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Public Expenditure on Agriculture, Youth Out-migration, and Engagement in Agriculture?

Evidence from Nigeria

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Abstract

Theoretical models posit that migration decisions are driven by differences in economic opportunities across locations, including across rural and urban areas, which implies that increased rural investment can curb rural-urban migration and encourage engagement in agriculture. However, direct empirical evidence of this remains scant, especially on youth migration in Africa. We fill this knowledge gap by examining the effect of temporal changes in public expenditures for the agriculture sector (PEA) on rural youth's migration and engagement in rural economies in Nigeria. We combine unique subnational data that capture PEA's spatiotemporal variations and individual level youth data and estimate two-way fixed effects models. We find that a 1 percentage point increase (equivalent to a 25 percent increase) in the share of PEA, is associated with up to 0.9 percentage points reduction in youth's out-migration. Conversely, an increase in PEA leads to increased youth engagement in farm activities. Our results suggest that public investments in rural economies can mitigate youth out-migration from rural areas. These results have important implications for informing youth and migration policies, especially in the context of Africa, often characterized by its youth bulge and the exodus of youth from rural areas because of perceived lack of economic opportunities.

Keywords: Internal migration, youth, subnational public expenditures on agriculture, panel data, two-way fixed effects models, Nigeria

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1. Introduction

Canonical models of migration attribute migration decisions as responses to the geographical distribution of economic activities and opportunities, as wealth and economic opportunities are unequally distributed across space (for example, Harris and Todaro 1970; Gollin et al. 2016). While the seminal work by Harris and Todaro (1970) posits migration as a response to (actual or perceived) wage differentials between two locations, rural and urban, recent extensions account for additional factors, including liquidity constraints, risk and uncertainty, and heterogenous returns to migration (e.g., Rapoport 2002; Bryan et al. 2014; Dustmann and Okatenko 2016; Christiaensen et al. 2019; De Weerdt et al. 202; Fried and Lagakos 2021; Lagakos et al. 2023). The implications of these factors are likely to vary across different types of migration: internal versus international as well as rural-urban migration (Amare *et al.* 2021; Malchow-Møller *et al.* 2013). In particular, internal migration, which refers to the movement of people within the borders of a particular country, can quickly respond to changes to attributes that affect one or more of the above factors.[1]

Most importantly, changes in economic opportunities in origin or potential destination geographies are likely to affect migration decisions and choice of potential destinations as well as labor allocation across geographies and sectors of economies. Given that much of the internal migration happening in developing countries, especially in Africa, entails rural-urban migration[2], an increase in economic opportunities in urban areas is more likely to attract migrants; conversely, corresponding increase in rural economies is likely to reduce rural-urban migration. While the impact of pull factors such as urbanization and push factors related to lack of rural employment opportunities, low agricultural productivity, and stagnant rural growth are argued to encourage

[1] Internal migration patterns within a country could be from rural to urban areas, as well as between rural areas and from urban to rural areas. The observed patterns of migration in a particular country appear to be influenced by the country's stage of development, as originally proposed by Zelinski (1971) in the field of human geography.

[2] In some cases, individuals or families may migrate from urban areas to rural regions. This could be motivated by a desire for a quieter lifestyle, lower living costs, or a return to rural roots. The migration from urban to rural areas is a growing trend in developed nations (Takahashi et al. 2021). This movement is often driven by a desire to escape crowded cities and embrace the allure of rural living. The COVID-19 pandemic may have intensified this phenomenon, potentially leading to an even greater influx of individuals seeking a rural lifestyle (Takahashi *et al*. 2021). Migration can also occur between different urban areas. People may move from smaller towns or cities to larger metropolitan areas, often in pursuit of higher-paying jobs, better infrastructure, and a more dynamic lifestyle.

rural-urban migration (e.g., Amare et al. 2021; Chamberlin et al. 2021; Amare et al. 2023)[3], empirical evidence on the impact of investment in rural economies on youth migration remains scant. Although many governments in Africa have invested in major rural development programs meant to create economic opportunities for rural youth (for example, Abay et al. 2024), rigorous evaluation of their potential remains missing.

Understanding the potential of public policies to shape migration patterns is particularly important in the context of Africa, where many countries are struggling to absorb the ever increasing "youth bulge" that enters the labor market every year (African Development Bank, 2016; Sumberg et al.2021).[4] Because of the push and pull factors described above, many argue about the prevalence of (or potential for) exodus of youth from rural areas in Africa (for example, Davis et al. 2017; Yeboah and Jayne 2020). Among the major push factors of youth out-migration, the lack of investments and opportunities in African agriculture is argued to have made agriculture "risky and unattractive" to sub-Saharan African youth (e.g., Chamberlin et al. 2021).

This study seeks to provide empirical evidence on the effect of increased public expenditures (PE) for the agriculture sector (PEA) on youth out-migration decisions and engagement in agriculture in Nigeria. We use unique disaggregated PE data from Nigeria to quantify the implication of public investment in rural economies, mainly in the agriculture sector, on youth out-migration and youth engagement in agriculture. These unique panel data allow us to exploit temporal variation in PEA and hence quantify the potential of fiscal instruments to curb youth out-migration and encourage youth engagement in agriculture.

Nigeria offers an interesting case for this analysis for many reasons. Nigeria hosts the largest youth population, as well as the largest arable land, in Africa South of the Sahara (SSA). Although African countries, including Nigeria, committed to allocate at least 10% of their national budget to agriculture and rural development through the Comprehensive Africa Agriculture Development Programme (CAADP) promoted by the African Union (Au), most countries have failed to achieve this target. Indeed, Nigeria is among the countries with the lowest share of PE allocated to PEA, despite the sector's considerable potential. For example, Nigeria's overall PEA

[3] Other push factors—including economic destitution, restricted access to social support, depletion of natural resources, and the negative effects of climate change and environmental degradation—force many migrants to relocate (Chamberlin *et al.* 2021; Kosec *et al*. 2018).

[4] Every year about 12 million people enter the labor market in Africa, while the formal economies on the continent only generate about 3 million jobs (African Development Bank, 2016).

share to PE has been typically around 2% in recent years, despite the agricultural sector accounting for 22% of GDP (ReSAKSS Africa 2025; World Bank 2025), making the potential roles of increased PEA particularly worthy of investigation relative to PE in other sectors that have received greater shares of allocations over the years in Nigeria.[5] At the same time, the country faces high youth unemployment rates, and youth migration has become a growing concern, attracting significant policy attention. For the agriculture sector, public investments, including those by local governments, are particularly important factors affecting the underlying economic conditions driving migration. The agriculture sector in developing countries tends to be associated with various market failures that, in many cases, can only be addressed by the public sector. In addition, returns to investment in the agriculture sector are associated with greater risks due to its dependency on climate and weather conditions (for example, Herdt 2010), as well as long gestation periods associated with technological advancement (Evenson and Westphal 1995), and only the public sector can tolerate such risk. As such, the role of public investment in agriculture in influencing migration patterns becomes potentially significant.

Addressing the knowledge gap regarding the effects and potential of public investments in agriculture to curb rural-urban migration, particularly that of subnational public investments, is crucial given that many subnational governments in Africa face competing needs for limited public resources. In many African countries with often limited state capacity of the central government, decentralized investments implemented by local governments can have greater effects on the welfare of rural populations (for example, Archibong 2019). In large African countries like Nigeria (home to the largest pool of youth on the continent), significant shares of public investments for various sectors of the economy are in fact disbursed at local district levels, rather than by the central government (e.g., Mogues and Benin 2012).

We find that a 1 percentage point increase (equivalent to a 25 percent increase) in the share of PEA is associated with up to a 0.9 percentage points reduction in youth out-migration. Similarly, an increase in the level of investment in agriculture is associated with a modest reduction in youth out-migration rates. These impacts are consistent across different types of internal migration, with

[5] The PEA share in Nigeria is also much lower than the commitment pledged by Nigeria and other SSA countries, The low PEA share in Nigeria also stands in contrast to some other countries in which similar linkages between migration and public investments in the nonagricultural sector are studied, such as India (Asher and Novosad 2020) where PEA shares have remained about 7% even though agricultural sector share of GDP is below that of Nigeria (18%), and Brazil (Morten and Oliveira 2024) where the agricultural sector share to GDP has already dropped to 5% or less in recent years (FAO 2025; World Bank 2025).

the impacts being higher for rural-urban migration. Conversely, we find that an increase in the share of PEA is associated with increased youth engagement in farm activities. We also find some important heterogeneities across demographic and socioeconomic attributes. The impacts are larger for male and more educated youth, implying that those investing heavily in education and preparing for urban labor markets are not likely to be attracted by an increase in economic opportunities in rural economies.

Our findings offer important lessons that can inform youth and migration policies in Africa. The results are particularly encouraging for African countries such as Nigeria that are underinvesting in their agriculture while also facing the youth bulge that most service and manufacturing sectors in Africa are unable to absorb. Indeed, our findings show that satisfying the 10 percent CAADP commitment can serve multiple purposes in countries such as Nigeria, where agriculture holds significant potential, despite the disappointingly low investment in the sector. However, we also note that for countries such as Nigeria that are lagging far behind the CAADP commitment, this will require a significant boost in investment in the agriculture sector and in the rural economy.

This paper contributes to at least two strands of literature aiming to explain rural-urban migration decisions. The first strand relates out-migration decisions to access to land and related tenure security (e.g., de Brauw and Mueller 2012; Kosec et al. 2018; Amare et al. 2024). These studies show that youth's out-migration rates are closely linked with their expectations about access to land in rural economies. The second strand of literature studies the role and potential of public investment in agriculture and rural development on migration and intersectoral labor allocation (e.g., Matsuyama 1992; Bustos et al., 2016; Lanati and Thiele 2018).

The remainder of this paper is structured as follows. Section 2 describes the data and descriptive results. Section 3 describes empirical strategy. Section 4 presents and discusses results. Lastly, section 5 concludes.

2. Data and Descriptive Results

2.1. Data on individual youth migration decisions

Data on individual youth migration decisions are obtained from three waves of panel household surveys. These household surveys come from the Living Standards Measurement Study-Integrated Surveys on Agriculture (LSMS-ISA), collected by the National Bureau of Statistics of Nigeria

(NBS) and the World Bank. We use three waves of data collected in 2010/2011 (wave 1), 2012/2013 (wave 2), and 2015/2016 (wave 3), which consist of panel data from 5,000 nationally representative households.[6] These 5,000 households were reinterviewed in waves 2 and 3. From these household data, we focus on 13,025 youth members aged between 15 and 35, pooled across all three waves.[7]

2.2. Public expenditure data[8]

The aforementioned longitudinal household surveys and migration spells of individual household members are then merged with the LGA-level PE data, based on the LGAs in which these households and youth members resided (and/or originated if migrating out). Initially, the LGA-level annual PE data for all of Nigeria's 774 LGAs were obtained from annual statistical bulletins and reports from the Central Bank of Nigeria and from annual surveys conducted jointly by the Federal Ministry of Finance, the Central Bank of Nigeria, NBS, and the Nigerian Communications Commission for the period 2008 to 2015 (Government of Nigeria 2016). Out of PE data for the 774 LGAs, data for 704 LGAs in which LSMS-ISA household samples are collected are used for the analyses.

Overall, PE data are broadly categorized by functions (economic affairs, as well as general public services, defense, public order and safety, environmental protection, etc.), and PE for agriculture is classified as a subcomponent under the "economic affairs" function. It is recorded as an aggregate single category "Agriculture, Forestry, Fishing & Hunting", PE for agriculture reports the aggregate value of spending across all projects related to agriculture, forestry, and fisheries following the Government Finance Statistics Manual (IMF 2001).[9] While the exact

[6] These 5,000 households were selected through multistage random sampling, which involved a random selection of about 500 enumeration areas (EAs), after which 10 households were randomly selected from each of the 500 EAs.
[7] This definition follows the African Union Youth Charter (African Union, 2006).
[8] Description in this subsection is largely taken from Takeshima et al. (2022, Section 2).
[9] According to the Government Finance Statistics Manual developed by the International Monetary Fund (2001), the type of PE classified under agriculture, forestry, and fisheries expenditures typically includes (Fan and Saurkar 2012, p.23-25): administration of agricultural affairs and services; conservation, reclamation, or expansion of arable land; agrarian reform and land settlement; supervision and regulation of agricultural industries; construction or operation of flood-control, irrigation, and drainage systems, or grants, loans, or subsidies for such work; operation or support of programs or schemes to stabilize or improve farm prices and farm incomes; operation or support of extension services or veterinary services to farmers, pest-control services, crop inspection services, crop grading services; production and dissemination of general information, technical documentation, and statistics on agricultural affairs and services; compensation, grants, loans, or subsidies to farmers in connection with agricultural activities, or payments for restricting or encouraging output of a particular crop, or for allowing land to remain uncultivated.

classifications of PE varied considerably over the years, the agriculture sector was categorized consistently for all years of the study period, allowing us to include it in our panel data analyses.

2.3. Variables and measurements

2.3.1. Key outcome variables

This paper focuses on internal migration, specifically examining the migration decisions of youth, defined as individuals aged 15 to 35 years, in accordance with the African Union's Youth Charter (UN 2014).[10] Our focus on youth is driven by the fact that they tend to have higher mobility, making them more likely to be influenced by the characteristics of potential destination areas. Our key outcomes focus on youth migration and youth employment decisions.

Youth migration decisions

We adopt a broad definition of migration that encompasses any form of mobility, regardless of reason or destination. Specifically, we define the migration activity of each interviewed individual as a binary variable, taking the value of 1 in round $t+1$ if the individual was present in the surveyed household in round t but was either nonresident in the same household in round t+1 or absent for at least one month during the 12 months preceding round t+1. This definition excludes absence due to death and relocation within the same village. Using this general definition of migration, our analyses focus on migration in three different forms. First, we categorize migration based on the distance between the origin and destination. *Short-distance migration* is a binary variable indicating if the individual is a migrant (according to the aforementioned definition) whose destination is in the same state as the origin. *Long-distance migration* is a binary variable indicating if the individual is a migrant whose destination is outside the origin state.

Second, we also categorize migration based on the urban and rural status of origin and destination. *Rural-rural migration* is a binary variable indicating if the individual is a migrant whose origin and destination are both in rural areas. *Rural-urban migration* is a binary variable indicating if the individual is a migrant whose origin is a rural area but whose destination is an urban area. Within this category, we focus on migrants whose origin is rural, as they are most likely to be affected by PEA. Third, we distinguish between temporary and permanent migration based

[10] We use this widely accepted definition partly to enable comparison with other studies on youth. However, we recognize that any age-based classification can be inherently arbitrary and may not always align perfectly with societal definitions of youth or the functional characteristics of young people (Ripoll et al. 2017).

on the duration of the absence. Temporary migration is defined as an absence lasting at least one month but less than 12 months, while permanent migration is defined as an absence of 12 months or more. *Temporary migration* is a binary variable indicating if the individual is a migrant who was absent for at least one month during the 12 months preceding round t+1 but was present in the surveyed household in both round t and round t+1. *Permanent migration* is a binary variable indicating if the individual was present in the surveyed household in round t but nonresident in the same household in round t+1 (indicating s/he migrated for more than 12 months).

These migration typologies can offer valuable insights for policy, as the drivers, constraints, and characteristics of different migration patterns vary (Rapoport 2002; Chen et al. 2019). Although migration decisions regarding both the pattern and destination may be made simultaneously, modeling such joint outcomes can be analytically complex and computationally intensive. Therefore, we assume that the decision regarding the type of migration pattern—such as whether to migrate to a rural or urban area, or whether the migration will be temporary or permanent—is made prior to selecting the specific destinations.

Youth engagement in agriculture and employment decisions

In addition to migration decisions, we also examine youth engagement in farming and non-farm activities by eliciting the main sector of employment, regardless of migration status. *Farm employment* is a binary variable indicating that the reported main occupation of the individual is in the agriculture sector. *Nonfarm employment* is a binary variable indicating that the reported main occupation of the individual is in the nonagricultural sector.

2.3.2. Relevant measures of public expenditure in agriculture (PEA)

Using the raw public expenditure data described above, we construct our PEA variables of interest in the following ways. First, we convert the PE figures into a per capita base, using the LGA-level population from the Nigerian Population Census in 2006 (NPC 2010). Second, we select PEA from varying reference periods, considering broader sets of time lags through which PE may affect the outcomes (youth migration decisions), as well as considering both the absolute and relative size of PEA (that is, the share of PE for agriculture among total PE across all sectors). Specifically, as for time lags, we primarily consider the averages of PEA from the prior two years and check the robustness of the results using an alternative selection of lags, as discussed in subsequent sections. We focus on the effects of combined (average) PEA over the two years preceding the survey instead of identifying the effects of yearly change in PEAs for two reasons: (i) PE can be highly correlated

across years (often due to the nature of how PE is determined, with significant correlations across years (for example, Mogues and Benin 2012; Fan and Saurkar 2012); (ii) migration is a medium-term and major decision that involves some level of planning and preparation. Similarly, we consider both the effect of the size of PEA as well as the share of public expenditure on agriculture. Focusing on the relative size of PEA, in addition to its absolute size, can make our analyses relevant to the context where overall public expenditure is limited and significant trade-offs must be considered in allocating resources across sectors (Takeshima et al. 2022; Fan and Saurkar 2012).

2.4. Descriptive results

Table 1 provides summary statistics associated with our outcome variables, as well as participants' individual and household characteristics. Between the two survey periods, approximately 20 percent of youth migrated (comparing the baseline survey to the follow-up survey). Of these migrants, 65 percent were temporary movers, while 35 percent relocated permanently. This indicates that temporary migration is more prevalent, suggesting that short-term moves are likely to help meet seasonal labor demands and contribute to consumption smoothing for migrant households, as seen in other developing countries (McKenzie and Rapoport, 2010). Among all migrants, 45 percent were long-distance migrants who had moved out of state, and 65 percent migrated from rural areas to urban settings. Youth are primarily engaged in farm (29 percent), non-farm (19 percent), both farm and non-farm activities (7 percent) and the remaining youth are unemployed or in school (45 percent).

The average PEA (across LGAs) over the past two years preceding the surveys amounts 365 Nigerian Naira per capita (current values in respective survey years). The average share of PEA of total PE during the same period was 0.04 (that is, about 4 percent of the LGA's total PE). This suggests that, in addition to the relatively low share of PEA at the federal level in Nigeria relative to the CAADP target of 10 percent (Mogues and Benin 2012; Takeshima et al. 2022), the share of PEA is also generally low at the LGA level, highlighting relatively minimal investment in the agriculture sector across broad localities in Nigeria. Household-level controls reveal that average household size was 8.3 members, landholding was small (0.2 ha per adult equivalent), asset value averaged $210 per adult equivalent, and livestock ownership was low (0.2 TLU per adult equivalent). These figures reflect the widespread resource constraints faced by Nigerian households, which may influence migration decisions and occupational choices. Individual-level

characteristics, including gender (50 percent male), age (23.3 years), and education (10 years on average), are also reported to account for human capital differences in the analysis.

Table 1: Descriptive summary statistics for outcome and explanatory variables

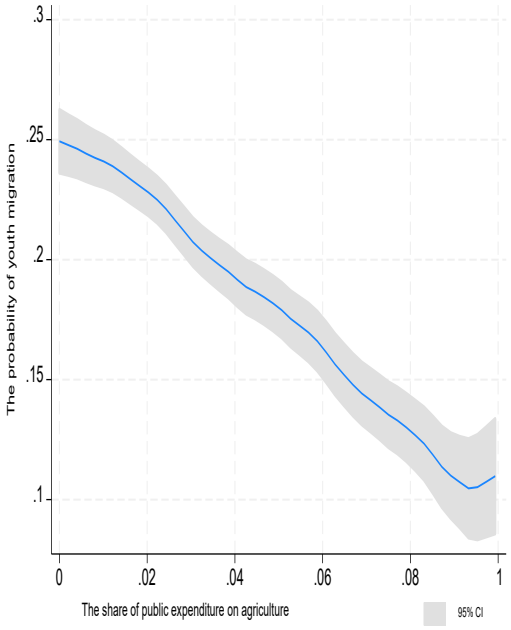
Variable	Mean	Standard Deviation
Migrant, 0/1	0.20	0.40
Temporary migrant, 0/1	0.13	0.33
Permanent migrant, 0/1	0.07	0.24
Short-distance migrant, 0/1	0.11	0.30
Long-distance migrant, 0/1	0.09	0.28
Rural-urban migrant, 0/1	0.14	0.34
Rural-rural migrant, 0/1	0.04	0.31
Primary occupation is...		
Farm only, 0/1	0.29	0.45
Nonfarm only, 0/1	0.19	0.40
In dual sector, 0/1	0.07	0.25
Unemployed	0.45	0.47
Public expenditures for the agriculture sector		
Amount of public expenditure on agriculture per capita (Naira, Current)[a]		
Current public expenditure on agriculture per capita (*Naira, Current*)	343.02	469.55
Last year's (One-year lag) PEA (*Naira, Current*)	337.83	375.26
Two years ago, PEA (*Naira, Current*)	393.79	539.37
Average PEA in the last two years (*Naira, Current*)	365.34	383.64
Share of public expenditure on agriculture per capita (PEA) [a]		
Last year's share of PEA	0.04	0.04
Share of PEA two years ago	0.05	0.05
Average share PEA in the last two years	0.04	0.04
Individual controls		
Male, 0/1	0.50	0.50
Age, years	23.33	5.85
Education, years of schoolings	10.10	5.45
Household size	8.32	3.73
Land size, ha per adult equivalent	0.20	1.17
Assets value ($PPP) per adult equivalent	210.73	649.86
Livestock assets (TLU) per adult equivalent	0.20	1.67
Distance to the market (km)	54.14	43.66
No. observations	13,025	

Source: Authors' calculations based on Nigeria LSMS-ISA 2012/2013 and 2015/2016 (NBS and World Bank 2016), and Public Expenditure data (Government of Nigeria 2016).

Note: [a]Mean and standard deviation figures for LGA-level PE variables are computed using individuals as the unit, after merging LGA-level PE variables with individual observations as described in section 2.

Before turning to conditional regression analyses, we begin by presenting nonparametric and unconditional relationships between public expenditure on agriculture (PEA) and youth out-migration outcomes as well as their engagement in agriculture. Figures 1(a) shows local polynomial regressions that illustrate the associations between the share of PEA and youth out-migration while Figures 1(b). Figure 1(a) reveals a strong negative relationship between the share of PEA and youth out-migration, suggesting that higher levels of agricultural spending are associated with lower rates of youth migration. Figure 1(b) shows a positive association between the share of PEA and youth engagement in the farm sector, indicating that greater investment in agriculture may encourage youth to remain in rural areas and engage in farming activities.

(a) PEA and youth out-migration



(b) PEA and youth engagemnt in farming

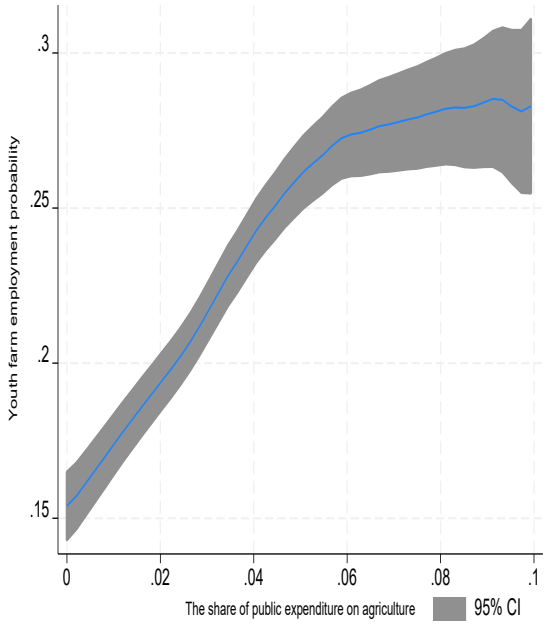


Figure 1: Nonparametric relationships between PEA and migration and engagement in farming.

3. Empirical Estimation Strategy

To estimate the impact of investment in agriculture on youth migration and associated outcomes, we exploit temporal variations in LGA-level PEA and estimate aggregated and individual migration decisions. We used a two-way fixed effects (TWFE) model, which allows us to flexibly account for both unit-specific characteristics (through LGA fixed effects) and common time shocks (through year fixed effects). More specifically, the TWFE specification controls for time-invariant confounders at the LGA level, such as geographic or institutional factors that do not change over

time, while also capturing common shocks or trends affecting all units in a given year. [11] We start by estimating the following aggregated fixed effects specification:

$$Y_{lt} = \beta_0 + \beta_1 A_{lt-1} + \beta_2 X_{lt} + \mu_l + \vartheta_t + \epsilon_{lt} \quad (1)$$

where Y_{lt} stands for the share of youth out-migrating in LGA l at survey round t. A_{lt-1} stands for the (average) share of PEA or the log-transformed value of average PEA over the last two years preceding the survey. As migration is a medium-term decision that involves a significant level of planning and preparation, we use the average share or absolute PEA over the last two years preceding the survey round.[12] Using lagged values of PEA instead of contemporaneous values helps to circumvent potential reverse causality arising from government responses to youth unemployment spells.[13] X_{lt} captures household-, individual-, and community-level characteristics that may influence migration decisions. Control selection builds on standard migration theory, where individuals compare expected benefits and costs between potential origin and destination locations. Key determinants include human capital, demographics, wealth, networks, and geographic access. Human capital is measured by years of schooling, reflecting formal skills and innate ability, which affect migration decisions. Age and gender capture demographic differences in mobility and labor participation, while household asset values (excluding land and livestock) proxy for liquidity constraints that may limit migration (McKenzie and Rapoport 2007, 2010). At the community level, distance to the nearest paved road captures transport and market access. μ_l stands for LGA-level fixed effects, which capture all time-invariant heterogeneities across LGAs, including agroclimatic conditions and cultural differences, which remain constant remain

[11] Consistent with recent advances in the econometrics literature, we acknowledge that the TWFE estimator relies on the strong assumption of homogeneous treatment effects across groups and time periods. When treatment effects are heterogeneous, the TWFE estimate represents a weighted average of these effects, where some weights may be negative (Goodman-Bacon 2021; de Chaisemartin and D'Haultfœuille 2020). We probe some of these assumptions in our robustness tests.

[12] In our robustness checks, we also estimate using PEA values averaged over the last three years preceding the survey, as well as simply using PEA in the last year preceding the survey.

[13] The endogeneity can also potentially arise due to other factors, such as governments foreseeing future agricultural productivity growth in certain areas and allocating more PEAs for these areas. In such case, some external factors (other than PEAs) potentially affecting both future agricultural productivity growth, and migration decisions, can confound our results. While it is difficult to test such hypothesis directly, we argue that the endogeneity of this type may be less likely in our empirical setting. For example, for SSA countries like Nigeria, spatial allocation of PE including PEA can also be highly subject to the external donors who often have their own development agenda (e.g., Mogues & Benin 2012), often leading to more complex PE allocation decisions that are beyond the control of the governments.

over time. ϑ_t represents time dummies controlling for survey rounds. ϵ_{lt} stands for other unobservable factors that may explain differences in migration decisions.

As we are controlling LGA-level fixed effects (μ_l), the expression in equation (1) and the associated parameters β_1 capture the impact of temporal changes in PEA on youth out-migration decisions under the following identifying assumption. Our identifying assumption is that conditional on location and time fixed effects, temporal changes in PEA (which is measured at LGA level) are exogenous to individuals' decisions. Individuals have limited opportunities to endogenously shape changes in temporal PE. Although our outcome variable in equation (1)—the share of out-migrating youth in each LGA—takes either binary or fractional values, we estimate equation (1) using linear models for ease of interpretation.

While the expression in equation (1) quantifies the average effect of changes in PEA, it does not help to identify individual attributes and heterogeneities associated with high or low out-migration propensities. Thus, we also estimate a disaggregated version of equation (1) using individual-level migration decisions using the following specification:

$$Y_{ilt} = \beta_0 + \beta_1 \, \mathrm{A}_{lt-1} + \beta_2 X_{ilt} + \mu_l + \vartheta_t + \epsilon_{ilt} \quad (2)$$

where Y_{ilt} stands for the migration decision of individual *i* living in LGA *l* at survey round *t*. A_{lt-1} stands for the (average) share of PEA or the log-transformed value of average PEA over the last two years preceding the survey. X_{ilt} captures a vector of household and community-level attributes affecting youth migration decisions. μ_l stands for LGA-level fixed effects, while ϵ_{ilt} stands for other unobservable factors that may affect individual-level migration propensities. Besides quantifying the average impacts, we aim to identify potential heterogeneous impacts across different groups and types of youth. For this purpose, we use baseline values of key demographic and socioeconomic attributes, such as gender, education, and age. For example, for assessing potential differential impacts by gender, we expand equation (2) by adding interaction terms between the main variable of interest with a gender indicator. Similarly, to examine potential differential impacts across educational attainment, we interact the indicator variables associated with these attributes (by using median values of education) with the main explanatory variable (A_{lt-1}) as follows:

$$Y_{ilt} = \delta_0 + \delta_1 \, \mathrm{A}_{lt-1} + \delta_2 H_{ilt} + \delta_3 \, \mathrm{A}_{lt-1} \# H_{ilt} + \delta_4 X_{ilt} + \mu_l + \vartheta_t + \epsilon_{ilt} \quad (3)$$

where all terms except the interaction variables are similar to those in equation (2). The interaction terms in equation (3) and associated coefficients (δ_3) helps us to test differential impacts of increasing rural investment for different groups of youth population.

We also examine whether investments in agriculture and rural economies can affect youth engagement in agriculture. This is meant to uncover some of the mediating factors through which PEA influences youth migration in different ways. We hypothesize that an increase in PEA can create employment opportunities in the farming sector in rural areas. We can explicitly test this by examining youth engagement in farming and nonfarming sectors of the economy. For this purpose, we estimate the following:

$$F_{ilt} = \gamma_0 + \gamma_1 \mathrm{A}_{lt-1} + \gamma_2 X_{ilt} + \mu_l + \vartheta_t + \varepsilon_{ilt} \quad (4)$$

where F_{ilt} stands for binary indicators of engagement in farming and off-farm activities, while the remaining terms and notations are as defined in equation (2). In all our estimations, we cluster standard errors at the LGA level, the level at which our main policy variable changes.

4. Results and Discussion

4.1. The effect of agricultural investment on youth migration decisions

We use linear TWFE models to estimate the specifications in equations (1)–(4). The primary empirical specifications are estimated for all variants of the out-migration definitions outlined in Section 3. We disaggregate migration by duration, distance, and destination to differentiate between the various types of migration, including temporary versus permanent, long-distance (out-of-state) versus short-distance (within-state), and rural-urban versus rural-rural migration. We then estimate both unconditional and conditional regressions, controlling for a number of relevant observable characteristics. As described in Section 4, we use both the share and level of PEA. By considering both, our analysis offers relevant insights into the implication for the important trade-offs in public investments when the overall PE remains constrained. These trade-offs can have a significant effect on the outcomes of interest, as discussed by Takeshima et al. (2022).

The results in Table 2 and Table 3 show that investment in agriculture significantly reduces youth out-migration. The results in Table 2 are based on the share of PEA relative to the rest of the sectors of the economy, while those in Table 3 are based on its absolute size. The results in Panel A of Table 2 control only LGA and year fixed effects along with our main variable of interest (the

share of PEA); those in Panel B control for additional (averaged) individual and household characteristics.

The results in Panels A and B of Table 2 indicate that a 1 percentage increase in the share of PEA reduces the probability of youth out-migration by 0.4–1.0 percentage points. The results remain consistent and robust after controlling for (averaged) individual and household characteristics. Given the low share of PEA reported in Table 1, a 1 percentage point increase in the share of PEA requires boosting the current share by about 25 percent. In other words, increasing the current share of PEA by 25 percent can reduce out-migration by up to 1 percentage point. These findings are consistent across different definitions of out-migration, with slight and intuitive differences. The impacts are stronger when a broader definition of out-migration is used. For instance, the effects are more pronounced among rural-urban migrants, who account for 65 percent of overall migration in our data. This may suggest that greater PEA can reduce rural-urban migration by increasing economic opportunity or labor productivity in rural areas that rely on the agricultural sector (Bazzi et al. 2016; Takeshima 2019).

This aligns with literature on agricultural investments that focus on improving agricultural employment for youth, which could motivate them to remain in their communities (Alaerts, 2020; Balasubramanya et al. 2023). The results are consistent with existing literature, including Matsuyama (1992) and Bustos et al. (2016), which posit that increased investments in agriculture, can induce labor movement from the nonagricultural sector to the agricultural sector. Such investments could boost agricultural production, promote farm technology adoption, enhance resilience to climate change, mitigate other shocks, and contribute to the long-term stability of rural communities, thereby reducing out-migration. The results also show that increasing the current share of PEA reduces both temporary and permanent out-migration but has higher effects on the former. This may indicate that increasing PEA in origin locations could reduce the need for temporary migration altogether by raising the returns from future asset inheritance and enhancing prospects for more stable income-earning opportunities in rural areas (Gosselin-Pali 2025; Morten 2019; Taylor and Martin 2001).

Table 2: The effect of share of public expenditure on agriculture on youth migration decisions

	(1) Migrant	(2) Short distance	(3) Long distance	(4) Rural-Rural	(5) Rural-Urban	(6) Temporary	(7) Permanent
Panel A: Using the share of PEA: without control variables							
Share of PEA	-0.982**	-0.521***	-0.484***	-0.468***	-0.603**	-0.568***	-0.468***
	(0.414)	(0.103)	(0.125)	(0.063)	(0.237)	(0.163)	(0.152)
Individual characteristics	No	No	No	No	No	No	No
Household characteristics	No	No	No	No	No	No	No
LGA fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Panel B: Using the share of PEA: with control variables							
Share of PEA	-0.977***	-0.554***	-0.479***	-0.419***	-0.738***	-0.570***	-0.476***
	(0.225)	(0.178)	(0.173)	(0.124)	(0.212)	(0.187)	(0.147)
Individual characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes
LGA fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. observations	704	704	704	704	704	704	704

Notes: In this table, we control LGA-sample average values of individual and household characteristics, including gender, age, education level, household size, asset value, land size, livestock assets (measured in TLU), and distance to the nearest market. Standard errors, clustered at LGA-level, are given in parentheses. * $p<0.10$, ** $p<0.05$, *** $p<0.01$. PEA = Public Expenditures for the agriculture sector.

The results in Table 3 indicate that a 1 percent increase in PEA reduces the probability of youth out-migration rates by 0.13–0.14 percentage points. Again, these results and impacts are consistent across the different types of migration. As expected, the impacts are slightly higher for rural-urban than rural-rural migration. As discussed in the next section, several mechanisms exist through which such investments can reduce out-migration rates, including because of an increase in economic opportunities in the farm sector, which in turn can also create nonfarm employment. Although agriculture remains a vital sector of the economy—providing jobs and acting as a key driver of growth in Nigeria and many other African countries—it continues to be underfunded despite consecutive pledges to increase investment, including through the CAADP commitment. This lack of sufficient investment hinders tapping the sector's full potential, especially in contexts such as Nigeria's where the share of investment in agriculture remains very low. The results in Tables 2 and 3 suggest that a modest increase in investment in agriculture can encourage youth to stay in rural areas and engage in agriculture, which could lead to higher productivity and

profitability. These results support policies that advocate agricultural investments linked to rural development, which may help reduce rural-urban migration, thereby easing the strain on urban natural and public resources.

Table 3: The effect of public expenditures for the agriculture sector on youth out-migration

	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: all types of migration and duration of migration						
				Distance		
	Migrant	Migrant	Short	Short	Long	Long
Log (PEA)	-0.133**	-0.142***	-0.029***	-0.023**	-0.074*	-0.097**
	(0.055)	(0.054)	(0.009)	(0.009)	(0.043)	(0.046)
Individual characteristics	No	Yes	No	Yes	No	Yes
Household characteristics	No	Yes	No	Yes	No	Yes
LGA fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
No. observations	704	704	704	704	704	704
Panel B: Migration by destination						
	Rural-Rural	Rural-rural	Rural-urban	Rural-urban		
Log (PEA)	-0.006	-0.030	-0.140**	-0.136***		
	(0.021)	(0.022)	(0.055)	(0.052)		
Individual characteristics	No	Yes	No	Yes		
Household characteristics	No	Yes	No	Yes		
LGA fixed effects	Yes	Yes	Yes	Yes		
Year Fixed Effect	Yes	Yes	Yes	Yes		
No. observations	704	704	704	704		
Panel C: Migration by duration						
	Temporary	Temporary	Permanent	Permanent		
Log (PEA)	-0.110**	-0.134**	-0.025*	-0.023*		
	(0.054)	(0.058)	(0.014)	(0.011)		
Individual characteristics	No	Yes	No	Yes		
Household characteristics	No	Yes	No	Yes		
LGA fixed effects	Yes	Yes	Yes	Yes		
Year Fixed Effect	Yes	Yes	Yes	Yes		
No. observations	704	704	704	704		

Notes: Standard errors, clustered at LGA-level, are given in parentheses. PEA = Public Expenditures for the agriculture sector. * p<0.10, ** p<0.05, ***p<0.01.

4.2. Potential mechanisms

There are several mechanisms through which investment in rural economies and agriculture can reduce youth out-migration rates. Improvement in employment opportunities in the farm sector and its indirect impact on nonfarm employment is one of the most important mechanisms. To probe this, we assess youth engagement in the farm and nonfarm sectors and the implication of changes in investment in agriculture on their engagement in farm and nonfarm activities. The results in Table 4 illustrate the effect of PEA on farm and nonfarm participation rates. As anticipated, an increase in the share or level of PEA is associated with a significant increase in youth participation in farm employment activities. Specifically, Panel A of Table 4 suggests that a 1 percentage point increase in the share of PEA increases youth engagement in farm activities by 0.4 percentage points (the second column in Table 4). Similarly, Panel B of Table 4 indicates that doubling current PEA (a 100 percent increase) is associated with a 4 percentage point increase in youth participation rates in farm employment. These patterns align with the findings presented in Tables 2 and 3. Specifically, the results in Table 4, along with the youth out-migration rates reported in Tables 2 and 3, suggest that youth engagement in agricultural activities, as shown in Table 4, plays a key role. This implies that investments in the agriculture sector can generate economic opportunities within the farm sector, making agriculture an attractive option for youth. The last two columns in Table 4 show that the impacts of an increase in PEA on youth engagement in nonfarm activities remain negligible.

It is generally difficult to interpret how different components of PEA contribute to the observed effects on migration due to the lack of disaggregated classification within PEA (as described in the data section). Nonetheless, past studies examining PE in Nigeria offer some insights. A significant share of the PEA by the Federal Government during the 2000s and the early 2010s was used for activities aimed at stabilizing markets for inputs like fertilizer through subsidies and outputs through strategic grain reserves (Mogues and Benin 2012; Takeshima et al. 2022). In contrast, PEA by the local government, including those by LGAs during this period, typically focused on activities targeting their local jurisdiction, like extension, maintenance, and operation of state-owned agricultural infrastructure and farmland improvements in their locality (Mogues and Benin 2012; Takeshima et al. 2022), while PEA for certain labor-saving technologies like subsidized distribution of tractors gradually declined (Takeshima et al. 2015). These patterns are consistent with the hypothesis that a significant component of PEA by LGAs has had the effects

of enhancing the demand for labor (rather than labor-saving effects), enhancing labor productivity in the agricultural sector and hence youth engagement in rural agricultural activities.

Table 4: The effect of public expenditure on the agriculture sector

	(1)	(2)	(3)	(4)
Panel A: Using the share of PEA				
	Farm employment		**Nonfarm employment**	
Share of PEA	0.765**	0.435**	0.336	0.593
	(0.376)	(0.214)	(0.319)	(0.389)
Individual characteristics	No	Yes	No	Yes
Household characteristics	No	Yes	No	Yes
LGA fixed effects	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes
No. observations	9453	9453	9453	9453
Panel B: Using the amount of PEA				
	Farm employment	**Nonfarm employment**		
Log (average PEA)	0.039***	0.037***	0.008	0.001
	(0.014)	(0.012)	(0.008)	(0.008)
Individual characteristics	No	Yes	No	Yes
Household characteristics	No	Yes	No	Yes
LGA fixed effects	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes
No. observations	9453	9453	9453	9453

Notes: PEA = Public Expenditures for the agriculture sector. Individual characteristics controlled include gender, age, education level, and while household characteristics include household size, asset value, land size, livestock assets (measured in TLU), and distance to the market. Standard errors, clustered at LGA-level, are given in parentheses. *p<0.10, **p<0.05, *** p<0.01.

4.3 Heterogeneity in the effects of PEA on migration decisions

To uncover potential heterogeneities in the impact of PEA, we use baseline individual characteristics and interact with the share or amount of PEA. The effect of PEA is likely to differ across individuals with varying levels of education and experience. Our goal here is to explore how these agricultural investments affect different groups of youth within rural communities. For example, we focus on exploring whether these effects vary across male and female youth as well as across those individuals owning varying level of land, as these groups may face varying level of constraints that influence their migration decisions.

4.3.1 Heterogeneity analysis by level of education

Table 5 shows that the effect of an increase in PEA on youth out-migration rates varies across more and less educated youth. The interaction effects between PEA and the less educated dummy are positive and statistically significant, implying that the reduction in out-migration rates in response to an increase in agricultural investment is higher among more educated youth. Ultimately, this implies that in terms of reducing out-migration rates, the impact of an increase in PEA is slightly higher among more educated youth. These results are intuitive because less educated youth have limited economic opportunities outside the farm sector and are likely to be less motivated to migrate.

Table 5: Heterogeneous effects by level of education

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Using the share of PEA							
	Migrant	Short dis	Long dis	Rural-Rural	Rural-Urban	Temporary	Permanent
Share of PEA	-0.751***	-0.722***	-0.146	-0.167**	-0.661***	-0.426**	-0.458**
	(0.199)	(0.166)	(0.130)	(0.069)	(0.194)	(0.196)	(0.188)
Share of PEA#Less educated	0.034*	0.049***	-0.014	0.008	0.029	0.010	0.030**
	(0.018)	(0.015)	(0.013)	(0.006)	(0.018)	(0.016)	(0.013)
Less educated	0.004**	0.001	0.004***	-0.000	0.004***	0.004***	0.000
	(0.002)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)
Individual characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes
LGA fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. observations	13010	11882	11627	10857	12652	12187	11322
Panel B: Using the amount of PEA							
	Migrant	Short distance	Long distance	Rural-Rural	Rural-Urban	Temporary	Permanent
Log (average PEA)	-0.026***	-0.029***	-0.002	-0.012***	-0.019**	-0.012**	-0.021***
	(0.008)	(0.008)	(0.005)	(0.003)	(0.008)	(0.006)	(0.008)
Log (average PEA)#Less educated	0.001**	0.002***	-0.000	0.001***	0.001*	0.000	0.001***
	(0.001)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)
Less educated	-0.002	-0.006**	0.004*	-0.003**	0.000	0.002	-0.005**
	(0.003)	(0.003)	(0.002)	(0.001)	(0.003)	(0.002)	(0.002)
Individual characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes
LGA fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. observations	13010	11882	11627	10857	12652	12187	11322

Notes: Standard errors, clustered at LGA level, are given in parentheses. PEA = Public Expenditures for the agriculture sector. * p<0.10, ** p<0.05, *** p<0.01. Individual characteristics controlled include gender, age, education level, and while household characteristics include household size, asset value, land size, livestock assets (measured in TLU), and distance to the market.

4.3.2 Heterogeneity analysis by gender

Table 6 explores potential differences in the impact of PEA across gender. While female youth are generally more likely to migrate than male youth, we do not find statistically significant differences in the effect of PEA across male and female youth. The coefficients associated with the interaction terms ("Share of PEA#Female") these effects are comparable across both female and male youth.

Table 6: Heterogeneous effect of public expenditures on the agriculture sector by gender

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Using the share of PEA							
	Migrant	Short dis	Long dis	Rural-Rural	Rural-Urban	Temporary	Permanent
Share of PEA	-0.477**	-0.391**	-0.188	-0.130*	-0.395*	-0.295	-0.269*
	(0.228)	(0.153)	(0.186)	(0.070)	(0.230)	(0.211)	(0.145)
Share of PEA#Female	0.187	0.081	0.100	0.056	0.128	0.199	-0.057
	(0.187)	(0.145)	(0.139)	(0.080)	(0.181)	(0.173)	(0.118)
Female	0.025**	0.039***	-0.009	0.013**	0.017	0.008	0.028***
	(0.012)	(0.010)	(0.009)	(0.006)	(0.011)	(0.010)	(0.009)
Individual characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes
LGA fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. observations	13010	11882	11627	10857	12652	12187	11322
Panel B: Using the amount of PEA							
	Migrant	Short dis	Long dis	Rural Rural	Rural-Urban	Temporary	Permanent
Log (PEA)	-0.022***	-0.012**	-0.015***	-0.006**	-0.019***	-0.015**	-0.012**
	(0.007)	(0.006)	(0.005)	(0.002)	(0.007)	(0.006)	(0.005)
Log (PEA)#Female	0.009*	0.004	0.006	0.002	0.008	0.006	0.004
	(0.005)	(0.004)	(0.004)	(0.002)	(0.005)	(0.004)	(0.004)
Female	-0.010	0.020	-0.029	0.007	-0.015	-0.009	0.003
	(0.026)	(0.023)	(0.020)	(0.012)	(0.026)	(0.024)	(0.020)
Individual characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes
LGA fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. observations	13010	11882	11627	10857	12652	12187	11322

Notes: Standard errors, clustered at LGA level, are given in parentheses. PEA = Public Expenditures for the agriculture sector. Individual characteristics controlled include gender, age, education level, and while household characteristics include household size, asset value, land size, livestock assets (measured in TLU), and distance to the market. * p<0.10, ** p<0.05, *** p<0.01.

4.4 Robustness checks

The results in Tables 2–6 are based on PEA averaged over the last two years preceding the survey. To probe the robustness of these results, we estimate similar specifications by aggregating PEA over the last three years preceding the survey. Table A1 shows the impacts of a change in the absolute size of PEA and its share of total PE averaged over the last three years on out-migration rates. The impacts are consistent and comparable to those reported in Tables 2 and 3. Similarly,

Table A3 shows the effects on youth engagement in farm and nonfarm activities, which are again consistent with and similar to those reported in Table 4. Finally, we report comparable impacts by just using PEA and its share of PE in the last one year preceding the survey. Again, these results (reported in Tables A3–A4) show comparable impacts. The effects reported in Tables A4–A5 are slightly smaller than those in Tables 2–3 and Tables A2–A3, suggesting that the short-term impacts are likely to be slightly smaller than the medium- and long-term impacts.

5 Conclusions

Youth migration is receiving substantial policy attention in Africa in general and Nigeria in particular. High rates of youth unemployment and lack of economic opportunities in rural areas are pushing youth to migrate to urban areas in search of better economic opportunities. However, urban economies in Africa are unlikely to fully absorb the ever-increasing youth bulge and associated exodus of youth from rural areas. Among the push factors, lack of public investment in rural development, particularly in the agriculture sector (the mainstay of rural areas), is often cited as a leading factor. This is particularly the case in contexts such as Nigeria, where the share of public expenditure for the agriculture sector (PEA) remains far below the 10 percent target committed by African countries through the Comprehensive Africa Agriculture Development Programme (CAADP). This paper provides unique insights into an important research question: Will increased public investments in the agriculture sector reduce youth out-migration rates? We identified these effects using unique disaggregated subnational public expenditure (PE) data at the local government level in Nigeria, which allowed us to exploit spatiotemporal variations in PEA (in both absolute size and share in overall PE). We merged these data with panel household surveys covering multiple rounds and captured comprehensive characteristics of individuals and households. The panel nature of the PEA and household survey allowed us to estimate two-way fixed effects models characterizing the implication of temporal changes in PEA on the dynamics of youth migration rates.

Our findings show that an increase in (and in the share of) PEA leads to a modest reduction in youth out-migration. Specifically, a 1 percentage point increase (equivalent to a 25 percent rise) in the share of PEA is associated with up to a 0.9 percentage point reduction in youth out-migration.

Similarly, an increase in the absolute level of PEA is linked to a modest reduction in the share of youth out-migrating, with the most significant responses observed in rural-urban migration. In terms of potential mechanisms, we find that an increase in PEA increases youth participation in farm activities. Doubling PEA is associated with a 4-percentage points increase in youth engagement in farm activities, while its effect on nonfarm activities appears negligible. These results suggest that, though modest, investments in rural economies can help reduce youth out-migration, particularly rural-urban migration. We also find some important heterogeneities across demographic and socioeconomic attributes of youth. The impacts are larger for more educated youth, implying that those investing in rural economies can make the agriculture sector attractive even for those relatively educated youth.

Our findings provide valuable insights that can inform youth and migration policies in Africa. Specifically, a key implication is that public instruments in rural economies can shape youth migration and employment outcomes. Deliberate investments in rural economies can address pertinent lack of economic opportunities in rural areas in Africa. These results are particularly relevant for countries—like Nigeria—that are underinvesting in agriculture while grappling with a youth bulge that their service and manufacturing sectors cannot absorb. Our findings indicate that fulfilling the CAADP commitment—allocating at least 10 percent of the national budget to agriculture—could serve multiple purposes in countries like Nigeria, where agriculture has significant untapped potential despite the current low investment in the sector.

Lastly, our findings contribute to the debate on the role of public investments to shape structural transformation. Conventional literature often hypothesizes that increased public investments in agriculture and the resulting increase in agricultural productivity could accelerate labor movement from the agricultural sector to the nonagricultural sectors (for example, Schultz, 1953; Gollin et al. 2016; Lee 2018). This is intuitive, as a boost in the agriculture sector productivity is usually associated with increased demand for nonagricultural goods and services and the ensuing increased demand for labor in nonagricultural sectors (e.g., Emerick 2018). However, our findings suggest that in contemporary Nigeria, the nexus between youth migration and public investments in agriculture may be more complex, potentially due to the low level of investment in agriculture. In contemporary Nigeria, the food market may be more integrated both domestically and globally, thus the food problem may be a less binding constraint affecting labor movement across sectors. Instead, comparative advantages of locations (and, to some degree,

sectors) that significantly drive labor movement across locations may be more purely driven by the relative level of investment across sectors. While testing such hypothesis is beyond the scope of this paper, our findings shed some light into how public investments in agriculture can play dual roles of supporting youth employment and rural revitalization, and how youth migration play central roles in such processes.

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Appendix

Table A2: Robustness check (for Tables 2 and 3) using PEA over the last three years

	(1) Migrant	(2) Short distance	(3) Long distance	(4) Rural-Rural	(5) Rural-Urban	(6) Temporary	(7) Permanent
Using the share of PEA over the last three years							
Share of PEA over the last three years	-0.737***	-0.464***	-0.485**	-0.192**	-0.655***	-0.422	-0.519***
	(0.243)	(0.160)	(0.202)	(0.082)	(0.238)	(0.259)	(0.161)
Individual characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes
LGA fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	704	704	704	704	704	704	704
Using PEA over the last three years							
Log (average PEA over the last three years)	-0.016**	-0.012**	-0.009*	-0.007**	-0.017**	-0.012**	-0.011*
	(0.007)	(0.006)	(0.005)	(0.003)	(0.007)	(0.005)	(0.006)
Individual characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes
LGA fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. observations	704	704	704	704	704	704	704

Note: PEA = Public Expenditures for the agriculture sector. * p<0.10, ** p<0.05, *** p<0.01.

Table A2: Robustness check (for Table 4) using average share of PEA over the last three years

	(1)	(2)
Panel A: Using the share of PEA		
	Farm employment	**Nonfarm employment**
Average share PEA over the last three years	0.970*	0.043
	(0.524)	(0.286)
Individual characteristics	No	No
Household characteristics	No	No
LGA fixed effects	Yes	Yes
Year Fixed Effect	Yes	Yes
No. observations	9453	9453
Panel B: Using the amount of public expenditure on agriculture		
	Farm employment	**Nonfarm employment**
Log (average PEA over the last three years)	0.032***	0.008
	(0.010)	(0.009)
Individual characteristics	No	No
Household characteristics	No	No
LGA fixed effects	Yes	Yes
Year Fixed Effect	Yes	Yes
No. observations	9453	9453

Note: PEA = Public Expenditures for the agriculture sector. * p<0.10, ** p<0.05, *** p<0.01.

Table A3: Robustness check (for Tables 2 and 3) using the share of PEA in the last one year

	(1) Migrant	(2) Short distance	(3) Long distance	(4) Rural-Rural	(5) Rural-Urban	(6) Temporary	(7) Permanent
Using the share of PEA last one year preceding the survey							
Share of PEA in the last one year	-0.403***	-0.283***	-0.226**	-0.110**	-0.347***	-0.194	-0.319***
	(0.133)	(0.088)	(0.104)	(0.051)	(0.123)	(0.142)	(0.120)
Individual characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes
LGA fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	704	704	704	704	704	704	704
Using PEA last one year preceding the survey							
Log(PEA in the last one year)	-0.011**	-0.009*	-0.006*	-0.003	-0.011**	-0.006	-0.008
	(0.005)	(0.004)	(0.003)	(0.002)	(0.005)	(0.004)	(0.005)
Individual characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes
LGA fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	704	704	704	704	704	704	704

Note: PEA = Public Expenditures for the agriculture sector. * p<0.10, ** p<0.05, *** p<0.01.

Table A4: Robustness check (for Table 4) using the share of PEA in the last one year

	(1)	(2)
Panel A: Using the share of PEA last one year preceding the survey		
	Farm employment	**Nonfarm employment**
Share of PEA last one year preceding the survey	0.221	0.183
	(0.332)	(0.265)
Individual characteristics	Yes	No
Household characteristics	Yes	No
LGA fixed effects	Yes	Yes
Year Fixed Effect	Yes	Yes
No. observations	9453	9453
Panel B: Using the amount of PEA last one year preceding the survey		
	Farm employment	**Nonfarm employment**
Log (PEA last one year preceding the survey)	0.019**	0.011
	(0.009)	(0.007)
Individual characteristics	No	No
Household characteristics	No	No
LGA fixed effects	Yes	Yes
Year Fixed Effect	Yes	Yes
No. observations	9453	9453

Note: PEA = Public Expenditures for the agriculture sector. * p<0.10, ** p<0.05, *** p<0.01.

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