

# Flypaper effect of fiscal transfers on sub-national governments' expenditure: Empirical evidence from Ghana

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## Abstract

Studies on the flypaper effect which describes the behavior of the lower level governments on their use of fiscal transfers and own-source revenues have received little scholarly attention, particularly in Ghana. This study estimates the two-step system GMM of 19 newly created district assemblies from 2018 to 2022 in Ghana. The findings indicate the presence of a flypaper effect in the new districts as the coefficient estimates of the fiscal transfers exceed the coefficient estimate of the internally generated revenue *per capita*. The study concludes that while the fiscal transfer system in Ghana has successfully directed financial resources to the lower level governments, it appears though as counterproductive to own-source revenue generation at the sub-national government levels. The study recommends that the central government redesign the fiscal transfer scheme to reduce the over reliance on the transfers by the lower level governments. The study suggests that the government uses the matching grant scheme in the allocation of financial resources to the district.

**Keywords:** fiscal transfers, flypaper effect, panel regression, Ghana.

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## 1.1 Introduction

The subject of flypaper effect has not received much scholarly attention among researchers and policy makers due to the weak decentralized system across African countries which make it difficult to get reliable data. This study therefore seeks to fill the void by examining a rich dataset on fiscal transfers from the central government to the lower level governments in Ghana. Due to inadequate financial resources at the lower level governments, the central government transfers financial resources to them through the process of fiscal decentralization to assist them in the development of their localities (Fumey & Egwaikhide, 2018; Inanga & Osei-Wusu, 2004). The transfer of these financial resources is to ensure efficiency and equity at the lower level governments (Fumey & Egwaikhide, 2018; Turati et al., 2012; Inanga & Osei-Wusu, 2004). Most often the financial resources include government transfers and donor funds to the local government, generally termed as fiscal transfers. This allocation from the central government is to stimulate economic development and gives subnational government the autonomy to control their own resources by identifying and addressing the specific needs of their communities, ensuring efficient and effective allocation of resources (Slavinskaite *et al.*, 2020). Also, the allocation of financial resources to the subnational government caters for fiscal imbalances at the lower levels of government and provides public goods to individuals (Baskaran, 2016; Lalvani, 2002).

Given the above benefits from fiscal transfers, it has been argued that the transfers are capable of disincentivizing the subnational authorities to generate their own revenue to finance their expenditure while at the same time motivating them to raise their spending giving rise to the phenomenon known in public sector economics as the flypaper effect (Tanjung *et al.*, 2021). The flypaper effect is consistent with the view that "money sticks where it hits" (Tanjung *et al.*, 2021). Flypaper effect depicts a situation where an increment in fiscal transfers boost district government expenditure more than an equal rise in local government revenue (Tanjung *et al.*, 2021; Inman, 2008). Lewis and Smoke (2017) corroborated this, arguing that unconditional payments from the central authority to the local authorities, the latter's revenue generation effort while boosting expenditure, resulting in the flypaper effect. According to Oates (1999), the lower-level governments are more incentivized and respond better to fiscal transfers than to the revenue generated locally. The allocation of these financial resources from the central government to the subnational government makes them rely heavily on fiscal transfers which negatively affects the decentralization and may lead to the re-centralization of district government (Tasri, 2023).

In Ghana, the Metropolitan, Municipal and District Assemblies (MMDAs) have increasingly relied on these transfers to fund expenses related to infrastructure, education, health, and other public goods, which has diminished their motivation to generate their own revenue (Masaki, 2018). Despite the increasing growth rate of MMDAs' total revenue, the proportion of total internally generated funds (IGF) for the MMDAs' expenditure has remained relatively low compared to the fiscal transfers they receive, leading to high dependency on the transfers

(Wulandari & Gantowati, 2021; Acar, 2019; Amalia, 2017). In 2014, IGF accounted for an average of 21 percent of the total revenue of the MMDAs in Ghana (Otoo & Danquah, 2021) implying that nearly 80 percent of the MMDAs' expenditures were financed by fiscal transfers. This situation contradicts the objective of establishing new districts, which is to enable the subnational government to be self-sufficient in generating revenue to address the grassroots needs of the local populations.

Some research have found that reliance on fiscal transfers at the expense of own-source revenue mobilization undermines district governments' autonomy, making them susceptible to political manipulation by the central government, effectively re-centralizing decentralized entities to serve the central government's political interests (Fumey & Egwaikhide, 2018; Kang & Setyawan, 2012). Few studies on flypaper effects from developed and emerging countries like Korea, Indonesia, Germany, Brazil, Sweden, generally concludes that transfer of financial resources from central to subnational governments disincentivize local governments in raising their own revenue while heavily depending on government grants to increase expenditure (Wati *et al.*, 2022; Cruz & Silva, 2020; Pettersson, 2020; Korzhenevych & Langer, 2016).

However, studies from developed nations such as ..... have indicated that transfers to lower level governments do not crowd out efforts to raise own source revenue hence no flypaper effect exist (Litschig & Morrison, 2013; Kang & Setyawan, 2012). It should be noted that the case of Africa and Ghana in particular, are hard to come by except for Isik *et al.* (2023) and Dick-Sagoe *et al.* (2022). In Ghana, a study by Dick-Sagoe *et al.* (2022) focuses only on the Central region of Ghana making it difficult to generalize the findings for effective policy formulation across Ghana. This shortcoming is addressed by the current study where the focus extends to cover 19 newly created district assemblies with comparable characteristics, and spanning the various regions in Ghana. Consequently, the outcomes will assist policymakers in crafting fiscal transfer schemes to prevent the phenomenon of flypaper effect. Furthermore, the existing study by Dick-Sagoe *et al.* (2022) did not consider critical variables, such as the political alignment and the population density of the districts which have been demonstrated in other studies to exert a notable influence on local government expenditure (Acar, 2019; Mogues *et al.*, 2009).

The omission of these important variables could undermine the reliability of their findings, therefore this study incorporates these variables for new estimates on the subject. This paper also accounted for the population differences of the districts by using the per capita value of the variables which was absent in the earlier studies. Methodologically, this study employs a dynamic panel regression approach as opposed to the static approach used by earlier studies in Ghana to address issues of reverse causality where a district expenditure may influence fiscal transfer and the fiscal transfers also affecting expenditure. The presence of treverse causality makes estimates of fixed effect and random effect biased. Therefore, the study applies the two-step system Generalised Method of Moments (GMM) to address the problem of endogeneity.

The main purpose of this study is therefore to determine the flypaper effect of fiscal transfers on district spending in Ghana with focus on 19 newly created District Assemblies. The findings of this study serve as an important policy guide for policymakers in designing effective fiscal decentralization policy and transfer schemes in developing countries.

## 2.0. Literature Review

The concept of the flypaper effect was originated by James Henderson and Edward Gramlich in the late 1960s in a study to understand government budgets. To explore this, their work focused mainly on utility maximization by citizens, where citizen's income constraint is the sum of their income plus their share of government grants. They found that an additional dollar of personal income led to an increase in spending from 0.02 to 0.05 dollars, while an extra dollar in government grants resulted in a spending boost of 0.3 to 1 dollar. This was contrary to their theoretical model's prediction. When presenting these results, Arthur Okun coined the famous phrase the flypaper effect. This refers to a phenomenon where the increase in local government spending triggered by central government transfers is significantly greater than that from changes in local government income. The fact that lower level governments use transfers from the central government to raise local spending is counterintuitive, suggesting that if the municipal or lower level governments receive transfers without any change in taxes, the transfer should function as an increase in income. This implies that lower levels governments should treat this additional income the same way they would treat any other income boost (Hines & Thaler, 1995). Many empirical studies that have examined how different fiscal transfers have impacted municipal spending, suggest that the flypaper effect is at play (Tasri, 2023; Isik *et al.*, 2023; Wati *et al.*, 2022; Ramadhani *et al.*, 2022). In the case of unrestricted transfers, the increase in spending could reach as high as 100 percent, as opposed to the 5 to 10 percent that theory typically predicts (Hines & Thaler, 1995). Bradford and

Oates (1971), and Dollery and Worthington (1995) elaborated further on the concept, noting that local governments tend to use transfer funds to boost local spending instead of relying on local revenue.

In other studies, Pettersson (2020) analyze how the government transfers to the municipalities in Sweden lead to the flypaper effect, using the fixed effect panel regression analysis data. The study found a positive and significant impact of the government transfer on local government expenditure. The study observed that in Sweden when the state government allocates financial resources to the municipalities, it results in an increase in municipal education spending with only a modest rise in the state revenue generation for education. Similarly, Nguyen-Hoang and Yinger (2020) examine how state education aid leads to the flypaper effect in the United States by employing a performance-based model, they accounted for nonlinearity in aid within household budget constraints. The study found that state aid has a positive and significant effect of government aid on education spending. The study further reveals that when there is a dollar increase in state aid, it results in a much more significant increase in education spending compared to the impact of an equivalent increase in household income. This confirms the previous studies and indicates how subnational government depends on fiscal transfers.

Suripto *et al.* (2024) examined how own-source revenue and fiscal transfers affect regional spending in Lampung province utilizing the seemingly unrelated regression (SUR) panel data estimation method. The study reveals there is a significant and positive effect of own-source revenue and fiscal transfers on regional spending, with the fiscal transfer coefficient being higher than own-source revenue. The study further indicates that an increase in fiscal transfers increases regional expenditure more than an increase in own tax revenue.

Suha *et al.* (2024) examine how the federal transfers of government affect subnational government spending resulting in the flypaper effect in India. The study used panel data non-linear ARDL estimation method. The study found that federal transfers positively and significantly affect subnational government spending reducing the effort of the subnational government to raise revenue leading to the flypaper effect. The study also reveals that the subnational government relies on federal transfers to increase the expenditure on public goods. Tasri (2023) also analyzes the flypaper effect in Indonesia using the generalized least squares model data. The study reveals that the influence of fiscal transfers on local expenditure is greater than that of local revenue, indicating the presence of a flypaper effect. The study shows that the subnational governments are more dependent on transfers from the central government to increase their local spending than their own internally generated revenue. Isik *et al.* (2022), explored how government transfers to the subnational government result in the flypaper effect employing system GMM panel data estimator. According to the study, government transfers and internally generated revenues have a positive and significant influence on local assemblies spending in Nigeria and South Africa. It further found that in Nigeria, the flypaper effect was highly significantly than in South Africa, indicating that Nigeria's subnational governments rely substantially on government transfers to fund their expenditures. Dick-Sagoe *et al.* (2022) study the influence of central government transfers on the spending patterns of local governments in Ghana using the fixed effect generalized least squares (GLS) technique data. The study indicates that local assemblies in Ghana depend more heavily on transfers from the central government than on their own-source revenue expenditures. The study reveals that the local governments substantially rely on central government transfers, which reduces the decentralization objective.

On the other hand, Park and Kim (2023) analyze the effect of fiscal decentralization on local government expenditure in South Korea employing the system GMM panel data estimation. The study found that both government transfers and local revenue generation have a positive and significant impact on the subnational government expenditure with cities following similar expenditure patterns of other cities especially cities that share similar ages and demographics. The study observed that higher revenue significantly affects expenditure just as fiscal transfers and there was no crowding out of internally generated revenue, indicating the absence of the flypaper effect. This could be that the subnational government effectively invests in the transfers to enable it to generate revenue from it. Litschig and Morrison (2013) examine the effect of fiscal transfers on local government spending in Brazil using the two-stage least squares (2SLS) estimation method. The study finds a positive and significant effect of fiscal transfers and own-sourced revenue on the expenditure of the local government. The study further shows that an increase in fiscal transfers crowd in the subnational government revenue generation effort but rather leads to an increase in expenditure on education, boosting the literacy level at the grassroots. Additionally, the study shows that when government transfers rise, the likelihood of the incumbent local government winning the next election also increases.

Based on the above literature, this study attempts to contributes to the ensuing debates on the impact of central government transfers on subnational governments and to fill in the scarcity of such study gaps in Ghana. In

addition, this study employs an improved estimation technique to address the shortcomings of the previous studies.

### 3. Methodology and Data

#### 3.1 Theoretical model

Following the theoretical framework of Niskanen's (1968), Sour (2013) and Isik *et al.*, (2023) conducted an empirical study and calculated the flypaper effect using the bureaucratic model. The model implies that unlike the individual monopolist, the bureaucrat does not have the power to turn his influence into monetary benefits. Instead, he optimizes a utility function that does not only considers his budget size but also demands of people when determining the extent of government spending or else he faces dismissal. The utility maximization function of the bureaucrat is in *per capita* terms, and it's as follows

$$B = B\{U(c; G); h\}$$

where  $c$  and  $G$  are consumption and public expenditure respectively. The equation is decreasing in marginal returns in the second derivative

$$U_c > 0, U_{cc} < 0,$$

$$B_u > 0, B_{uu} < 0$$

the following restrictions are imposed

the budget constraint of the individual is  $y = c + 1$

the budget constraint of the government is  $h = \frac{pG}{L} = t + d$

the amount of fiscal transfer,  $d = \alpha \frac{pG}{L}$  with  $\alpha \in (0,1)$

Where  $\alpha$  represent the amount of the public good funded by the central authority.

The bureaucrat is subjected to the following problem

$$\max B = B\left\{U\left[y - (1 - \alpha) \frac{pG}{L}; G\right]; \frac{pG}{L}\right\}$$

#### 3.2 Empirical Model

Based on the theoretical model, the baseline empirical model is expressed in a dynamic specification form as follows:

$$Y_{it} = \sum_{j=1}^N \alpha_j Y_{i,t-j} + \beta X_{it} + \delta Z_{it} + \gamma W_{it} + v_i + \varepsilon_{it} \dots \dots \dots (1)$$

$$i = 1, \dots, N, t = 1, \dots, T$$

Where the dependent variable  $Y_{it}$  is expenditure *per capita* of a district  $i$  at time  $t$  in a year,  $X_{it}$  is a vector of fiscal transfers that the districts  $i$  receives from both the central government and donors at time  $t$  in a year,  $Z_{it}$  is the vector of the internally generated funds by the local government in the district at time  $t$ ,  $W_{it}$  is a vector of control variables,  $\alpha_j$  is the parameter to be estimated, while  $\beta, \delta, \text{ and } \gamma$  are a vector of parameters to be estimated,  $v_i$  represents the unobserved effect specified to the district  $i$ , and  $\varepsilon_{it}$  is the error term.

Given the heterogeneity effect ( $v_i$ ) in the model, the ordinary least squares (OLS) estimation method with the lagged dependent variable ( $Y_{i,t-j}$ ) produces potential dynamic bias due to the correlation between the error term and the lagged dependent variable. While the panel data can be estimated using OLS, the assumptions under which the OLS produces consistent estimates are limited and difficult to achieve in practice. In order to overcome this shortcoming of the OLS, estimation methods such as the pooled OLS, fixed-effects (FE), and random effect (RE) are applied to estimate the panel data model. The pooled OLS, which pools all the observations together, assumes constant intercepts and slopes in the cross-section (districts), but it does not account for the time dimension and individual heterogeneity effect.

To address the limitations of the pooled OLS estimation approach, fixed and random effect panel data models have been used to address the individual heterogeneity effect of the panel data, which the pooled OLS does not capture. The fixed effect employs dummy variables to allow the intercept term to fluctuate over time and between districts, so accounting for heteroscedasticity and contemporaneous correlations. However, in the presence of a lagged dependent variable as an explanatory variable, the fixed effect and random effect estimation method lead to inconsistent estimates, resulting in the correlation between the lagged dependent variable and the error term. Even in the absence of any correlation between the error term and the lagged dependent variable, the bias would still exist in the data due to the cross-section's ( $N=95$ ) dominance over the time series ( $T=5$ ). To address this problem, the first difference of equation (1) is taken to remove the heterogeneity ( $v_i$ ), and hence, eliminates the source of bias.

$$\Delta Y_{it} = \Delta \sum_{j=1}^N \alpha_j Y_{i,t-j} + \beta \Delta X_{it} + \delta \Delta Z_{it} + \gamma \Delta W_{it} + \Delta \varepsilon_{it} \dots \dots \dots (2)$$

$$i = 1, \dots, N, t = 1, \dots, T$$

When the non-strictly exogenous variables are first-differenced, they become endogenous, and the error term correlates with the first-difference variables. To address the possibility of endogeneity resulting from simultaneity bias, whereby fiscal transfers influence districts government expenditures and the district government expenditures in turn influence fiscal transfers, an instrument usually the lag of the dependent variable is included serving as an explanatory variable. However, the fixed effect is a static model estimation method and cannot account for the lagged dependent variable in the panel date as a result, a linear dynamic model of estimation technique is employed for the estimation.

In particular, this study adopts the linear dynamic Generalized Method of Moments (GMM) approach of estimation by Arellano-Bond (1991). Two estimation techniques are involved in this approach, thus the difference GMM and the system GMM. The difference GMM estimation by Arellano and Bond (1991) focuses on first-differenced transformations of the data. It uses lagged levels of the dependent variable as instruments for differenced equations. It assumes that the differenced errors are serially uncorrelated and that the instruments are valid and uncorrelated with the error term Roodman (2009). Also, difference GMM is designed for “small T, and large N” panel data and it proceeds after first-differencing the data to estimate the fixed-effects. The system GMM estimation augments difference GMM by estimating simultaneously in difference and levels, the two equations being distinctly instrumented. However, the difference GMM estimation approach has some conceptual and statistical setbacks which are subsequently outlined.

Since the dependent and independent variables are eliminated at the difference form, one conceptual problem is the missed opportunity to do a cross-sectional analysis between them at the level form. Furthermore, because the difference GMM only makes use of moment conditions from differenced equations and might not completely utilize all of the information in the data, it might be less effective than the system GMM. Another shortcoming in terms of the statistical estimates is that it is sensitive to the assumption of serially uncorrelated errors in the differenced equations, and violations of this assumption lead to biased and inconsistent estimates, and the difference GMM may not fully account for individual effects in the panel data, which can result in biased estimates if individual-specific characteristics are not adequately controlled for. To overcome this shortcoming, an augmented approach is developed by Arellano and Bover (1995) called system GMM.

The system GMM estimator for dynamic panel data models combines moment conditions for the model in first differences with moment conditions for the model in levels. It has been shown to improve on the GMM estimator in the first differenced model in terms of bias and root mean squared error. The system-GMM allows for a more flexible and comprehensive instrumental variable strategy by incorporating both levels and differences of the data as instruments, enhancing the identification of parameters. The lagged difference of the dependent variable may also be a valid instrument for the equation at the level form. It also accounts for individual effects in the estimation process, which can lead to more accurate and reliable results, especially in the presence of unobserved heterogeneity. This study therefore adopts the system GMM estimator for the estimations.

### 3.3 Model Specification

The model specification for this study to examine the flypaper effect is expressed as follows:

$$\ln Exp_{it} = \beta_0 + \beta_1 \ln Exp_{i,t-1} + \beta_2 \ln Trans_{it-1} + \beta_3 \ln IGF_{it} + \beta_4 \ln Popden_{it} + \beta_5 PoA_{it} + w_i + \varepsilon_{it} \dots \quad (3)$$

$$i = 1, \dots, N \quad t = 1, \dots, T$$

Where;  $Exp_{it}$  is the expenditure *per capita* of the districts over time,  $Trans$  is the fiscal transfers *per capita* transferred to the districts,  $IGF$  is the internally generated funds *per capita*, and  $w_{it}$  is a vector of control variables that includes variables such as the population density, and political alignment included in the model to circumvent the problem of omitted variable bias or model underfitting.  $\beta_0$  is the intercept term for the country  $i$  and time  $t$ .  $\beta_1$ ,  $\beta_2$ ,  $\beta_3$ ,  $\beta_4$ , and  $\beta_5$  are the coefficients of the explanatory variables.  $w_i$  denotes unobserved district-fixed effects. The lagged value of local government expenditure ( $\ln Exp_{i,t-1}$ ) and the lagged value of the fiscal transfers ( $\ln Trans_{it-1}$ ) are the endogenous variables.

The model uses the one-year lag of local government expenditure as an instrumental variable. To estimate this, the study uses the two-step System GMM approach by Blundell and Bond (1998) and Arellano and Bover (1995) to estimate the equation (3). This system GMM is more appropriate in situations where the dependent variable is persistent in small time series (i.e. the expenditure is continuously high over time). To assess the validity of the instrument used, the Sargan test is used and the Arellano-Bond AR (2) test to verify if there is autocorrelation.



When the coefficient value of transfer funds is  $s$  greater than the coefficient value of local own revenues with respect to local government expenditures and the value of the two coefficients is significant then there is flypaper effect. To determine the flypaper effect hypothesis, the study compares the fiscal transfers regression coefficient ( $\beta_{Trans}$ ) on local government expenditure with the regression coefficient of internally generated funds ( $\beta_{IGF}$ ) on local government expenditure. If  $\beta_{Trans}$  is greater than  $\beta_{IGF}$  then a flypaper effect is said to exist (Dick-Sagoe *et al.*, 2022; Ramadhani *et al.*, 2022; Amalia, 2017).

### 3.4 Variable Description, Measurement, and Expected Signs

#### Expenditure per capita (Exp)

The dependent variable, expenditure *per capita* is measured by the total annual expenditures by the local government in the districts using their sources of income either from the fiscal transfers or the internally generated funds or both. The expenditure *per capita* measures the total annual spending by the district per their population.

#### Internally Generated Funds (IGF)

The Internally Generated Funds are measured based on funds earned in the district from property rates, rent, fines, levies, land rent, and investment, among other things. This variable's data comes from the District Composite dataset from the Ministry of Finance, Ghana. High internally generated revenue is expected to increase the local government expenditure. The internally generated revenue is expected to have a positive effect on expenditure *per capita*.

#### Fiscal Transfers (Trans)

Fiscal transfers refer to the amount of funds transferred by the central government to the district in a given year and the annual donors' funds to the districts *per capita*. For this study, the fiscal transfer is the sum of government transfers and donor funds transferred to districts for various local developmental initiatives divided by the total population of the district. This data is obtained from the District Composite dataset from the Ministry of Finance, Ghana. Higher fiscal transfers to the local government increase the expenditure levels of the local government. Fiscal transfers are expected to have a positive effect on expenditure *per capita*.

#### Population Density (Popden)

Population density refers to the number of people residing in a district divided by the total land size. This variable is important in the model since the number of people living in an area tends to influence the area's local revenues and expenditures via the moderating function of increasing economic activity (Masaki, 2018). The higher the population, the higher the revenue base for the district and the higher the expenditure levels of the district. Data for this indicator is taken from the Ghana Statistical Service's website and the District Composite dataset from the Ministry of Finance, Ghana. Population density is expected to have a positive effect on expenditure *per capita*.

#### Political Alignment.

Political alignment is a dummy for the political orientation of the district over the study period with 1 being a district is aligned with the incumbent government and 0 otherwise. This variable is measured by the electoral results of the districts. This variable is important because it helps us to understand if the local government expenditure is influenced by the political alignment of the districts since the District Chief Executives in charge of the districts' administrations are appointed by the incumbent government. According to Gennari and Messina (2014), the political affiliation of a district, influences the expenditure levels of the subnational government. Political alignment is therefore expected to have a negative effect on expenditure *per capita*.

### 3.5 Sources of Data

The data on expenditure *per capita*, internally generated funds, and fiscal transfers and land size were sourced from the District Composite Budget document at the Ministry of Finance in Ghana. The district composite data is an annual report on the districts that contains information on the population of the district, the land size, the economy of the district, expenditure of the district, revenue generated in the districts, and fiscal transfers received by the districts. Data on the population of the districts are obtained from the 2020 Population and Housing Census Report from the Ghana Statistical Service. The political data was derived from the Gazette reports on general elections from the Electoral Commission Ghana.

## 4. Results and Discussions

### 4.1 The Descriptive Statistics of variables

**Table 11: Descriptive statistics (in Millions of Ghana Cedis)**

Variables	Observation	Mean	Maximum	Minimum	Skewness	Kurtosis
Totexpcap	95	79.32	975.56	4.47	4.59	21.62
Ftcap	95	68.60	248.633	9.552	1.41	3.13
Igfcap	95	5.86	35.92	0.07	2.49	8.08
Popden	95	209.80	1052.14	31.61	2.42	5.85
PoA	95	0.84	1.0000	0.0000	-1.85	1.43

Source: By authors

From the descriptive analysis, the study finds that on average the districts spend 79 million cedis of its financial resources each year *per capita* with a minimum and maximum value of 4.47 million cedis and 975.56 million cedis respectively indicating significant variability and potential outliers in the data. Similarly, fiscal transfers *per capita* have a mean of 68.60 million cedis, with a minimum of 9.60 million cedis and a maximum of 248.63 million cedis, indicating that on average fiscal transfer, the central government transfers about 68 million cedis of funds to the subnational government *per capita*, and the minimum and maximum values indicate that there instancing of both very low and very high transfers. Also, the internally generated revenue has a mean of 5.86 million cedis, with a minimum value of 0.07 million cedis and a maximum value of 35.92 million Ghana cedis. This implies that on average about 6 Ghana cedis *per capita* of the funds are generated internally by the subnational government, and the range indicates substantial differences in internally generated revenue across the districts.

The population density has a mean value of 209.80, suggesting that on average, the population per land size in a district is about 209. However, the minimum value of 31.61 and the maximum value of 1052.14 indicate extreme variations in population density in the districts. Political alignment has a mean value of 0.84 indicating that on average, most of the study districts are aligned with the incumbent government. With a minimum value of 0 and a maximum value of 1 indicating whether the district is aligned with the incumbent government or not. The descriptive analysis shows that expenditure *per capita* is right skewed with the value of 4.59 and a kurtosis of 21.62, indicating that most values are clustered at the lower end, and kurtosis indicates the presence of outliers and extreme values.

Fiscal transfers *per capita* have a skewness of 1.41 and a kurtosis of 3.13, also showing a right skew, and the kurtosis indicates the presence of outliers. Also, internally generated revenue has a skewness of 2.49, indicating a right-skew and a kurtosis of 8.08 signifies a sharp peak with heavy tails, implying significant outliers. Population density is right-skewed, with a value of 2.42 and a kurtosis of 5.85, indicating considerable variability and extreme values in population densities. Political alignment has a skewness of -1.85, indicating a left-skewed distribution, meaning most values are clustered towards the higher end, and a kurtosis of 1.43, suggesting a distribution with a relatively flat distribution with fewer outliers.

### 4.2 The 2-Step System GMM Estimates

To estimate the flypaper effect, the study used the two-step GMM as it is asymptotically normal and has a smaller variance. Statistical tests based on the two-step estimator are also asymptotically more powerful than that of the one-step estimator. Table 2 presents the dynamic panel regression estimation results for the difference GMM in Ghana.

For comparison, this study also estimates the system GMM which can control not only the endogeneity problem but also omitted variable bias and unobserved panel heterogeneity. The 2-stage system GMM is also more appropriate in such situations where the dependent variable in the model is persistent. In this study, the district government expenditures are high over the over-time which makes the difference GMM not appropriate because it yields biased and inefficient estimate.

**Table 2: Estimates of System GMM (One-Step and Two-Step)**

Variables	One-step system GMM			Two-step system GMM		
	Coefficient	Standard Errors	p-value	Coefficient	Standard Errors	p-value
<i>Lntotexpcap<sub>-1</sub></i>	-0.6285***	0.1864	0.0007	-0.6530***	0.1969	0.0009
<i>Lnftcap<sub>-1</sub></i>	1.5297***	0.2146	0.0000	1.5510***	0.1960	0.0000
<i>Lnigfcap</i>	0.4677*	0.2447	0.0560	0.4281**	0.1801	0.0175
<i>Lnpopden</i>	-1.3095	1.2176	0.2830	-0.8335	1.0482	0.4265
<i>PoA</i>	0.1883*	0.1110	0.0890	0.5413*	0.2842	0.0568
<i>AR (1)</i>	0.3072			0.1879		
<i>AR (2)</i>	0.3491			0.5551		
<i>Sargan test</i>	0.1325			0.2997		

Note: \*\*\*, \*\*, and \* represents 1 percent, 5 percent, and 10 percent levels of significance respectively.

Source: By authors

Table 2 shows the estimates for the one-step and two-step system GMM, from the one-step the coefficient of the one-year lagged expenditure *per capita* of the subnational government is statistically significant and has a negative effect on the current expenditure of the local government. A one percent increase in one-year lagged expenditure *per capita* is expected to decrease local government expenditure at the district by 0.63 percent holding all other variables constant. The coefficient of a year-lagged of fiscal transfers *per capita* is statistically significant and has a positive effect on current subnational government expenditure. A one percent increase in a year lagged of fiscal transfers *per capita* is expected to increase the district government expenditure by 1.53 percent, holding all other variables constant. Also, the coefficient of internally generated revenue *per capita* is positive and statistically significant at the 10 percent level of significance. A one percent increase in internally generated revenue *per capita* is expected to increase district government expenditure by 0.48 percent, holding all other variables constant. From the results, there is the existence of the flypaper effect in the one-step system GMM, since the coefficient of the fiscal transfer *per capita* (1.53) is greater than the coefficient of the internally generated revenue *per capita* (0.48). The coefficient of political alignment of the district is positive and statistically significant at a 10 percent level of significance. This suggests that districts that are aligned with the incumbent government have an 18 percent increase in local government expenditure compared to those that are not aligned with the incumbent government at the center. However, the sign of the population density coefficient is negative and not statistically significant.

From the two-step system GMM estimates, the coefficient of the one-year lagged expenditure *per capita* of the local government has a negative sign and has a statistically significant impact on the current expenditure of the local government. A one percent increase in one year lagged subnational government expenditure *per capita* is expected to lead to a decrease in local government expenditure by 0.65 percent holding all other variables constant. This is contrary to the findings of Isik *et al.*, (2023), where the one-year lagged expenditure has a positive and significant effect on district government expenditure. The coefficient of a year-lagged fiscal transfer *per capita* is positive and statistically significant at the 1 percent level of the district expenditure. A one percent increase in a year lagged of fiscal transfers *per capita* is expected to increase district-level expenditure by 1.55 percent holding all other variables constant. This the study by Isik *et al.*, (2023). In addition, the coefficient of internally generated revenue *per capita* is positive and statistically significant at the 5 percent level of significance. A 1 percent increase in internally generated revenue *per capita* is expected to increase district government expenditure by 0.43 percent holding all other variables constant. This is also in line with the study by Isik *et al.* (2023).

More importantly, the results reveal the presence of the flypaper effect as the coefficient estimates of the fiscal transfers *per capita* (1.55) is greater than the coefficient of the internally generated revenue *per capita* (0.43) respectively. The political alignment of the district has a positive sign and it is statistically significant at a 10 percent level of significance. 54 percent increase in district government expenditure is associated with aligned districts relative to non-aligned districts. However, the coefficient of population density has a negative sign, and it not statistically significant. This confirms the study of Gennari and Messina (2014) where districts that are aligned with the incumbent government have higher expenditures compared to those that are not aligned. From the results, districts that are aligned with the incumbent government have an 18 percent increase in local government expenditure compared to those that are not aligned with the incumbent government. However, the population density coefficient is negative and not statistically significant. The AR (1) and AR (2) indicate that there is no first-order and second-order autocorrelation in the model. The Sargan test of validity of the



instrument also indicates that the instrument is valid for the model in both the one-step and two-step system GMM. This result confirms the study by Isik *et al.* (2023) on Nigeria and South Africa.

### 4.3 Robustness checks

The study conducts robustness checks by first using an alternative way of estimating the system GMM without using the *per capita* variables to see how the results will be if the population difference at the districts are not accounted for in the estimation. Another form of robustness checks is to use other static panel estimations approaches to verify the results, such as OLS, fixed and random effects.

**Table 12:** Estimates of System GMM without per capita variables (One-Step and Two-Step)

Variables	One-step system GMM			Two-step system GMM		
	Coefficient	Standard Errors	p-value	Coefficient	Standard Errors	p-value
<i>Lntotexp<sub>-1</sub></i>	-0.6028***	0.1933	0.0018	-0.6382***	0.1954	0.0010
<i>Lnft<sub>-1</sub></i>	1.5849***	0.1994	0.0000	1.6174***	0.1973	0.0000
<i>Lnigf</i>	0.4912**	0.2412	0.0416	0.4288**	0.1890	0.0230
<i>Lnpopden</i>	-0.8893	1.0944	0.4164	-0.6322	0.9869	0.5218
<i>PoA</i>	0.3199	0.3000	0.2864	0.4475	0.3547	0.2072
<i>AR (1)</i>	0.2836			0.1632		
<i>AR (2)</i>	0.3459			0.5437		
<i>Sargan test</i>	0.1184			0.2450		

Note: \*\*\*, \*\*, and \* represents 1 percent, 5 percent, and 10 percent levels of significance respectively.

Source: By authors

From Table 4, without the *per capita* variables, it was observed that in both the one-step and two-step system GMM cases, the coefficients of one year lagged of expenditure, one year of fiscal transfer, and internally generated revenue were statistically significant, but political alignment is not statistically significant. From the results in the one-step system GMM, the coefficient of one-year lagged district expenditure has a negative sign and it's statistically significant, a percentage increase in one year lagged district expenditure is expected to decrease current district expenditure by 0.60 percent, holding all other variables constant. Additionally, the coefficient of one-year lagged fiscal transfers had a positive sign and it's statistically significant. A percentage increase in one-year lagged of fiscal transfers is expected to increase local government expenditure in the districts by 1.58 percent, holding all other variables constant. The coefficient of internally generated revenue is positive and statistically significant at the 5 percent level of significance. A percent increase in internally generated revenue is expected to increase district government expenditure by 0.49 percent given that all variables are held constant.

From the two-step system GMM results, the coefficient of one-year lagged district expenditure has a negative and statistically significant effect on current district expenditure. A percentage increase in one-year lagged district expenditure is expected to decrease local government expenditure in the districts by 0.63 percent, holding all other variables constant. This is contrary to the findings of Isik *et al.*, (2023) who used the same approach. The coefficient of a year-lagged fiscal transfer has a positive and statistically significant effect on local government expenditures. A percentage increase in a year lagged of fiscal transfers is expected to increase district expenditure by 1.62 percent, holding all other variables constant. This confirms the findings of Isik *et al.* (2023). Also, the coefficient of internally generated revenue is positive and statistically significant. A percentage increase in internally generated revenue will be expected to increase subnational government expenditure by 0.43 percent, holding all other variables constant. This confirms the findings of Isik *et al.* (2023). From the results there exist the flypaper effect as the coefficient of fiscal transfers (1.62) is greater than the coefficient of internally generated revenue (0.43). This suggests that whether population at the district level is accounted for or not flypaper effect still exist at the districts.

**Table 13:** Robustness Results from Other Estimators

Variables	Pooled OLS	Fixed Effect	Random Effect
<i>Constant</i>	-0.0899 (0.6872)	-0.4543 (1.4592)	0.1404 (0.8215)
<i>Lnftcap</i>	0.9182*** (0.1254)	0.9812** (0.3382)	0.8737*** (0.1280)
<i>Lnigfcap</i>	-0.0031 (0.0875)	-0.0937 (0.1378)	0.0712 (0.1087)
<i>Lnpopden</i>	-0.0004 (0.0952)	0.0099 (0.1366)	-0.0120 (0.1300)
PoA	0.2379 (0.2461)	0.4495 (0.4551)	0.1296 (0.2710)
<i>N</i>	95	95	95
<b>R<sup>2</sup></b>	0.4078	0.3954	0.4174
<b>Adjusted R<sup>2</sup></b>	0.3815	0.2226	0.3915
<i>Year effect</i>	Yes	Yes	Yes
<i>District effect</i>	No	Yes	No
<i>Hausman test</i>	Na	0.3168	0.3168

Note: \*\*\*, \*\*, and \* represents 1 percent, 5 percent, and 10 percent levels of significance respectively and values in parentheses are the standard errors.

Source: By authors

From the pooled OLS results, only the coefficient of fiscal transfer is statistically significant and positive, all the other variables are not statistically significant. A one percent increase in fiscal transfer is expected to increase district expenditure by 0.92 percent holding all other variables constant. From the adjusted R<sup>2</sup> about 38 percent of the variation in the dependent variable is explained by the explanatory variables. The results confirm of the findings of Isik et al. (2023) and Acar (2019). The Hausman test is computed to determine which effect is more suitable for the data. The results of the Hausman test which is 0.3168 indicate that the null hypothesis cannot be rejected suggesting the random effect is independent of the explanatory variables, this can be found in Table 4.5 confirming Isik et al.(2023) Hausman test results for Nigeria, however, this finding is contrary to the study by Dick-Sagoe et al. (2022) which rejected the null hypothesis and used the fixed-effect estimation method.

## 5.0 Conclusion and Policy recommendations

The two-stage system GMM is used to analyze the study. From the findings of the study, the coefficient of fiscal transfer *per capita* has a positive and statistically significant effect on the district government expenditure. The coefficient of internally generated *per capita* is positive and statistically significant effect on district government expenditure. The results show that the coefficient of fiscal transfers *per capita* (1.5510) is greater than the coefficient of internally generated revenue *per capita* (0.4281) indicating the presence of the flypaper effect. From the results it is observed that the high expenditure of the district government is mostly funded by the fiscal transfers allocated to the district government, indicating the high dependence of subnational government on the fiscal transfers.

Based on the findings of the study, district level governments are more sensitive to changes in fiscal transfers than changes in the internally generated revenue in funding their expenditures in the district, making them more reliant on the fiscal transfers. The study recommends that the government redesign the scheme for transferring financial resources to the subnational government to control for their over reliance on the central government fundings. The study recommends that the government use the matching grant scheme where the central government transfers an amount to match the internally generated funds of the district in executing projects at the district levels. This will incentivize the districts to make efforts at generating their own revenue.

In addition, the study recommends that central government set policies and guidelines on how lower level governments can utilize their financial resources in the districts. The use of funds by the district government should focus on investing in assets that can generate revenue. For instance, districts that have tourist sites should invest in developing them to promote tourism in the area which can generate revenue for them and also create an avenue for businesses to grow which will indirectly improve the tax base of the district.

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