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Synopsis: Subnational public expenditures, short term household level welfare, and economic resilience

Evidence from Nigeria*

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This study estimates the effects of the shares of subnational public expenditure (PE) for agriculture, health, education, and social-welfare, as well as PE-size, on household-level outcomes, using nationally representative panel household data and district and state-level PE data for Nigeria. We find that greater shares of total PE allocated to agriculture, health, and social-welfare, conditional on PE-size, generally have positive effects on household consumption levels, poverty reduction, and non-farm business capital investments by households. A greater share of total PE for agriculture also positively benefits household dietary diversity across seasons. Moreover, household economic resilience, measured in terms of the economic flexibility a household has to shift between farming and non-farm activities, is more greatly enhanced through greater shares of total PE going towards agriculture than to health and social-welfare. These multi-dimensional benefits of greater PE for agriculture are particularly worthy of attention in countries, like Nigeria, which have historically allocated a low share of total PE to agriculture.

Background

Public expenditures by governments remain an important instrument for carrying out key public sector functions that contribute to achieving many human welfare goals and for the mitigation of market failures. Together with social-sector PE (such as health, education, social-welfare), PE for agriculture, including subnational PE, has been considered critical for economic and food systems development.

However, direct evidence of the impact of subnational PE on household-level development and welfare outcomes in developing countries is relatively limited. This study aims to help fill this evidence gap by using data from Nigeria on PE in the social sectors of health, education, and social welfare

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and in agriculture by both state and lower-level local government areas (LGA) over time. The administrative data is coupled with nationally representative household-level panel data (Living Standard Measurement Study – Integrated Survey on Agriculture, LSMS-ISA) to estimate the effects of PE on various household-level development outcomes, including consumption, poverty, private investment levels, and dietary diversity. We also estimate the effects of PE on the economic flexibility of households in their ability to switch between non-farm activities and farm activities, an indicator of household economic resilience.

Subnational public expenditures in Nigeria

Table 1 provides descriptive statistics of annual total PE as well as the percentage shares of total PE allocated to agriculture, health, education, and social welfare, respectively, for the LGAs and states in which are found LSMS-ISA sample households. To facilitate interpretation and to account for regional differences in prices, total PE figures are expressed on a per capita basis as the equivalent quantity of staple food (an average of rice and gari) in kg evaluated at their local prices – the average recurrent expenditures by the LGAs in which the sample households resided in the years of the LSMS-ISA panel survey rounds was equivalent in value to 56.6 kg of staple food per capita per year. Mean values are also often considerably higher than median values, suggesting skewed distributions. The shares of total PE are generally higher for education, followed by health. Shares for social-welfare are generally lower, while those for agriculture are often the lowest.

Table 1. Descriptive statistics of public expenditure variables among all households, average over the three years leading up to each wave of Nigeria LSMS-ISA survey

Public Expenditure Variables	Recurrent expenditure			Capital expenditure			Total expenditure		
	Mean	Median	Std. dev.	Mean	Median	Std. dev.	Mean	Median	Std. dev.
Local Government Areas (LGA)									
Total (value per capita)	56.65	46.36	48.83	27.30	18.77	35.81	83.95	69.67	67.64
Agriculture (% share)	3.05	1.96	3.42	2.97	1.11	5.97	3.07	1.85	4.12
Health (% share)	9.42	7.47	7.11	4.41	2.86	4.88	7.57	6.27	5.35
Education (% share)	21.10	19.80	16.63	5.69	3.46	7.03	17.07	16.01	11.77
Social welfare (% share)	5.06	3.29	5.59	0.00	0.00	0.00	3.44	2.20	3.81
States									
Total (value per capita)	71.99	64.58	42.92	57.22	44.92	46.84	129.21	112.59	75.76
Agriculture (% share)	3.37	2.40	3.20	5.27	3.21	7.43	3.97	3.26	3.50
Health (% share)	6.82	6.17	4.85	5.86	4.37	5.35	6.15	5.71	3.56
Education (% share)	9.95	9.34	6.45	8.70	7.51	6.92	9.13	8.66	5.16
Social welfare (% share)	6.84	5.34	5.65	2.72	0.00	7.63	3.99	2.90	3.63

Source: Authors, based on Nigeria, Federal Ministry of Finance (2015) and LSMS-ISA (NBS and World Bank 2016, 2019) data.
Note: Sample size (all waves combined) = 14,502. "Value" is the value in kilograms of staple food evaluated at local market prices. Recurrent and capital expenditures may not add up to total expenditures due to rounding of decimals. Total expenditures include a small share of other categories that are neither recurrent nor capital.

Effects of subnational public expenditures on development outcomes and economic resilience

Our results show that a higher share of total PE for agriculture has statistically significant positive effects on household consumption, poverty reduction, business capital investments, and dietary diversity across seasons (Table 2). In contrast, higher shares of total PE for health and social welfare have weaker effects on these outcomes, while those for education have no statistically significant effects. Increasing PE-size generally has positive effects on these outcomes – in developing countries like Nigeria, greater PE is generally associated with greater development. The only outcome with a negative effect for increased PE-size is dietary diversity in the post-planting season, but the magnitude is small.

Table 2. Effects of public expenditure share and size on household-level outcomes, full household sample

Outcome variables	PE shares for each sector (effects of 1 percentage point increase)				PE size (effects of 1 % increase)
	Agriculture	Health	Education	Social welfare	
Consumption per capita (% change)	4.263*** (1.437)	9.029*** (1.803)	0.752 (0.489)	13.770*** (1.239)	1.397*** (0.068)
Above poverty line of 1.00 international PPP dollars per day per capita (percentage point change in population share)	0.684** (0.342)	1.286*** (0.285)	0.072 (0.121)	2.063*** (0.273)	0.213*** (0.013)
Above poverty line of 1.90 international PPP dollars per day per capita	-0.037 (0.429)	1.314*** (0.323)	0.082 (0.165)	1.916*** (0.356)	0.173*** (0.017)
Above poverty line of 3.20 international PPP dollars per day per capita	0.250 (0.351)	0.916*** (0.311)	-0.247 (0.164)	1.291*** (0.324)	0.144*** (0.016)
Above poverty line of 5.50 international PPP dollars per day per capita	0.345* (0.207)	0.429** (0.210)	0.069 (0.124)	-0.012 (0.246)	0.065*** (0.012)
Non-farm capital (% change)	4.248** (2.111)	5.843*** (1.732)	-0.044 (0.833)	7.989*** (1.657)	0.894*** (0.089)
Household dietary diversity score in post-planting season (change in score)	0.029* (0.017)	0.017* (0.010)	-0.014* (0.007)	0.000 (0.015)	-0.002*** (0.001)
Household dietary diversity score in post-harvesting season (change in score)	0.039*** (0.014)	-0.019** (0.009)	-0.004 (0.007)	-0.015 (0.012)	0.000 (0.001)

Source: Authors' calculations. Asterisks indicate the statistical significance: *** 1%; ** 5%; * 10%.
Note: Sample size = 14,502. Asterisks show statistical significance: *** 1%; ** 5%; * 10%. Numbers in parentheses are standard errors. PE = public expenditures. "PE shares" indicates the effects of increasing the share of total PE while fixing the PE size. "PE size" refers to the effects of increasing the PE size while fixing the shares of total PE for agriculture, health, education, and social welfare.

These effects are partly realized through improvements in agricultural outcomes (Table 3). A one percentage point greater share of total PE allocated to agriculture leads to a 2.56 percent increase in household agricultural revenue, 4.75 percent lower agricultural production costs (and thus higher agricultural profit), 1.20 percentage point higher likelihood of receiving agricultural extension services, 3.37 percent greater value of agricultural capital, and 3.95 percent increase in labor use and employment in agricultural production.

Table 3. Effects of public expenditure share and size on household-level agricultural outcomes, agricultural households only

Outcome variables	PE shares for each sector (effects of one percentage point increase)				PE size (effects of 1 % increase)
	Agriculture	Health	Education	Social welfare	
Agricultural revenue (% change)	2.557* (1.342)	0.101 (0.726)	-1.028 (0.667)	-0.740 (1.314)	0.073 (0.074)
Agricultural cost (% change)	-4.751** (2.392)	3.849** (1.770)	-4.086*** (1.153)	5.992** (2.968)	0.371*** (0.135)
Receive subsidized fertilizer (yes = 1)	-0.143 (0.184)	-0.172* (0.103)	-0.434*** (0.122)	-0.253 (0.176)	0.040*** (0.013)
Received extension service (yes = 1)	1.203** (0.498)	-0.209 (0.202)	0.197 (0.165)	0.559 (0.347)	0.009 (0.016)
Agricultural capital investments (% change)	3.368*** (1.119)	1.343* (0.723)	0.031 (0.558)	-3.208** (1.280)	0.051 (0.061)
Labor use in agriculture (% change)	3.953*** (1.206)	0.234 (0.739)	-0.819 (0.630)	-1.858 (1.392)	0.467*** (0.094)

Source: Authors' calculations.
Note: Sample size = 10,091. Asterisks show statistical significance: *** 1%; ** 5%; * 10%.

Table 4 summarizes the effects of the shares of total PE for agriculture, health, education, and social-welfare on household flexibility in shifting between farming and non-farm activities. For example, the first row compares the top 80 percent experiencing an increase in share of total PE between the 2008-10 and 2013-15 periods, with the bottom 20 percent experiencing declines in

these shares of total PE. We see that the 80 percent of households in areas where the share of total PE for agriculture relatively increased (or decreased less), experienced a net increase of 2.07 in the flexibility indicator, compared to the remaining 20 percent of households. These results hold consistently for a range of thresholds and are consistent with the hypothesis that increasing the share of total PE for agriculture helps households retain flexibility in shifting between farming and non-farm activities. In contrast, the effects of share of total PE for health, education, or social-welfare on a household's economic flexibility are all statistically insignificant.

Table 4. Effects of public expenditure shares on flexibility of a household shifting between farm and non-farm income-earning activities

Share of sample below threshold of change in share of total PE for the corresponding sector between waves 1-2 and 3-4	Effects of changes in share of total PE for each sector on changes in the flexibility index			
	Agriculture	Health	Education	Social welfare
20%	2.072* (1.143)	0.930 (3.313)	-0.361 (1.051)	-0.088 (0.930)
30%	1.326 (0.857)	1.510 (2.483)	-0.656 (1.076)	-0.289 (1.227)
40%	3.206** (1.430)	1.661 (1.685)	-1.648 (1.763)	-0.341 (1.268)
50%	1.482* (0.886)	1.760 (2.164)	-0.768 (1.398)	-0.824 (1.264)
60%	1.433* (0.877)	1.524 (2.050)	-0.450 (1.275)	-0.578 (1.644)
70%	2.455** (1.160)	1.107 (1.696)	-0.461 (1.098)	-0.117 (0.890)
80%	1.845* (1.038)	1.907 (1.450)	-1.306 (1.330)	-0.177 (0.923)

Source: Authors' calculations. Numbers in parentheses are standard errors. Asterisks indicate statistical significance: *** 1%; ** 5%; * 10%.

Conclusions

The findings of this research underscore the importance of increasing PE for agriculture in Nigeria. A higher share of total PE for agriculture has more pronounced positive effects on poverty reduction, consumption, private investment, dietary diversity, and economic resilience than do higher shares of total PE for health and social-welfare. Such multi-dimensional benefits of higher PE for agriculture are particularly worthy of attention in countries like Nigeria, which have historically allocated a low share of total PE to agriculture.

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