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Impact of Intergovernmental Transfers on Household Multidimensional Well-Being

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ABSTRACT *Do intergovernmental transfers affect the multidimensional well-being of households? This paper investigates the relationship between intergovernmental transfers and household multidimensional well-being, using the revenue allocation by the federal government to sub-national or state governments in Nigeria. We follow Alkire & Foster to compute a multidimensional poverty index (MPI), which is the weighted sum of three broad dimensions of poverty – health, education, and living standards. We adopt an instrumental variable (IV) approach by using exogenous variation in oil windfalls as an instrument to mitigate the endogeneity concerns associated with using intergovernmental transfers in our analysis. We find that an increase in intergovernmental transfers leads to an improvement in household multidimensional well-being or a decline in the multidimensional poverty index. We identify recurrent and capital expenditures as some of the potential channels through which intergovernmental transfers affect the multidimensional well-being of households in Nigeria. The findings of this paper reinforce the growing evidence of the developmental impacts of intergovernmental transfers, especially in the context of developing countries.*

KEYWORDS: Intergovernmental; transfers; multidimensional; households; well-being; Nigeria

1. Introduction

There is a growing interest among researchers and policymakers alike in unravelling the nexus between intergovernmental fiscal transfers and developmental outcomes. The interest among researchers and policymakers stems from understanding the capacity of most sub-national governments in developing countries to collect taxes and heavy reliance on transfers from the central government to meet their financial obligations (Shah, 2006). However, the implications of intergovernmental transfers from the central government to sub-national governments have received divergent views in development discourse. Proponents of intergovernmental transfers argue that making funds available to subnational governments might be an effective tool for increasing the efficiency of public expenditures and maintaining vertical balance[1] (Bahl, 2000; Shah, 1999). Therefore, a significant number of decentralized public service provisions in developing countries are based on funding from intergovernmental transfers (Rodden, 2004; Shah, 2006)[2].

Contrarily, there are opposing views that intergovernmental transfers and additional financing to subnational governments may not lead to developmental outcomes because of

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inefficient utilization of transfers from the central government and elites' capture of resources (Crook, 2003; Reinikka & Svensson, 2004; Shah, 2006). Moreover, without strong existing institutional arrangements, intergovernmental transfers can lead to capturing of the funds by local officials and politicians (Reinikka & Svensson, 2004). Despite the increased interest on the impact of intergovernmental transfers, there is relatively little evidence about the nexus between intergovernmental transfers and household well-being in the context of sub-Saharan Africa.

In the light of the foregoing, this paper aims to contribute to the understanding of the relationship between intergovernmental transfers and household multidimensional well-being in Nigeria, by exploiting the variation in intergovernmental transfers from the central government to sub-national governments over time. In the absence of a random assignment of intergovernmental transfers, this study uses an instrumental variable approach that exploits exogenous variation in oil windfalls as an instrument for intergovernmental transfers. The findings of the study reveal that an increase in intergovernmental transfers leads to an improvement in household multidimensional well-being or a decline in multidimensional poverty. We identify channels such as capital and recurrent expenditures as some of the potential pathways through which intergovernmental transfers affect household multidimensional well-being in Nigeria.

This paper contributes to two major strands of literature. First, this study is related to the broad literature on intergovernmental transfers and their impacts on household welfare (Zhuravskaya, 2000; Mogues & Benin, 2012; Litschig & Kevin, 2013; Masaki, 2018). In this regard, Masaki (2018) argues that in settings with a weak fiscal capacity of local government and where the political costs of enforcing revenue collection are low, intergovernmental transfers can stimulate local revenue generation. This effect could stem from fiscal transfers aiding to finance revenue collection efforts and broadening the tax base, which ultimately will result in the provision of public goods and ultimately have consequences on tax compliance. However, in some instances, intergovernmental transfers could erode the fiscal autonomy of subnational governments because they can serve as substitutes for local tax revenue (Zhuravskaya, 2000; Mogues & Benin, 2012).

Second, this paper contributes to the studies on decentralisation, access to public services, growth, and poverty in the context of developing countries (Canavire-Bacarreza, Martinez-Vazquez, & Yedgenou, 2020; Martinez-Vazquez & Mcnab, 2003; Sanogo, 2019). For example, Sanogo (2019) investigates whether the devolution of revenue-raising responsibilities to Cote d'Ivoire municipalities enhances access to public services and leads to a reduction in poverty, and the author finds evidence in the affirmative. One major driver, which has formed the central argument in the literature on the transmission mechanisms of decentralisation leading to desirable outcomes is based on the capacity of well-structured intergovernmental fiscal arrangements to create enough incentives for subnational governments to foster markets which lead to improved resource allocation (McKinnon, 1997; Weingast, 1995).

Contrarily, Galiani, Gertler, and Schargrodsky (2008) suggest that decentralization can lead to an increase in inequalities in the provision of public services such as education. One common explanation is that, in the absence of proper supervision and regulatory framework, local elites can capture resources for their benefit (Reinikka & Svensson, 2004). Further, Francis and James (2003) show that the decentralization in Uganda resulted in local governments captured by local or political elites and failure to reduce poverty. Therefore, there is mixed empirical evidence from the analysis of the relationship between decentralization, poverty, and access to public services in the context of sub-Saharan Africa. Some empirical studies find a positive effect of fiscal decentralization on poverty and access to public services (Caldeira, Martial, & Rota-Graziozi, 2012; Cavalieri & Ferrante, 2016), while few others have negative results (Bahiigwa, Rigby, & Woodhouse, 2005).

Despite this plethora of evidence on the analysis of intergovernmental transfers, there is, however, a limited micro-analysis of the effects of intergovernmental transfers on household

multidimensional well-being in the context of Saharan Africa. The focus of this paper on Nigeria provides a compelling context to investigate the nexus between intergovernmental transfers and multidimensional well-being for the following reasons. First, intergovernmental transfers constitute a major source of revenue for subnational governments in Nigeria. Although states in Nigeria independently implement their budgets without control from the central government, they do not have the power over the tax base or tax rate in their domains. And due to limited capacity for revenue or tax collection across most states in Nigeria, the main sources of revenue are derived from central government transfers (Maystadt & Salihu, 2019). Evidence from the Central Bank of Nigeria 2014 Annual Economic Report reveals that state internally generated revenue in most cases amounts to less than 20% of their total revenue.

Second, Nigeria largely depends on oil revenues and the derivative principle is employed to allocate oil revenues across states based on factors such as oil and non-oil producing states, among others. The variation in oil revenue allocated to states allows us to exploit how exogenous variation in crude oil prices determines intergovernmental transfers and their implications on household multidimensional well-being. Oil prices can indeed be considered exogenous since Nigeria accounts for less than 4% of world oil production (Abidoye & Calì 2021). Third, Nigeria is one of the countries that account for the highest number of people living in extreme poverty and the number of people undernourished has increased from 21.4 million people in 2017 to 25.6 million people in 2018 (FAO, 2019; Roser & Ortiz-Ospina, 2018). In this regard, to the best of our knowledge, this paper is therefore the first to examine the relationship between intergovernmental transfers and multidimensional well-being at the micro-level in the context of Nigeria.

The rest of the paper is organized as follows: Section 2 discusses the background of intergovernmental transfers in Nigeria. Section 3 describes the data sources and empirical approach used in the study. Section 4 presents the main findings of the econometric analysis of this paper. Section 5 concludes by discussing the policy implications of the findings.

2. Background

Nigeria is a federation that comprises 36 states, and a Federal Capital Territory (FCT) in Abuja There are 774 local government areas – a local government area is the smallest administrative unit in the country. The country operates a bicameral legislature (the Senate and the House of Representatives) with an elected president for four years[3]. The 1999 constitution of the Federal Republic of Nigeria also defines to a large extent, the country's system of fiscal federalism. The system of fiscal federalism allows for government functions, including revenue and expenditure responsibilities to be performed in different tiers of government (Buhari, 2001; Likita, 1999). The constitution defines three levels of government: Federal, the 36 states and the Federal Capital Territory (FCT), and 774 local government areas. Moreover, the states in Nigeria are categorized into 6 geopolitical zones, namely: North-East, North-Central, North-West, South-South, South-East, and South-West.

The 1999 constitution of the Federal Republic of Nigeria provides the framework in which the revenues realized by the federal government are shared among the different levels/tiers of government (federal government, state governments, and local government authorities), using the formula developed by the Revenue Mobilization Allocation and Fiscal Commission (RMAFC) and approved by the National Assembly (Maystadt & Salihu, 2019). All federal revenues from oil, VAT, corporate income tax, custom and excise duties are paid into a central 'purse' known as the Federation Account, and are distributed every month among the federal, state and local government areas, using the pre-determined rules (Maystadt & Salihu, 2019). Revenue sharing arrangement from the Federation Account to the different tiers of government is at two levels: the first is the vertical allocation, which is among the federal, state, and local

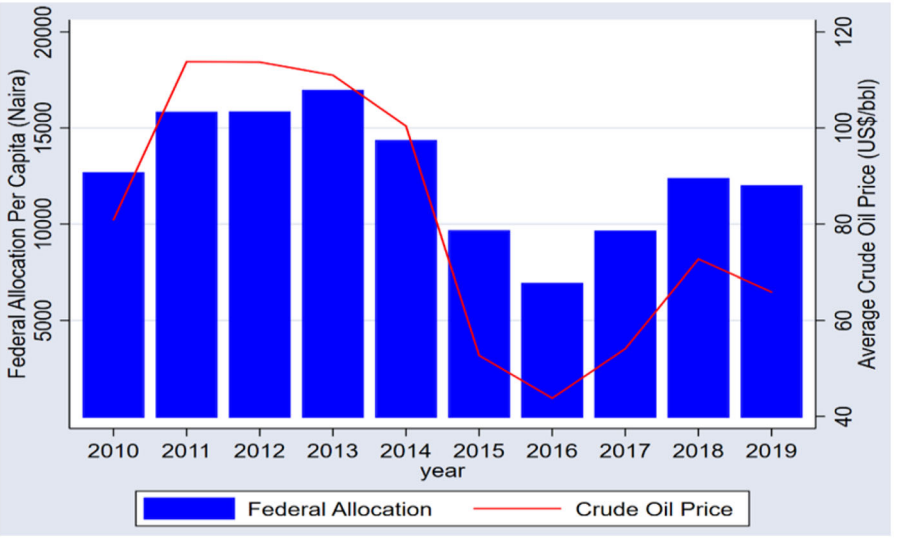

Figure 1. Federal allocation per capital and crude oil price.
Source: Author's compilation using data from the National Bureau of Statistics and Central Bank of Nigeria.

councils while the second is the horizontal allocation, among the state and the local governments. Revenue allocation is meant to attain two broad objectives, namely, efficiency and equity. However, the allocation formula is guided by certain allocation principles like population, equality of states, internal revenue generation, landmass, and principle of derivation (Ohiomu & Oluyemi, 2019).

Oil has had a great influence on the Nigerian economy. Oil accounts for almost 65 per cent of the federal revenues and about 88 per cent of the country's foreign exchange earnings[4]. The crude oil price has a significant impact on federal government revenue and sub-national transfers to other tiers of government. See Figure 1 below for a graph of the federal allocation per capita and the average crude oil price. Based on the 1999 constitution, the oil revenues collected by the federal government are shared in such a manner that 13% of the gross oil revenue accrues to oil-producing states in proportion to their production volumes (Maystadt & Salihu, 2019; Uche & Uche, 2004). The amount left is paid to the federation account and distributed to the tiers of governments using the horizontal allocation formula, which is based on the following rules: 40% based on equality; 30%, on population; 10%, on land mass and terrain; 10%, to internally generated revenue and 10% for social development such as education enrolment, health, and water. Moreover, about 50% of VAT revenues are shared equally by all states, but 30% in proportion to the state population, and 20% based on the relative state contribution to VAT revenues (Maystadt & Salihu, 2019; Uche & Uche, 2004).

3. Data sources and empirical methodology

This study uses data matched from two sources to carry out the analysis in this paper. These data are drawn from the Nigerian General Household Surveys Panel data, and intergovernmental transfers to sub-national government data over time across the 36 states in Nigeria obtained from the Federal Account Allocation Committee (FAAC) reports. We exclude the Federal Capital Territory (FCT-Abuja) from our analysis because the FCT is under the control of the federal government. Specifically, we use data from the three waves of the Nigerian General Household Survey-Panel data: 2010/11 (wave 1), 2012/13 (wave 2) and 2015/16 (wave 3).

The General Household Survey-Panel (GHS-Panel) is part of the Living Standard Measurement Study (LSMS) – Integrated Surveys on Agriculture (ISA) project of the World Bank. The GHS-Panel Surveys were implemented by the Nigeria National Bureau of Statistics (NBS) with support from the World Bank. The Nigerian GHS data provides detailed information on individuals, households, and community-level information over time. It contains information such as age, education level, household size, gender, marital status, labour market activities, food, and non-expenditure, health, cooking fuel, sanitation, drinking water, electricity, housing conditions, and assets, among others The information contained in the GHS allows us to construct the multidimensional poverty index (MPI) used in the analysis.

To investigate the relationship between intergovernmental transfers and household multidimensional well-being, we obtained intergovernmental transfers data from the National Bureau of Statistics publications on Federation Account Allocation Committee's (FAAC) reports from 2010 to 2016. First, the annual allocations to each state were extracted, and then averaged over each wave period corresponding to the GHS (2010–2011, 2012–2013, and 2015–2016). In addition, we compute the moving average means of intergovernmental transfers for the periods under consideration to take into account the possibility of volatility in transfers. The analysis using the moving average is reported in Table 6.

3.1. Measuring multidimensional well-being

The multidimensional poverty index (MPI) is a direct method to measure poverty that focuses on acute poverty and considers a person's inability to meet minimum international standards in indicators related to basic needs, rights, and functionings or deprivations (Alkire & Santos, 2014; Sen, 1981, 28). This method differs from the indirect or income method that determines whether people's incomes fall below the poverty line by focusing and identifying people who experience overlapping deprivations and fail to meet the accepted conventions of minimum needs or functioning (Sen, 1981). Moreover, using the MPI circumvents some limitations associated with indirect or income measure of poverty such as non-uniform pattern of consumption behavior, in which attaining the poverty line level of income does not guarantee minimum needs; households in the same country may face different prices, which reduce the accuracy of the poverty line; absence of intra-household income distribution of income (Sen, 1981).

We compute an MPI using the same method adopted in Alkire and Foster (2011a), and Alkire and Santos (2014). The method is the weighted sum of three (3) broad dimensions of poverty – health, education, and the living standards of the households. The three broad dimensions are measured using ten (10) indicators. Each dimension was equally weighted and each indicator within a dimension was also weighted equally (Alkire & Foster, 2011a; Alkire & Santos, 2014).

Following Alkire and Foster (2011a, 2011b), and Alkire & Santos, 2014, a household is identified as multidimensionally poor if, and only if, it is deprived in some combination of indicators whose weighted sum is more than 33.33 per cent dimensions. The dimension, indicators and deprivation criteria are explained in Table 1. We computed the *MPI* by multiplying the percentage of poor households (H) by the average proportion of dimensions in which households are deprived (A) as shown below:[5]

$$MPI = H \times A$$

Further, in addition to using MPI, following Bukari, Peprah, Ayifah, and Annim (2021), we estimate a proxy for poverty measure in our analysis as the real total consumption per adult equivalent after adjusting for inflation. The consumption aggregate comprises both food and non-food items such as health care, education, rent, utilities and consumer durables. The results of the analysis are reported in Table 6. From Table 1, a household is considered to have access to improved sanitation if it has a type of flush toilet or latrine or ventilated improved pit or

Table 1. Dimensions, indicators, and weights of the MPI

Dimension	Indicator	Deprived if …	Weight
Health	Nutrition	Any person under 70 years of age for whom there is nutritional information is undernourished	1/6
	Child mortality	Any child died in the family in the five years preceding the survey	1/6
Education	Years of schooling	No household member of 10 years or older has completed six years of schooling.	1/6
	School attendance	Any school-age child is not attending school up to the age at which he/she would complete class 8.	1/6
Living Standards	Cooking fuel	A household cooks with dung, agricultural crop, shrubs, wood, charcoal or coal.	1/18
	Sanitation	The household's sanitation facility is not improved (according to SDG guidelines) or it is improved but shared with other households.	1/18
	Drinking water	The household does not have access to improved drinking water (According to SDG guidelines) or safe drinking water is at least a 30-minute walk (roundtrip) from home.	1/18
	Electricity	The household has no electricity	1/18
	Housing	The household has inadequate housing: the floor is of natural materials or the roofs or walls are of natural or rudimentary materials.	1/18
	Assets	The household does not own more than one of these assets: radio, TV, telephone, computer, animal cart, bicycle, motorbike, or refrigerator, and does not own a car or truck.	1/18

Source: Alkire and Santos (2014).

composting toilet, provided that it is not shared. A household has access to clean drinking water if the water source is any of the following types: pipe water, public tap, borehole or pump, protected well, protected spring or rainwater, and it is within 30 minutes' walk (round trip). The household is deprived if the floor is made of mud/clay/earth, sand, or dung; or if the dwelling has no roofs or walls or if either the roofs or walls are constructed using natural materials such as cane, palm/trunks, sod/mud, dirt, grass/reeds, thatch, bamboo, sticks, or rudimentary materials such as carton, plastic/polythene sheeting, bamboo with mud/stone with mud, loosely packed stones, adobe not covered, raw/reused wood, plywood, cardboard, unburnt brick, or canvas/tent.

3.2. Multidimensional Poverty Index (MPI) and intergovernmental transfers to states

Figure 2 presents the MPI across states, while government transfers (FAAC) to states are presented in Figure 3. The results from the analysis show that MPI is more concentrated in the northern part of Nigeria than the southern part, suggesting that there is lower well-being in the North compared to the South. Also, the level of multidimensional poverty declined over-time as seen in the movement from 2010/2011 to 2015/2016. Per capita intergovernmental transfer varies across states, with the oil-producing states (located in the South–South region) having higher per capita

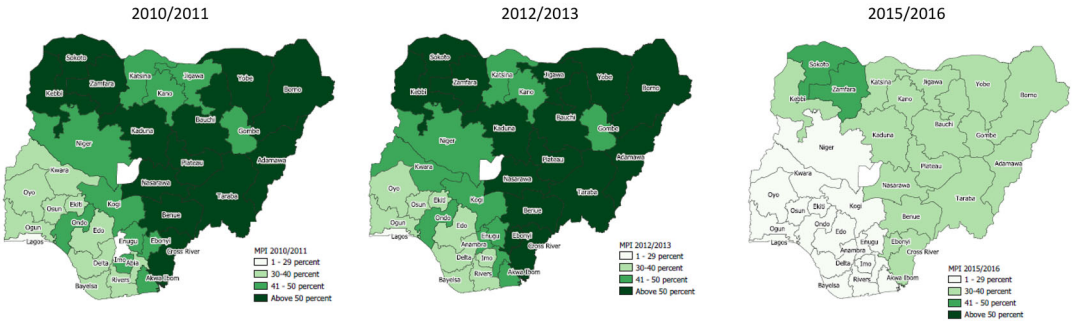

Figure 2. Multidimensional poverty across states (2010–2016).

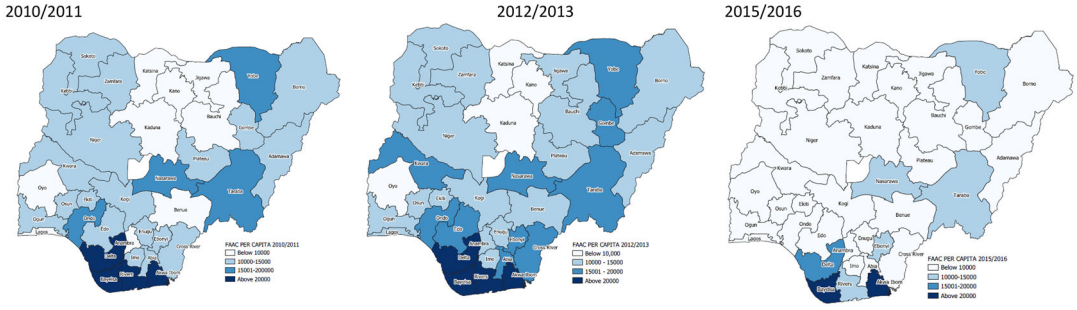

Figure 3. Per capita transfers to states (2010–2016).
Note: maps exclude Federal Capital Territory.
Source: Author's compilation using data from the National Bureau of Statistics and Central Bank of Nigeria.

transfers. Intergovermental transfers improved between 2010/2011 to 2012/2013, largely due to higher oil prices and stable production. Following the crash in international crude oil prices and low oil production in Nigeria, largely due to unrest in the oil producing regions, government revenue was affected negatively and this reduced government transfers to states.

Table 2 presents the summary statistics of the key variables considered in this study. The average MPI was 38.89 per cent during 2010/2011 and 2015/2016. On the average, per capita, government's transfers to subnational units were N13,837. The ruling political party at the federal level controls about 62 per cent of the state government. Urbanization measured by "Night-time Light intensity" ranged between 0.13 and 45.96, with mean and standard deviations of 6.52 and 8.98, respectively. Most of the households have members between the ages of 15 and 60 years, while households have fewer dependents of ages below 5 years and above 60 years, respectively. Males accounted for about 84 per cent of household heads while about 80 percent of the household heads are married.

3.3. Empirical methodology

To examine whether intergovernmental transfers induce a change in household multidimensional well-being, we use the General Household Surveys (GHS) for 2010, 2012, and 2015 matched with intergovernmental transfers to states for the periods that correspond to the GHS data. We estimate the effect of intergovernmental transfers on multidimensional well-being using the equation below:

$$MPI_{hst} = \alpha_0 + \alpha_1 \ln(transfers)_{st} + \alpha_2 X_{hst} + \gamma_r + \delta_t + \varepsilon_{hst} \quad (1)$$

Table 2. Descriptive statistics (2010–2015)

Variable	Mean	Std. Dev.	Min	Max
MPI	38.89	17.39	0.00	100.00
Log of FAAC per capita	13837	11475	2846	84302
Log of conflict events	3.417	1.859	0	9.181
Political party (opposition party = 0)	0.62	0.49	0.00	1.00
Nighttime light intensity	6.52	8.98	0.13	45.96
Number of HH members by age				
Below 5 years	1	1	0	9
6–14 Years	2	2	0	14
15–60 Years	3	2	0	23
Above 60 years	0.4	0.6	0.0	4.0
Sex of household head				
Male	0.84	0.37	0.00	1.00
Marital status of household head				
Married	0.80	0.40	0.00	1.00

Source: Authors' computation using GHS data for Nigeria (waves 2010–11, 2012–13, and 2015–16).

where the MPI_{hst} is Multidimensional Poverty Index for household h in state s at time t. The $transfers_{st}$ are average yearly intergovernmental transfers to state s at time t, X_{hst} denotes vector of households, community, and states covariates. γ_r and δ_t capture region and time fixed effects respectively, and ε_{hst} is the error term. We include the region fixed effects to control for unobserved time invariant heterogeneity that may affect intergovernmental transfers and the multidimensional well-being at the regional level, and the year fixed effects account for unobserved time effects.

One potential problem associated with the estimation of Equation (1) is the non-random allocation of intergovernmental transfers to state governments, which is likely to be correlated with unobserved factors such as political influence or lobbying by state governments, which can affect household well-being. Moreover, transfers may be measured with error and the measurement error in transfers would become part of the error term in the regression Equation (1) above which can lead to endogeneity bias in the OLS estimate of the effect of transfers on well-being. To mitigate this concern, we propose two-stage least squares (2SLS) approach, and we instrument transfers by exogenous variation in oil windfalls. Figures 1 and 4 reveal a strong association between crude oil prices and intergovernmental transfers to states, particularly, the proportion of allocation to oil producing states.

The validity of oil windfalls as an instrument for intergovernmental transfers rests on the following assumptions. First, the results of this study support the relevance assumption, which argues that the endogenous regressor must be correlated with the chosen instrumental variable (or instrument). From the analysis of this study, the relevance of the instrument is tested in the first-stage regression result shown in Table A1 in the Appendix, which shows that the instrument (oil windfalls) is correlated per capita federal allocation to states. The level of statistical significance indicates that the instrument used in the two-stage least square (2SLS)–IV helps predict household multidimensional well-being in the analysis. In addition, weak identification tests show that the instrument used is relevant. We check for the strength of the instrument used in our analysis using the F-statistic. Table A1 in the Appendix shows that the statistic for strength of instrument or Cragg-Donald Wald F statistic is 895.28, which is larger than the threshold of 10 used as the rule of thumb for the strength of instrument. Based on the argument for the exogeneity or orthogonality (exclusion restriction) of the instrument used in the analysis, it is unlikely that the instrument (oil windfalls) directly affects household multidimensional well-being or is correlated with unobserved variables that can affect household multidimensional well-being. However, we are unable to statistically test the assumption for the validity of the instrument used in the analysis. Therefore, the exclusion restriction argument is that the oil

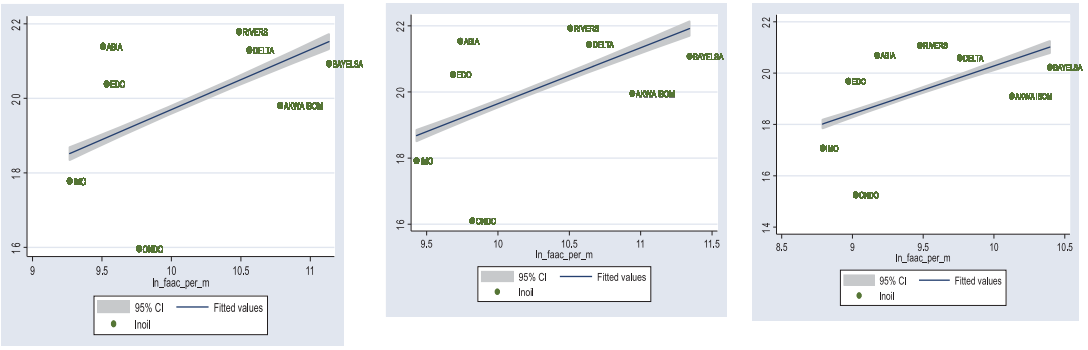

Figure 4. Relationship between government transfers and oil prices.
Source: Author's compilation.
Note: ln_faac_per_m represents the log per capita of government transfers to state in million naira, while lnoil is the log of oil price.

price shocks affect multidimensional well-being exclusively through intergovernmental transfers. We estimate the first-stage regressions as follows:

$$\ln(transfers)_{st} = \beta_0 + \beta_1 oil\ \ windfalls_{st} + \beta_2 X_{hst} + \gamma_r + \delta_t + \varepsilon_{hst} \tag{2}$$

where $transfers_{st}$ are yearly average intergovernmental transfers from the federal government to state, s at time t, $oil\ \ windfalls_{st}$ represents an index for oil windfalls occurring in state s at time t. Following Abidoye and Calì (2021), and, Maystadt and Salihu (2019), oil windfalls are defined as the multiplication of oil production value at the state level in 2003 with the yearly average international oil price at time t[7], which is given as: $oil\ \ windfalls_{st} = P_t^{oil} \times oil_s$. X_{hst} and denotes vector of households, community, and states covariates. γ_r and δ_t capture region and time fixed effects respectively, and ε_{hst} is the error term.

Further, the second assumption for the validity of oil windfalls as an instrument stem from our understanding of the exogeneity or orthogonality of oil windfalls with unobserved factors that can influence household well-being. Our choice of an instrumental variable is based on the identifying assumption that oil windfalls are likely to affect household well-being only through federal revenue allocation or intergovernmental transfers to subnational or state governments. In other words, oil windfalls are unlikely to have direct influence on household multidimensional well-being. So, the correlation between oil windfalls and the error term (ε_{hst}) would be zero. Moreover, oil production value at the state level in 2003 with the yearly average international oil price at time t (oil windfalls) are likely to be exogenous occurring within Nigeria. As reckoned by Abidoye and Calì (2021), and Fenske and Zurimendi (2017), Nigeria accounts for less than 4% of world oil production, hence, oil prices can be considered exogenous in our analysis.

4. Results and discussions

Table 3 presents the OLS regression result which shows the impact of government transfers to sub-national units on multidimensional poverty in Nigeria. The full sample of the result shown in Panels I, II. and III presents the split sample of the Ordinary Least Squares (OLS) regression by the gender (male and female) of the household head, while Panel IV and V show the split sample regression by location (rural and urban).

From Panel I, II, and III, the OLS results show that the federal allocations to subnational governments are not statistically associated with multidimensional poverty in Nigeria. While Panel IV reveals a positive association between federal allocations to subnational governments

Table 3. Impact of government transfers on multidimensional poverty (OLS results)

	Panel I Full sample	Panel II Female headed households	Panel III Male headed households	Panel IV Rural	Panel V Urban
Log of FAAC per capita	0.000 (0.004)	0.011 (0.009)	0.011 (0.009)	0.033*** (0.007)	−0.026*** (0.005)
Log of conflict events	0.004*** (0.001)	0.005*** (0.002)	0.005*** (0.002)	0.005*** (0.001)	0.003*** (0.001)
Nighttime light intensity	−0.008*** (0.001)	−0.007*** (0.001)	−0.007*** (0.001)	−0.006*** (0.001)	−0.007*** (0.001)
Nighttime light intensity squared	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)
Political party (opposition party = 0)	0.001 (0.003)	−0.004 (0.006)	−0.004 (0.006)	−0.007 (0.004)	0.000 (0.003)
Less than 5 years	0.012*** (0.001)	0.025*** (0.004)	0.025*** (0.004)	0.009*** (0.002)	0.013*** (0.001)
6–14 years	0.023*** (0.001)	0.020*** (0.003)	0.020*** (0.003)	0.022*** (0.002)	0.023*** (0.001)
15–60 years	0.003*** (0.001)	−0.001 (0.002)	−0.001 (0.002)	0.004*** (0.001)	0.002*** (0.001)
Above 60 years	0.010*** (0.002)	−0.007 (0.006)	−0.007 (0.006)	0.017*** (0.004)	0.003 (0.003)
Gender of HH (Male = 1)	0.017*** (0.005)			0.011 (0.007)	0.013* (0.007)
Marital status of HH (Married = 1)	−0.002 (0.005)	−0.030*** (0.011)	−0.030*** (0.011)	−0.016** (0.007)	0.007 (0.007)
HH internet	−0.068*** (0.005)	−0.073*** (0.018)	−0.073*** (0.018)	−0.050*** (0.006)	−0.061*** (0.008)
HH member own bank account (yes = 1)	−0.081*** (0.003)	−0.052*** (0.007)	−0.052*** (0.007)	−0.059*** (0.004)	−0.067*** (0.004)
Constant	0.465*** (0.038)	0.382*** (0.088)	0.382*** (0.088)	0.109* (0.062)	0.715*** (0.046)
Observations	10,423	1,651	1,651	3,358	7,065
R-squared	0.490	0.430	0.430	0.474	0.454

Standard errors in parentheses. ***$p < 0.01$; **$p < 0.05$; *$p < 0.1$ denotes 1, 5, and 10% level of significance.

and multidimensional poverty for rural residents, Panel V shows a negative association between federal allocations to subnational governments among urban households. The results in Panel V suggests that the increased federal allocation to sub-national units will reduce multidimensional poverty and improve well-being in Nigeria. The result is plausible even after controlling for gender of the household. The negative impact of federal allocation to sub-national government on multidimensional poverty is in line with our a priori expectation and it is consistent with the findings of Litschig and Kevin (2013). Other variables such as, urbanization (measured by nightlight intensity), number of household members, marital status, household head access to internet facility, ownership of bank account have significant impact on multidimensional poverty.

Further, Table 3 reveals that states with higher conflicts are associated with higher multidimensional poverty. The positive relationship between the level of conflict and multidimensional poverty is plausible, given the extent to which conflict affects socio-economic outcomes in many developing countries. There is no significant relationship between the ruling party of a

state and their level of poverty. This implies that multidimension poverty is not correlated with the type of political party ruling the state. Although the household size has a positive impact on multidimensional poverty, the results show that the households with higher number of dependents will experience lower well-being compared to the household with higher number of non-dependents. Also, there are statistically significant difference between the male headed households and their female headed counterparts in terms of the effect of intergovernmental transfers on well-being.

Table 4 shows the impact of intergovernmental transfers on multidimensional poverty using the 2SLS regression. The results obtained using the 2SLS are dissimilar in some of the Panels in terms of signs and significance when compared to the results obtained using the OLS regression estimates. It is imperative to note that the 2SLS estimate is more robust than the OLS regression as it controls for potential endogeneity between intergovernmental allocations and multidimensional poverty. In Panel I, the results reveal the impact of intergovernmental transfers or allocations on multidimensional poverty in Nigeria, and Panels II–III and IV–V present the impact of intergovernmental allocations on multidimensional poverty in male/female headed households as well as rural/urban households in Nigeria. The results reveal that intergovernmental transfers reduce multidimensional poverty and improves well-being, even after controlling for the gender of the household head and location (urban and rural). Specifically, a percentage increase in intergovernmental transfers will reduce multidimensional poverty by 0.039 percent, with more reduction in the male-headed households than the female-headed. Also, households in urban areas have higher impact of intergovernmental transfers on well-being compared to households in rural areas. This finding is consistent with our a priori expectation and it is in line with the findings of Litschig and Kevin (2013), which noted that intergovernmental transfers reduce poverty in Brazil. Other key determinants of multidimensional poverty (or well-being) include: urbanization, number of dependents, gender of the household head, and household head access to internet facility. Similar to the OLS estimates, there is no significant relationship between the political party dummy and multidimensional poverty in Nigeria.

An important consideration in the empirical analysis of this paper could be the extent to which internal validity and external validity are fulfilled. We can argue for the internal validity of our analysis based on the causal effects of intergovernmental transfers on multidimensional well-being. Using an instrumental variable approach, we limit the possibility of omitted variable bias and establish that the coefficient of intergovernmental transfers is unbiased and consistent in estimating the relationship between intergovernmental transfers and multidimensional well-being. Hence, the threats to internal validity of the results of this paper are likely to be grossly minimized.

Further, the external validity of the findings of this paper stems from our understanding of the specific knowledge of the population and setting studied, and the population of interest. The population in our analysis covers households in Nigeria drawn by the General Household Surveys (GHS). Hence, in our analysis, there is comparability between the population (households in Nigeria) and the setting studied (Nigeria), which leads to threats to external validity being minimized. Another approach to minimize the threat to external validity is by comparing the results of the findings of this paper to other studies in different settings. Finding similar results about the effect of intergovernmental transfers on multidimensional well-being would be evidence of external validity of the findings in this paper. However, we are unable to establish external validity based on this point because, to the best of our knowledge, we find no study that explicitly examine the causal effect of intergovernmental transfers on multidimensional well-being (Stock & Watson, 2019).

4.1. Mechanism or the transmission channels

In this sub-section we unpack the potential channels through which intergovernmental transfers could influence household multidimensional well-being. Using two-stage least squares (2SLS)

Table 4. Impact of government transfers on multidimensional poverty (2SLS results)

	Panel I Full Sample	Panel II Female headed Households	Panel III Male headed Households	Panel IV Rural	Panel V Urban
Log of FAAC per capita	−0.039***	−0.007	−0.041**	−0.071***	−0.077***
	(0.014)	(0.029)	(0.017)	(0.020)	(0.021)
Log of conflict events	0.003***	0.004*	0.003***	−0.000	0.001
	(0.001)	(0.003)	(0.001)	(0.002)	(0.001)
Nighttime light intensity	−0.008***	−0.007***	−0.008***	−0.005***	−0.007***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Nighttime light intensity squared	0.000***	0.000***	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Political party (opposition party = 0)	0.002	−0.003	0.003	−0.005	0.003
	(0.003)	(0.007)	(0.003)	(0.004)	(0.004)
Less than 5 years	0.012***	0.025***	0.010***	0.009***	0.013***
	(0.001)	(0.004)	(0.001)	(0.002)	(0.001)
6–14 years	0.023***	0.020***	0.023***	0.021***	0.023***
	(0.001)	(0.003)	(0.001)	(0.002)	(0.001)
15–60 years	0.003***	−0.000	0.003***	0.005***	0.003***
	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)
Above 60 years	0.009***	−0.007	0.010***	0.017***	0.001
	(0.002)	(0.006)	(0.002)	(0.004)	(0.003)
Gender of HH (Male = 1)	0.017***			0.014*	0.011
	(0.005)			(0.008)	(0.007)
Marital status of HH (Married = 1)	−0.002	−0.031***	0.006	−0.016**	0.007
	(0.005)	(0.011)	(0.006)	(0.007)	(0.007)
HH internet	−0.067***	−0.073***	−0.063***	−0.050***	−0.056***
	(0.005)	(0.018)	(0.005)	(0.006)	(0.008)
HH member own bank account (yes = 1)	−0.081***	−0.053***	−0.086***	−0.061***	−0.067***
	(0.003)	(0.007)	(0.003)	(0.004)	(0.004)
Constant	0.827***	0.551**	0.858***	1.076***	1.196***
	(0.135)	(0.267)	(0.156)	(0.184)	(0.195)
Observations	10,423	1,651	8,772	3,358	7,065
R-squared	0.486	0.428	0.493	0.435	0.446

Standard errors in parentheses. ***$p < 0.01$; **$p < 0.05$; *$p < 0.1$ denotes 1, 5, and 10% level of significance.

regression, we explore the relationship between intergovernmental transfers and capital and recurrent expenditures across states. The data on capital and recurrent expenditures are obtained from the Central Bank of Nigeria (CBN) Annual Statistical Bulletin. Table 5 presents the effect of intergovernmental transfers to subnational governments on capital and recurrent expenditures.

Consistent with the literature (Bergvall, Charbit, Kraan, & Merk, 2006), the results support our a priori expectation on the mechanisms of how federal allocations and subnational units affect government expenditure which would in turn influence multidimensional poverty and well-being. In Column 1 and 2, the results reveal positive coefficients of both recurrent and capital spending which suggest that higher government transfers would increase sub-national spending, especially capital expenditure. Specifically, a percentage increase in intergovernmental allocations to sub-national units will increase recurrent spending by 1.364 per cent and capital

Table 5. Intergovernmental allocations and subnational government expenditures (2SLS results).

Variables	(1) Capital expenditure	(2) Recurrent expenditure
Log of FAAC per capita	1.364***	0.562***
	(0.023)	(0.013)
Log of conflict events	0.045***	0.019***
	(0.004)	(0.002)
Nighttime light intensity	−0.029***	−0.011***
	(0.002)	(0.001)
Nighttime light intensity squared	0.001***	0.000***
	(0.000)	(0.000)
Political party (opposition party = 0)	0.302***	−0.117***
	(0.016)	(0.009)
Less than 5 years	0.025***	−0.002
	(0.007)	(0.004)
6–14 years	0.003	−0.002
	(0.005)	(0.003)
15–60 years	0.013***	−0.003
	(0.004)	(0.002)
Above 60 years	0.044***	−0.029***
	(0.013)	(0.007)
Gender of HH (male = 1)	0.077**	0.001
	(0.030)	(0.017)
Marital status of HH (married = 1)	−0.092***	0.001
	(0.028)	(0.016)
HH internet	0.050*	−0.032**
	(0.027)	(0.015)
HH member own bank account (yes = 1)	−0.074***	0.013
	(0.016)	(0.009)
Constant	−4.474***	3.926***
	(0.212)	(0.119)
Observations	7,108	7,108
Centered *R*^2	0.628	0.527

Notes: Standard errors in parentheses. ***$p < 0.01$; **$p < 0.05$; *$p < 0.1$ denotes 1%, 5% and 10% level of significance.

expenditure by 0.562 per cent. This suggests that sub-national governments spend more on capital expenditure for every unit increase in federal allocation to sub-national units. The spending on both capital and recurrent expenditure could transmit to lower poverty outcomes and improve well-being. By implications, these findings lend credence to some cross-country studies that found a negative relationship between government and poverty or income inequality (Anderson, Jalles D'Orey, Duvendack, & Esposito, 2017; Chu, Davoodi, & Gupta, 2000; Doumbia & Kinda, 2019; Fournier & Johansson, 2016).

Given the relationship between intergovernmental transfers and government spending (capital and recurrent expenditures), our findings suggest that intergovernmental transfers are linked to government spending, which has implications for the reduction of multidimensional well-being in Nigeria. Our findings, therefore, make a case for the need to increase intergovernmental transfers to sub-national governments by encouraging or promoting improved revenue generation or diversification by both the central and subnational governments.

4.2. Robustness check

Table 6 conduct robustness check using moving average of intergovernmental transfers and per capital expenditure (as a proxy for poverty) using 2SLS approach. The results reveal that an increase in intergovernmental transfers leads to a decline in multidimensional poverty, which

Table 6. Intergovernmental transfers and household well-being (2SLS)

	MPI	Log of per capita expenditure
Log of FAAC per capita (moving average)	−0.765*	0.393**
	(0.946)	(0.215)
Log of conflict events	0.664**	0.008**
	(0.092)	(0.015)
Nighttime light intensity	−0.828*	0.043*
	(0.088)	(0.006)
Nighttime light intensity squared	0.014	−0.001
	(0.002)	(0.000)
Political party (opposition party = 0)	0.100	−0.058
	(0.356)	(0.019)
Less than 5 years	1.189	0.139*
	(0.118)	(0.009)
6–14 Years	2.294	0.119*
	(0.098)	(0.005)
15–60 Years	0.310*	0.106*
	(0.071)	(0.005)
Above 60 years	0.950	0.144*
	(0.192)	(0.014)
Gender of HH (male = 1)	1.679**	0.192**
	(0.450)	(0.042)
Marital status of HH (married = 1)	−0.016*	−0.293**
	(0.440)	(0.041)
HH internet	−6.893*	−0.227**
	(0.446)	(0.031)
HH member own bank account (yes = 1)	−8.012*	0.329
	(0.275)	(0.020)
Residual	−3.83*	−0.122*
	(1.253)	(0.240)
Year dummies	Yes	Yes
Region dummies	Yes	Yes
Number of observations	10,423	10,423
R-squared	0.733	0.733

Standard errors in parentheses. ***$p < 0.01$; **$p < 0.05$; *$p < 0.1$ denotes 1, 5, and 10% level of significance.

reflect an improvement in well-being. This result is qualitatively similar to that which is obtained in Table 3.

Further, from Table 6, we estimate the effect of intergovernmental transfers on household real per capita expenditure (proxied as poverty). The result reveals that an increase in intergovernmental transfers lead to an increase in household per capita expenditure, which implies a decline in household poverty.

5. Conclusion and policy recommendations

This paper exploits variation across states in federal revenue allocation and examines its impact on household multi-dimensional well-being in Nigeria using data from the General Household Surveys 2010–2016 combined with the Federal Accounts Allocation Committee reports. To mitigate the concerns of endogeneity of intergovernmental transfers, we adopt an instrumental variable approach, and we use exogenous variation in oil windfalls as an instrument for intergovernmental transfers.

We find that an increase in intergovernmental transfers leads to an improvement in household multidimensional well-being. We identify capital expenditure and recurrent expenditure as

some of the potential channels through which federal revenue allocation to sub-national governments affect household multidimensional well-being. The findings of this paper have some interesting implications. Federal revenue allocation to subnational governments is negative and causally related to households' Multidimensional Poverty Index in Nigeria. Moreover, our results reveal that a percentage increase in intergovernmental transfers will lead to a reduction in multidimensional poverty (an improvement in household well-being), with more reduction in male headed households and households in urban areas.

We contribute to the existing literature on the impact of intergovernmental transfers on poverty by exploiting an exogenous variation in oil windfalls as an instrument for federal revenue allocation to sub-national governments. The main finding of our paper is similar to Litschig and Kevin (2013), who notes that intergovernmental transfers reduce poverty in Brazil, using Regression Discontinuity Design (RDD).

The positive correlation between international oil prices and intergovernmental transfers implies that the well-being of households in oil dependent economy like Nigeria is likely to be tied to fluctuations in oil prices, which is beyond the control of the central government. This implication brings into consideration the need for diversification from oil dependency to stable sources of revenue by the central government.

Notes

1. Intergovernmental transfers can be designed to correct for the imbalance between the expenditure responsibilities of subnational governments and their revenue raising powers (Bahl, 2000).
2. A few studies reveal a positive relationship between intergovernmental transfers and schooling and literacy rates, and reduction in poverty (Litschig et al., 2013; Brollo, Nannicini, Perotti, & Guido Tabellini, 2013).
3. Whilst the president is constitutionally allowed to seek re-election for another period of 4 years at the expiration of the first term in office, the legislatures can seek re-election multiple times.
4. https://eiti.org/es/implementing_country/32; https://africacheck.org/reports/nigerias-economy-services-drive-gdp-but-oil-still-dominates-exports/
5. We conducted further analysis by comparing three alternative weighting structures such as a 25–50% weight on each dimension. The results obtained suggest that the multidimensional poverty index (MPI) ranking is robust to changes in weights. The results are not reported but are available upon request.
7. The data were obtained from Abidoye and Calì (2021).

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Appendix

Table A1. First stage regression result: transfers and well-being

Dependent variable	Log of FAAC per capita
Oil windfalls	0.018***
	(0.001)
Log of conflict events	−0.045***
	(0.002)
Political party (opposition party = 0)	0.001
	(0.006)
Nighttime light intensity	0.011***
	(0.001)
Nighttime light intensity squared	0.000***
	(0.000)
Less than 5 years	−0.004
	(0.003)
6–14 years	0.000
	(0.002)
15–60 years	0.004***
	(0.002)
Above 60 years	−0.020***
	(0.005)
Gender of HH (male = 1)	−0.005
	(0.012)
Marital Status of HH (married = 1)	0.005
	(0.012)
HH internet	0.023***
	(0.011)
Household member own bank account (yes = 1)	−0.012**
	(0.007)
Constant	9.177***
	(0.007)
Year dummies	Yes
Region dummies	Yes
Cragg-Donald Wald F statistic for weak identification test	895.28

Note: Standard errors in parentheses; ***$p < 0.01$; **$p < 0.05$; *$p < 0.1$ denotes 1% level of significance, 5% level of significance, and 10% level of significance, respectively.