindering the provision of health services in municipalities. We measure corruption here by mayoral convictions. Corruption is a dichotomous variable, equal to 1 if a mayor in a municipality has been convicted of embezzlement and 0 otherwise. However, the results show that corruption has a positive effect on the number of community health workers (CHWs). Municipalities with corrupt mayors have more CHWs than other municipalities. Indeed, some mayors divert projects or resources intended for specific projects to their locality, thereby improving the provision of health services to their population.

The conflict variable indicates whether there has been instability (political or social) in a municipality. This variable equals 1 in the case of conflict and 0 otherwise. Instability often results in widespread loss and destruction. This tends to reduce the availability of healthcare infrastructure for the benefit of the population. The results indicate that municipalities that have experienced instability have

fewer health centers compared to municipalities that have not. The gender variable indicates the sex of the municipal executive. Studies have established that women and men have different preferences (Chattopadhyay & Duflo, 2004). Gender is a dichotomous variable that equals 1 if the mayor is female and 0 otherwise.

3) Alternative measure of fiscal decentralization

Table 7 presents the results after changing the measure of decentralization. In the literature, fiscal decentralization is measured either by expenditures or by resources. As an alternative measure, it is estimated by resources. In this case, decentralization is calculated by summing a municipality's revenues to the total revenues of all municipalities.

Table 7. Result with the alternative measure of decentralization.

VARIABLES	Dependent variable: Health			
	(1)	(2)	(3)	(4)
FD	0.315***	0.304***	0.291***	0.299***
	(0.047)	(0.041)	(0.038)	(0.043)
Mandate		0.341***	0.335***	0.320***
		(0.052)	(0.054)	(0.052)
Population			0.072***	0.113***
			(0.006)	(0.010)
AP				0.161***
				(0.026)
Constant	1.091***	0.646***	0.316**	0.006
	(0.016)	(0.077)	(0.106)	(0.149)
Observations	870	870	870	870
R-squared	0.018	0.029	0.030	0.032
No. Municipality	80	80	80	80

Standard errors in parentheses, ***p < 0.01, **p < 0.05, *p < 0.1. Source: Authors.

Table 7 shows that fiscal decentralization has a positive and significant effect at the 1% level on health. A one-point improvement in financial decentralization leads to a 0.315-point increase in the number of CSIs. Like decentralization, the control variables all have a positive and significant effect at the 1% level on the number of CSIs.

4) Alternative measure of access to health.

For further analysis, the health metric has been changed. As an alternative measure, we are using healthcare infrastructure, specifically the number of buildings constructed in health centers. This estimate has been used in accordance with the responsibilities assigned to municipalities, including equipping health centers. Thus, the construction of several buildings will allow for the treatment of a con-

siderable number of patients and consequently improve access to healthcare.

Table 8. Result with the alternative measure of fiscal decentralization

VARIABLES	Dependent variable: Health			
	(1)	(2)	(3)	(4)
Decentralization	1.665**	1.694**	0.988**	0.761**
	(0.672)	(0.702)	(0.412)	(0.245)
Mandate		−1.235**	−1.560***	−1.132***
		(0.429)	(0.336)	(0.345)
Population			3.691***	2.523***
			(0.173)	(0.107)
AP				−4.562***
				(0.045)
Constant	8.283***	9.894***	−6.997***	1.767***
	(0.318)	(0.426)	(0.614)	(0.498)
Observations	870	870	870	870
R-squared	0.029	0.037	0.122	0.197
No. Municipality	80	80	80	80

Standard errors in parentheses, ***p < 0.01, **p < 0.05, *p < 0.1. Source: Authors.

The information in Table 8 reveals that fiscal decentralization has a positive and significant effect at 5% on health. More specifically, a one-point increase in fiscal decentralization leads to a 1.665-point increase in the number of buildings in health centers.

The term of office negatively impacts the number of buildings constructed. Municipalities whose mayors are in their second term have fewer buildings in the health center sector compared to municipalities whose mayors are in their first term. This can be explained by the fact that it is difficult for these mayors to initiate the construction of health centers, as this requires collaboration with the Minister of Public Health. This collaboration can be time-consuming. However, these mayors can easily invest in the construction and renovation of buildings through donations. This would allow the population to place their trust in them for the upcoming elections. Similarly, in the baseline results, population size has a significant positive effect of 1% on the number of buildings. A one-point increase in population leads to a 3.691-point increase in the number of buildings. Municipalities whose mayors are not affiliated with the ruling party have more buildings than municipalities whose mayors are affiliated with the ruling party. Overall, it appears that fiscal decentralization has a positive effect on the supply of health services in Cameroon.

5) Health Demand Approach

To better understand the relationship between fiscal decentralization and access to healthcare, two healthcare demand variables are sequentially introduced into the analysis: the number of consultations and the number of hospitalizations in integrated health centers (IHCs) and district medical centers (DMCs). Table 9 and Table 10 below summarize the results. While studies on decentralization and access to healthcare also incorporate the demand aspect, few studies use these variables as indicators.

Table 9. Fiscal decentralization and access to healthcare (consultation).

VARIABLES	Dependent variable: Consultation				
	(1)	(2)	(3)	(4)	(5)
Decentralization	0.449***	0.487***	0.520***	0.505***	0.517***
	(0.146)	(0.134)	(0.134)	(0.134)	(0.140)
Mandate		0.268	0.344*	0.349*	0.333*
		(0.185)	(0.188)	(0.187)	(0.188)
Population		0.474***	0.498***	0.508***	0.466***
		(0.084)	(0.084)	(0.084)	(0.102)
AP			0.601*	0.589*	0.566*
			(0.323)	(0.322)	(0.327)
Corruption				−0.188	−0.143
				(0.181)	(0.188)
Conflict					0.112
					(0.283)
Sex					0.344
					(0.310)
Constant	11.026***	5.635***	5.014***	4.803***	5.086***
	(1.365)	(1.558)	(1.578)	(1.586)	(1.905)
Observations	173	173	173	173	173
Municipalities	18	18	18	18	18

Standard errors in parentheses, ***p < 0.01, **p < 0.05, *p < 0.1. Source: Authors.

The results are presented from two perspectives: the first presents the results according to the number of consultations recorded (Table 9), and the second is an econometric analysis of fiscal decentralization and the number of hospitalizations (Table 10). First, the analysis shows that fiscal decentralization positively and significantly affects the number of people seeking consultations. More specifically, a one-point increase in fiscal decentralization leads to a 0.449-point increase in the number of people requesting consultations (1). Similarly, control variables such as the mayor's term of office, population size, and the political affiliation of

the municipal executive also influence the number of people requesting public health services, particularly consultations. In short, municipalities where local elected officials have served more than one term and are affiliated with the ruling party have a higher rate of consultations. One explanation for this result can be found in an earlier contribution by Lewis et al. (2020), which highlights the empirical relationship between the accumulation of political mandates and public investment. Specifically, these results suggest that local and regional governments (LRGs) whose leaders hold more than one mandate invest more. Furthermore, municipalities affiliated with the ruling party receive more subsidies. This could influence their spending on healthcare infrastructure. Regarding demographics, the analysis reveals that a one-percentage-point increase in a municipality's population leads to a 0.508-percentage-point increase in the number of people consulted (4).

Secondly, the statistics in **Table 10** reveal that decentralization positively and significantly affects the number of people hospitalized in community health

Table 10. Fiscal decentralization and access to healthcare (Hospitalization).

VARIABLES	Dependent variable: Hospitalization				
	(1)	(2)	(3)	(4)	(5)
Decentralization	0.240**	0.265**	0.237**	0.215**	0.193*
	(0.110)	(0.105)	(0.107)	(0.106)	(0.106)
Mandate		0.013	0.013	0.014	0.014
		(0.016)	(0.016)	(0.016)	(0.016)
Population		0.049***	0.046***	0.049***	0.043***
		(0.008)	(0.008)	(0.008)	(0.009)
AP			−0.031	−0.034*	−0.032
			(0.021)	(0.020)	(0.021)
Corruption				−0.042**	−0.036**
				(0.018)	(0.018)
Conflict					0.019
					(0.026)
Sex					0.089***
					(0.029)
Constant	0.001***	0.001***	0.001	0.001	0.002
	(0.008)	(0.009)	(0.008)	(0.009)	(0.008)
Observations	378	378	378	378	378
Municipalities	35	35	35	35	35

Standard errors in parentheses, ***p < 0.01, **p < 0.05, *p < 0.1. Source: Authors.

centers (CMAs). Indeed, a one-point increase in decentralization leads to a 0.265 increase in the number of recorded hospitalizations (2). Similarly, a one-point increase in population results in a 0.049 increase in the number of hospitalizations (2). However, unlike the number of consultations, hospitalizations tend to decrease in municipalities affiliated with the ruling party. Regarding corruption as another control variable, it negatively affects the number of hospitalizations in CMAs. This result can be explained by the fact that some elected officials divert funds allocated to healthcare for private purposes and, consequently, reduce the equipment available in these health facilities.

Overall, consistent with the initial result, the statistics below (**Table 10**) are almost identical. In other words, whether from the supply or demand side, fiscal decentralization positively and significantly affects access to healthcare for populations. This conclusion aligns with theoretical predictions suggesting that subnational governments possess the best information about their populations' needs and, consequently, can respond to those needs with maximum efficiency.

5. Conclusion and Recommendations

The objective of this research was to analyze the effect of fiscal decentralization on the provision of public health services in Cameroon. To achieve this, several justified estimation techniques were employed, including the CGM estimation method, the Driscoll-Kraay estimator, and Lewbel's instrumental variable estimator. The results obtained using CGMs and the Driscoll-Kraay estimator show that fiscal decentralization has a positive and significant effect on access to healthcare. Specifically, these results show that an increase of one unit in fiscal decentralization leads to an increase in the number of Integrated Health Centers (IHCs) of 0.264 units, all other things being equal. This finding is also supported by the Driscoll-Kraay estimation method, which was used to mitigate the problem of cross-sectional dependence in situations of autocorrelation of errors and heteroscedasticity. Two health demand variables (number of consultations and number of hospitalizations in Integrated Health Centers (CSI) and Community Health Centers (CMA)) were introduced into the analysis to better assess the significance of the results. Moreover, all of these different robustness techniques confirm the baseline findings. Therefore, it appears that fiscal decentralization is a factor that promotes improved healthcare service delivery. As a recommendation, although the implementation of decentralization is gradual and long-term, public authorities should continue the momentum of strengthening the municipalization of health services induced by the decentralization process in order to improve health coverage and reduce inequalities. Furthermore, the results suggest a long-term political commitment to ensure the success of public health decentralization in Cameroon. This should not be understood as a weakening of central power, but *on the contrary* as a variation of its functions and intervention structures for the greater good of the people.

Conflicts of Interest

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

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