Article

Beyond Ownership: Assessing the Impact of Remittances on Nonfarm Enterprise Performance in Nigeria

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Abstract

A contemporary argument in the literature contends that recipients of international remittances exhibit moral hazard, dependency, and favour leisure over work, resulting in low labour supply and poor entrepreneurship development. This study contributes to the debate by investigating the effect of remittances on nonfarm enterprise performance in Nigeria. Using data for over 60,000 Nigerians and applying the Heckman selection technique to address self-selection bias and endogeneity concerns, we find that remittances are associated with increased nonfarm enterprise performance. Specifically, our findings show that controlling for selection into entrepreneurship, remittances increase the stock of inputs or supplies, physical capital, and overall enterprise revenue in Nigeria. These findings suggest that remittances foster entrepreneurship in two ways: investments in capital goods and labour supply to nonfarm enterprises. Additional findings show that the remittance-induced enterprise performance is mainly observed in informal enterprises that are not registered with the government. These findings yield important conclusions, including the fact that remittances may be potential sources of overseas goods for local entrepreneurship development and a catalyst for addressing unemployment in Nigeria. The paper also discusses key policy implications.

Keywords: Remittances, Labour Supply, Nonfarm Enterprise, Nigeria
JEL Classification: F24, J22, J24

1．Introduction

This study examines the effect of international remittances on the performance of non-

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farm enterprises in Nigeria, considering recent changes in the Nigerian labour market, developments in migration and remittance outlooks, and the absence of empirical consensus in the literature. First, the Nigerian labour force statistics have undergone significant adjustments, especially with respect to unemployment rate following the methodological revisions by the National Bureau of Statistics （NBS, 2023）. The NBS recently redefines the labour force to include individuals aged 15 and above as opposed to an earlier definition of those within 15 and 64 years of age. Similarly, the unemployment rate is redefined to only include individuals who have not worked up to an hour in a week for pay or profit, steering a decline in the unemployment rate from 33% in 2020 to 5.0% in the third quarter of 2023. While such a drop in unemployment due to methodological improvement looks good on paper, Nigeria remains a major host of the world's poorest people amidst macroeconomic instability, leading to increasing pressure on outmigration.

Second, remittances have recently become a major source of international finance for the development of low- and middle-income countries （LMICs）, surpassing both foreign direct investment （FDI） and official development assistance （ODA）. In particular, remittances to LMICs increased by about 270% between 2000 and 2010 （Habib, 2023） and reached $656 billion in 2023, accounting for about 72% of total global inward remittances （Ratha et al. 2024）. Following the global rise in remittance transfers, Nigeria has also become a major recipient, receiving US$19.7 billion in 2010 with subsequent inflows till date hovering between US$17 billion and US$25 billion despite the effect of the COVID-19 pandemic （World Bank-KNOMAD, 2024）. A growing body of research finds that these funds are mainly used for household consumption needs, including expenditure on food, health, education, and housing （Ajefu, 2018; Azizi, 2018; Osili, 2004）, improving household welfare, financial development, capital accumulation, and economic growth （Azizi, 2020; Combes & Ebeke, 2011; Sobiech, 2019）.

Although remittances may improve the welfare of recipients, scholars argue that they also cause dependency and moral hazard, leading to a reduction of labour supply and poor entrepreneurial development. The link between remittances and entrepreneurship development is often inferred from the new economics of labour migration （NELM） theory which alludes to the credit constraint alleviation effect of remittances （Lucas & Stark, 1985）. Accordingly, recipients are likely to use the excess of remittances to start up enterprises, thereby increasing labour force participation, hours worked, and employment for non-recipients （Posso, 2012）, especially in the presence of sufficient non-remittance income （Kakhkharov, 2019）. Several studies （Khan & Valatheeswaran, 2016; Taylor & Lopez-Feldman, 2010; Vadean et al., 2019） conclude that remittances increase labour supply to both nonfarm ventures and agricultural activities. However, Kharel et al. （2022） contend that due to moral hazard, remittance recipients may reduce labour supply, leading to the poor performance of household enterprises （fall in revenue） over time. These arguments suggest a lack of

consensus on the true effect of remittances on household entrepreneurship on one hand, and a need for context-specific investigation on the other hand.

In Nigeria, despite the increasing scholarly investigations into the impact of remittances, the extant studies have ignored the effect of remittances on the development and performance of household entrepreneurship, thereby creating a major research gap. Such gap is crucial to investigate given the potential contributions that remittances could have in addressing unemployment and fostering entrepreneurship development at the household level in Nigeria. Although Ainembabazi and Kemeze. (2022) investigate the remittance-induced employment potential of household enterprises in Nigeria and Ethiopia, the authors do not provide evidence of how remittances affect the performance of such enterprises. Furthermore, the extant literature does not distinguish between the effect of remittances on formal and informal enterprises despite the unique features of informality in developing countries. This study builds on these limitations to provide new empirical evidence on the remittance-enterprise performance nexus in Nigeria and the extension to the formality status of such enterprises.

Specifically, this study contributes to literature in three ways. First, it provides the first micro-level evidence of the effect of remittances on nonfarm enterprise performance in Nigeria using the most recent large-scale dataset for over 60,000 Nigerians. Being a high remittance receiving country with high underemployment rate, understanding the potential of remittances in expanding entrepreneurship is crucial for effective policy design. Second, this study goes beyond investigating the effect of remittances on household enterprise ownership commonly done in the literature to provide detailed effect of remittances on the performance of such enterprises. The credence of this contribution is inherent in the need to understand the channels through which remittances could facilitate entrepreneurship development. For instance, by investigating the effect of remittances on the input and capital stock of household enterprises, this study provides insights into the potential of migrants to support nonfarm enterprises through remitting capital goods from their host countries. There is a budding literature on the implication of such non-monetary remittances on entrepreneurship development in developing countries (see Barerra et al., 2024). Lastly, this study contributes to the literature by examining the differential impact of remittances on the performance of both formal and informal enterprises in Nigeria. Contemporary literature has ignored this disparity between formal and informal enterprises, hence providing a limited understanding of what types of enterprises benefit from the inflow of remittances.

The rest of the paper is adumbrated as follows: Section 2 provides a stylized factual look at the Nigerian labour force, migration trend, and remittances; Section 3 discusses both the theoretical and empirical perspectives on remittances and entrepreneurship; and Section 4 discusses the empirical techniques, identification strategy, and data used in the study. Section 5 presents and discusses the study's findings, while Section 6 concludes with

some policy directions.

2．Some Stylized Facts

Recent methodological revisions by the National Bureau of Statistics（NBS）to align Nigeria's labour force statistics with international standards show improvements in the labour market such as lower unemployment figures. However, several issues persist. For instance, data from the World Bank show that the total labour force participation rate in Nigeria marginally declined by 2.2 percentage points between 1995 and 2020（Figure 1）. When disaggregated by gender, Figure 1 shows that the female participation rate accounts for a significant share of the total drop, declining by 5.2 percentage points during the same period while the male labour force participation increased by 0.8 percentage points. In contrast, the COVID19 period between 2020 and 2022 shows an increase in the total, female and male labour force participation rates marginally by 0.7, 0.5, and 0.8 percentage points, respectively, although the total and female rates remain lower than their 1995 levels. Adhikari et al.（2021）opine that the pre-COVID decline in labour force participation rate, especially between 2018 and 2020, is due to the decision of millions of Nigerians to opt out of the active labour force, partly due to the increasing joblessness in the country.

In particular, the percentage of the active labour force that is unemployed has increased in recent years. For instance, estimates by the International Labour Organization（ILO）in
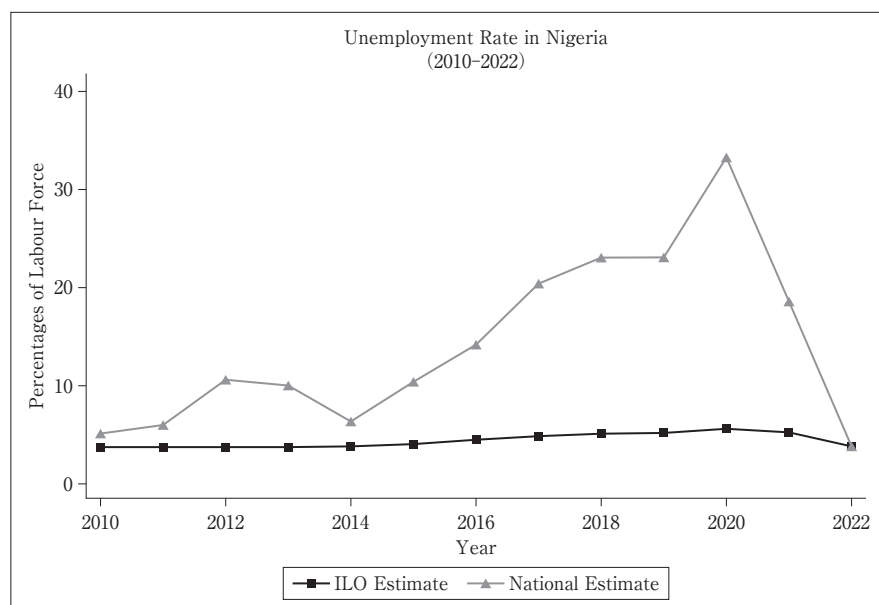
Figure 1: Labour Force Participation in Nigeria
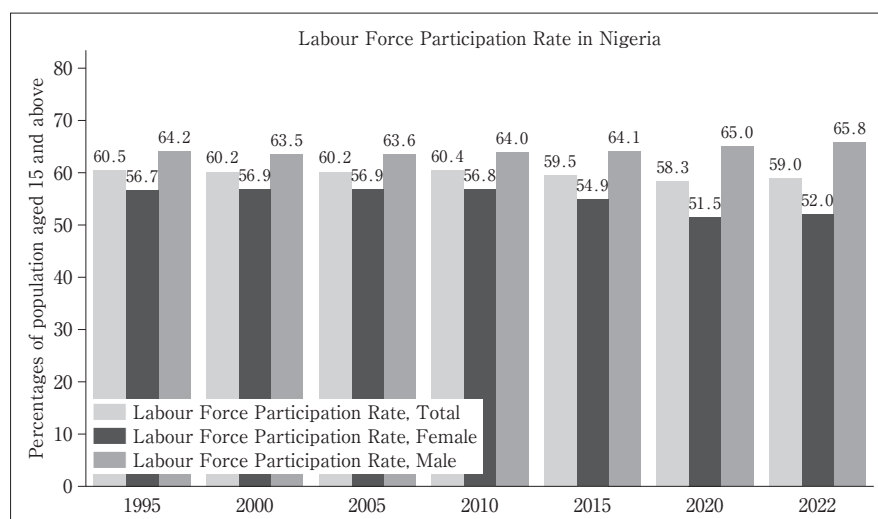
Note: *The figure shows the total labour force participation rate as a percentage of total working-age population（15 and above）（light gray）, the female labour force participation rate as percentage of total female population aged 15 and above（black）, and the male labour force participation rate as percentage of total male population aged 15 and above（dark gray）.*
Source: Authors' creation from WDI Data（World Bank, 2024）

Figure 2: Unemployment Rate in Nigeria

Figure 2 show that the unemployment rate increased from 3.8% in 2010 to 5.6% in 2020.
However, the ILO figures are a shadow of those reported by the Nigerian National Bureau
of Statistics （NBS） before its recent methodological revisions. The NBS figure shows that
unemployment had increased from 6.4% in 2014 to 33.3% in 2020. Recent improvement in
labour force survey methodology produced lower unemployment figures, showing a decline
to 3.8% in 2022 for both the ILO and NBS measures, as only those who work less than
an hour for pay or profit in a week are considered unemployed. On the other hand, the
number of those who work less than 40 hours per week remains high at 36.4% in 2022
（NBS, 2023）, suggesting a high level of underemployment in Nigeria and increasing the
likelihood of "brain waste" （Adhikari et al., 2021）.

 The increasing joblessness, income inequality, poverty, and insecurity in the country
partly explain the rising emigration rate from Nigeria, even among skilled individuals. For
instance, the Afrobarometer （2017） report indicates that about 36% of Nigerians had an
interest in emigrating to evade the harsh realities in the country. Table 1 shows that over
1.6 million people emigrated from Nigeria as of 2020, an increase of more than one million
individuals since 2000. In 2020, the USA remained the primary destination for Nigerian mi-
grants, followed by the UK. Interestingly, the migration trend is not limited to men only,
as women account for more than 48% of total Nigerian migrants in USA, UK, Cameroon,

Table 1: Number of Nigerian Emigrants per Destination ('000)

| Destination	Total			Male		Female	
	2000	2010	2020	2020	%	2020	%
WORLD	**610**	**996**	**1,670**	**877**	**52.5**	**792**	**47.5**
USA	138	216	402	195	**48.6**	**206**	**51.4**
UK	85	162	205	103	50.4	102	49.6
Cameroon	90	82	169	76	44.9	**93**	**55.1**
Niger	18	19	154	74	48.2	**80**	**51.8**
Italy	26	53	103	61	59.3	42	40.7
Benin	27	67	87	43	50.3	43	49.7
Ghana	16	57	80	46	57.6	34	42.4
Germany	14	21	52	33	63.5	19	36.5
Canada	10	27	45	23	51.4	22	48.6
Côte d'Ivoire	38	41	45	22	50.0	**22**	**50.0**

Source: United Nations Department of Economic and Social Affairs (UN-DESA, 2020)

Benin, Canada, Cote d'Ivoire and Niger. Since most migration to the USA, UK and Canada are based on lottery, skills, or education pursuit, one may consider the Westward migration as brain-drain.

Nonetheless, one of the positive outcomes of emigration from Nigeria is the sizeable amount of remittances transferred into the country by the diaspora. As shown in Figure 3, remittances to Nigeria have been larger and more stable than foreign direct investment and official development assistance combined since 2005. Furthermore, Nigeria's remittance receipt has increased from US$2 billion in 2004 to about US$23 billion in 2019, indicating an increase of over US$20 billion prior to the COVID-19 pandemic. Like several developing countries, the remittance inflow to Nigeria responded to the pandemic-induced shock by dropping to US$17 billion in 2020 before increasing to US$20 billion in 2022. This increase in 2022 made Nigeria the 9th largest remittance recipient globally (see Figure 4), the second in Africa after Egypt, and the first in Sub-Saharan Africa.

The sizeable inflow of remittances to Nigeria has been followed by several empirical studies assessing their effectiveness on several socioeconomic measures, including poverty (Fowowe & Shuaibu, 2021), household spending of durables, food, and education (Ajefu & Ogebe, 2021), and housing investment and savings (Osili, 2004, 2007). A recent study by Ainembabazi and Kemeze (2022) finds that remittances are associated with employment creation for individuals in both receiving (when remittances are low relative to household income) and non-receiving (when remittances are high relative to household income) households in Nigeria. Another study by Alhassan et al. (2024) shows that remittances are associated with an occupational shift from farm to nonfarm jobs. The study finds that remittance recipients are more likely to increase the hours works in nonfarm enterprises, especially among the less educated. Thus, the current study builds on both Ainembabazi and

Figure 3: International Financial Flows to Nigeria
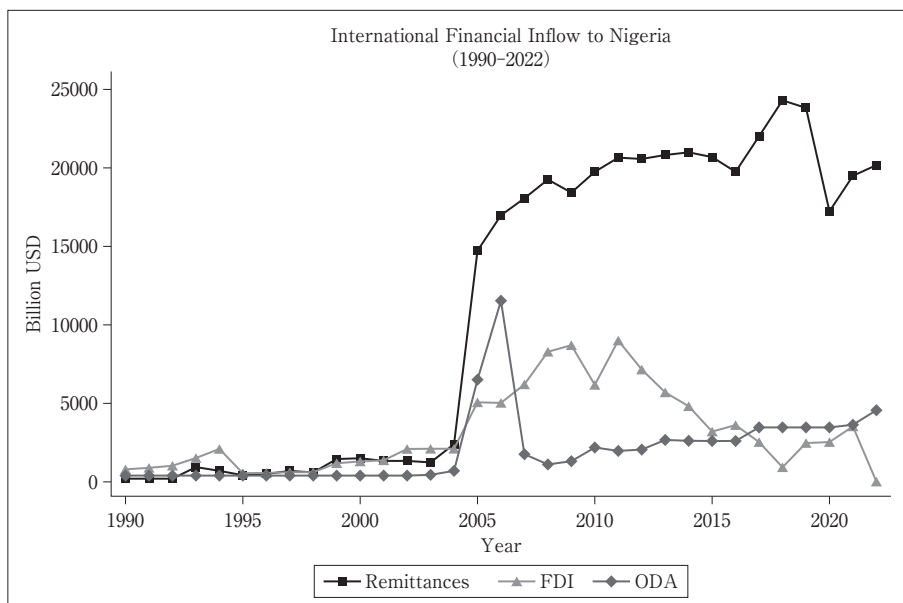
Source: Authors' creation from WDI, World Bank (2024); World Bank-KNOMAD (2024)

Figure 4: Top 10 Remittance Receiving Countries, 2022
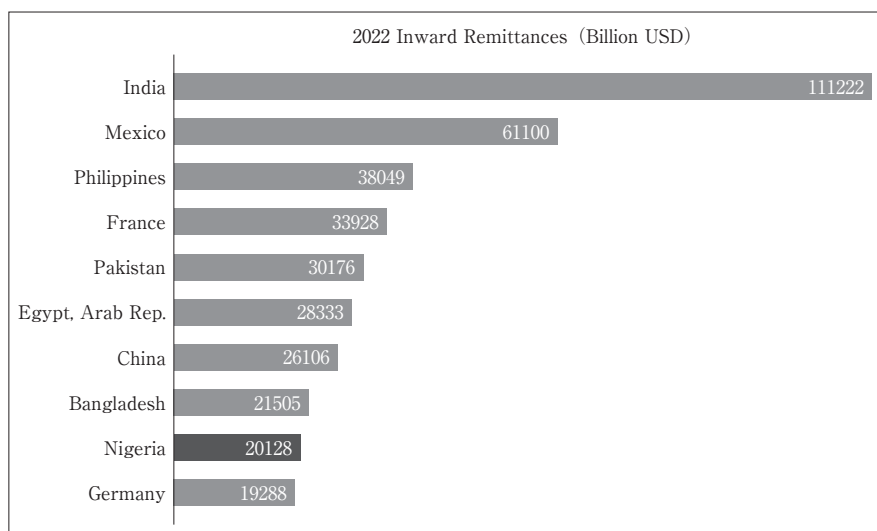
Source: Authors' creation from WDI, World Bank (2024)

Kemeze (2022) and Alhassan et al. (2024) to investigate whether the increased labour sup-
ply to nonfarm enterprises by remittance recipients affects the performance of such enter-
prises.

3．Literature Review

The relationship between remittances and entrepreneurship development is largely hinged on two theoretical postulations — the neoclassical labour-leisure dilemma and the new economics of labour migration theories. In the former, remittances are likened to non-labour income that raises the reservation wage of recipients and causes a dependency behavior, allowing recipients to favor leisure over labour supply（Gronau, 1973; Killingsworth, 1983）. Asiedu and Chimbar（2020）further extend the neoclassical theory to argue that remittance recipients may exit the labour force if remittances are beyond household consumption needs. Thus, remittances have an income or moral hazard effects, leading to a reduction in labour supply including to household enterprises. On the other hand, the new economics of labour migration（NELM）of Lucas and Stark（1985）offers a more positive prediction of the effect of remittances on entrepreneurship. The NELM theory alludes to the credit constraint alleviation effect of remittances, where households engage in migration to augment household income channels to circumvent domestic credit market inefficiencies.

Empirically, several studies test the predictions of both theories and reach contradictory findings. For instance, studies from Ethiopia, Ghana, Nepal, Tajikistan, and El Salvador lend credence to the income effect prediction of the neoclassical theory, indicating that remittance recipients are more likely to reduce labour supply, including to nonfarm enterprises （Asiedu & Chimbar, 2020; Ayalew & Mohanty, 2022; Azizi, 2018; Borja, 2013; Kharel et al., 2022; Murakami et al., 2021）. Contrarily, Nwokoye et al.（2020）and Alhassan et al.（2024） find that remittance recipients increase labour supply to nonfarm enterprises in Nigeria, thereby increasing the likelihood of entrepreneurship development. Similarly, Dey（2022） and Khan & Valatheeswaran（2016）submit that remittances increase enterprise ownership in India. One limitation of these studies is that the effect on remittances on entrepreneurship is inferred through the labour supply decisions of recipients, disregarding the performance of enterprises.

Following the NELM theory, several studies investigate the direct relationship between remittances and entrepreneurship at both the macro and micro levels. In the former, studies find no conclusive evidence of a positive impact of remittances on entrepreneurship. At the extreme, Ajide and Osinubi（2020）and Alhassan（2023）find that remittances are associated with a decline in entrepreneurship development, mainly manifesting through moral hazard of recipients. Zheng and Musteen（2018）further note that the negative effect of remittances on entrepreneurship is mainly evident in formal enterprises. For informal ventures, remittances have a positive effect. Recent studies thus contend that a positive effect of remittances on entrepreneurship development is conditional on remittance-receiving

countries' features such as e-government development （Alhassan, 2023）, diaspora concentration （Vaaler, 2013）, ethnic diversity （Yavuz & Bahadir, 2021）, the extent of informal economic activities （Martinez et al., 2015）, and migration duration （Cummings et al., 2019）.

At the micro-level, Dey （2022） observes that in contrast to domestic remittances, international remittances push rural Indians into self-employed nonfarm enterprises. However, Kakhkharov （2019） finds that remittances are only associated with increased household enterprise ownership conditional on sufficient household non-remittance savings in Uzbekistan. Moreover, remittance inflow to developing countries responds to exchange rate shock, thereby intensifying their impact in the receiving countries. Accordingly, Yang （2008） finds that the 1997 Asian financial crisis led to an increase in remittance inflow to the Philippines with an elasticity of 0.60 to exchange rate change. The increased remittances led to a series of investments, including in human capital and entrepreneurship development. Al-Assaf （2022） finds that although remittances reduce overall labour supply, especially to paid jobs, they encourage engagements in recipients' own enterprises for producing goods and services, regardless of gender. Contrarily, only Kharel et al. （2022） investigate the effect of remittances on the performance of enterprises. They find that Nepalese reduce hours worked as remittances to households increase. As a consequence, household enterprise revenue declines, indicating that remittances are associated with a decline in enterprise performance due to the moral hazard behavior, especially among female recipients.

There are two observed limitations in the literature on remittances and household entrepreneurship. First, there is a dart of studies on the direct effect of remittances on entrepreneurship ownership, especially in Nigeria. While Alhassan （2023） and Nwokoye et al. （2020） allude to the effect of remittances on household enterprises through labour supply, only Ainembabazi and Kemeze （2022） study the employment effect of remittances in household enterprises. Moreover, empirical studies investigating the effect of remittances on the performance of enterprises beyond mere ownership are missing in the literature. So far, only Kharel et al. （2022） present evidence of enterprise performance effect of remittances in Nepal. Thus, it is important to understand the effect of remittances beyond fostering the ownership of enterprises but to what extent they affect the performance of such enterprises. Second, the extant literature does not distinguish between the effect of remittances on formal and informal enterprises despite the unique features of informality in developing countries. This study builds on these limitations to provide new evidence on the remittance-entrepreneurship connection in Nigeria and the extension to the heterogeneity by formality status.

4．Data and Methods

4．1．Data Description and Source

This study utilizes data from Nigeria's 2018/2019 Living Standard Measurement Survey（LSMS）of the National Bureau of Statistics（NBS）with support from the World Bank.[1] The dataset includes information on about 116,000 individuals from 22,000 household randomly sampled from 2,220 enumeration areas（EAs, the primary sampling unit）across the 36 states of Nigeria and the Federal Capital Territory（FCT）. While the survey covers several modules, we only extract data from the household roster, labour force, enterprises, and community level information. Furthermore, we restrict our focus to individuals aged 15–65, thus yielding a sample of 61,169 individuals across 21,193 households. While the demographic and labour market information are used at the individual level, we observe remittances at the household level following the literature（Kharel et al., 2022）.

Table 2 shows the summary of variables used in the study at the individual, household, community, and enterprise levels. Notably, about 5.5%（see also graph（a）on Figure 5）of the households in the sample received an average of 165,953.7 Naira（$540.7）[2] in international remittances during the 12 months prior to the survey, slightly above the average non-remittance income of 157,784.5 Naira（$514.1）per household. Furthermore, Table 2 also shows that 52% of the sample consists of females, with an average age of 33 years, highlighting the youthfulness of the population studied. On average, individuals have 10 years of education. Additionally, 14% lacked formal education, 32% had primary school education, 42% had completed secondary school, and 11% had post-secondary education. Interestingly, 30% of the individuals own and work in nonfarm enterprises as one of their sources of income. At the household level, 83% of the households are headed by a male, while 55% of the household heads are literate（could speak and write in English）. The average household size in the sample is 5.2 individuals with a dependency（children under 5 years of age）ratio of 20%.

Regarding the nonfarm enterprises, graph（b）on Figure 5 shows that about 63.4% of households own at least one enterprise, suggesting the prevalence of nonfarm business ownership in Nigeria. For instance, Figure 6 shows the distribution of enterprises across the 36 states of Nigeria and the Federal Capital. Interestingly, nonfarm businesses are mainly concentrated in the northwestern and the southwestern parts of the country. However, 91% of the enterprises in the sample are informal, indicating that they are not registered with the government. The literature on informal economy indicates that although such enterprises create employment（mainly as a safety net）for most people in developing countries, especially in unemployment-ridden economies like Nigeria, such enterprises nega-

Figure 5: Household Remittance and Nonfarm Enterprise Ownership Status
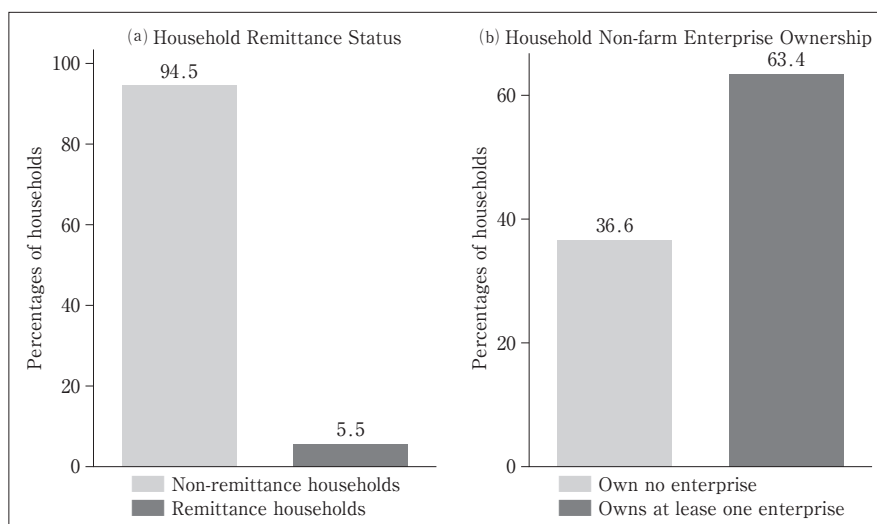
Source: Authors' Creation from LSMS 2018-2019

tively affect the macroeconomic outlook of a country（Ohnsorge & Yu, 2021）. In the Nige-
rian experience, income inequality and unemployment may have contributed to the enlarge-
ment of the informal sector（Haruna & Alhassan, 2022）. Moreover, the northern region
accounts for about 56% of total informality in the sample, indicating the prevalence of in-
formality in northern Nigeria（Figure 7）.

   A further look at the data reveals a small difference in enterprise ownership between
remittance and non-remittance households such that 66.7% of remittance households own
at least one enterprise compared to 63.20% for non-remittance households（Figure A1）.
However, the former are more likely to be registered with the government. Specifically,
Figure A2 shows that over 17.5% of enterprises in remittance households are registered
compared to 9.5% for non-recipients. Overall, Table 2 shows that 51% of the enterprises
are into retail and wholesale trade, 32% in other services such as food and hospitality,
while only 13% are into household manufacturing. The average enterprise size is 1.36, sug-
gesting that most of the enterprises have less than 2 employees. Furthermore, access to
external finance is challenging for household enterprises in Nigeria, as only 12% of enter-
prises in our sample have successfully borrowed money from outside the household. Lastly,
the average enterprise monthly revenue as of 2019 was 74,810 Naira（$243.7）, indicating a
relatively higher gross income despite a low value of total inputs（supplies）at 28,431.4
Naira（$92）. On the other hands, the total capital stock is over 220,000 Naira, yet indicat-
ing the small nature of the enterprises.

4.2. Analytical Framework and Estimation Strategy

   The productive use of remittances has remained an issue of contention. Kharel et al.

Table 2: Summary Statistics

Variables	Details	Mean	SD	Obs.
	Dependent Variables (Outcome Equations)			
Capital stock	The monetary value of all current capital stock	221,795.25	8,725,239.6	17,347
Input	The monetary value of all input/supplies for the NFE	28,431.44	152,947.13	17,347
Revenue	The total monthly revenue earned in the NFE	74,809.65	318,884.08	17,347
	Dependent Variable (Selection Equations)			
nfe_work	=1 if individual works in own NFE, 0 otherwise	0.30	0.46	61,169
	Individual Level Explanatory/Control Variables			
Male	=1 if the individual is a male, 0 if female	0.48	0.50	61,169
Age	Age in years	33.37	13.85	61,169
educ_yr	Years of education	10.18	6.07	61,169
No formal educ	Individual has no formal education	0.14	0.34	61,169
Primary educ	Attained primary level education	0.32	0.47	61,169
Secondary educ	Attained secondary level education	0.42	0.49	61,169
Post-secondary educ	Attained post-secondary level education	0.13	0.33	61,169
married	=1 if individual is married, 0 otherwise	0.45	0.50	61,169
Agric work land	=1 if individual owns a farmland, 0 otherwise	0.21	0.40	61,169
	Household Level Explanatory/Control Variables			
Remittances amount	Total amount received in cash and kind (Naira)	165,953.70	704,011.80	868
depratio_u5	HH dependency ratio (children under 5yrs)	0.20	0.20	21,193
HH size	Number of individuals per household	5.23	3.17	21,193
HH male head	=1 if household head is a male, 0 otherwise	0.83	0.37	21,193
HH head literate	=1 if household head is literate, 0 otherwise	0.59	0.49	21,193
HH NFE	=1 if household has at least 1 non-farm enterprise	0.63	0.48	21,193
HH income	Average income per household	157,784.5	471,829.8	21,193
	Community Level Explanatory/Control Variables			
share in wage work	Share of people in wage jobs in the community	0.08	0.07	2,213
share 15+ in agric work	Share of people in agriculture in the community	0.21	0.17	2,213
share 15+ in NFE	Share of people in NFE in the community	0.18	0.09	2,213
share 15+ unemp	Share of people unemployed in the community	0.16	0.09	2,213
Infrastructure: road	=1 if community has a road network	0.80	0.40	2,210
Infrastructure: school	=1 if community has a school	0.95	0.22	2,210
urban	=1 if community is in an urban area	0.40	0.49	2,213
zone	Zonal dummies	3.92	1.75	2,213
Migration network	Ratio of remittance households in the community	0.06	0.10	2,213
Avr. Comm*Rem	Average remittance per community with improved communication system	10,151.22	71,913.64	2,210
	Enterprise Level Explanatory/Control Variables			
Formal	=1 if the NFE is Formal	0.91	0.29	17,347
Total employment	Number of employees	1.36	1.81	17,347
Agric-based	=1 if NFE is agricultural-based	0.01	0.10	17,347
Mining & construction	=1 if NFE is in mining & construction	0.03	0.16	17,347
Manufacturing	=1 if NFE is in manufacturing	0.13	0.34	17,347
Services	=1 if NFE is in services other than trade	0.32	0.47	17,347
Trade	=1 if NFE is trade	0.51	0.50	17,347
Loan	=1 if NFE successfully borrowed money	0.12	0.33	17,347

Figure 6: Nonfarm Enterprises Distribution by States

Distribution of Non-farm Enterprises
State-level, Nigeria （2018/2019）
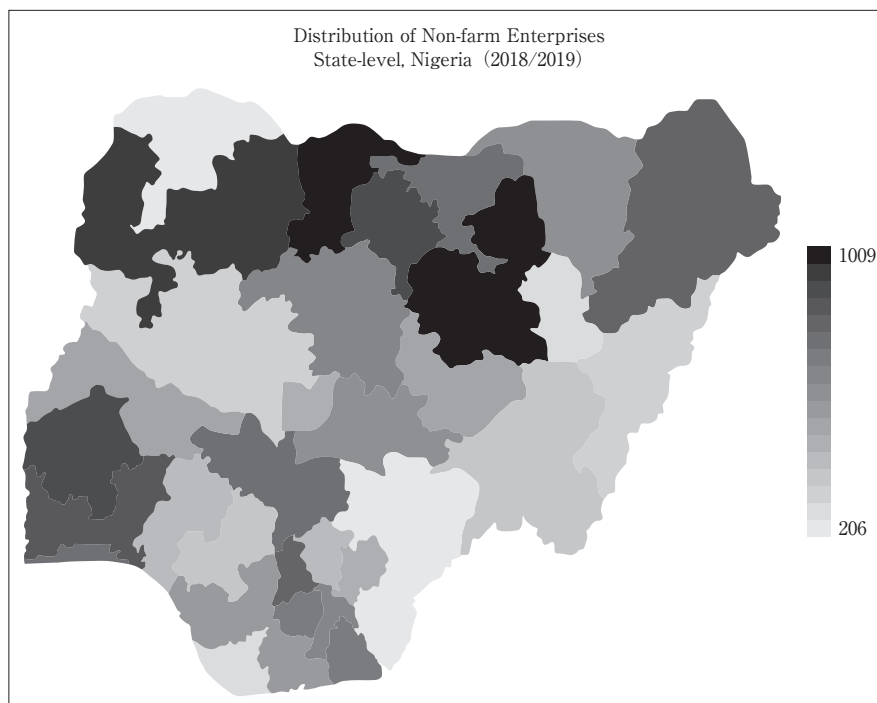
Source : Authors' Creation from LSMS 2018-2019

Figure 7: Nonfarm Enterprises by Region and Formality Status

Number of Enterprises by Formality Status and Household Zones
Nigeria, 2018/2019
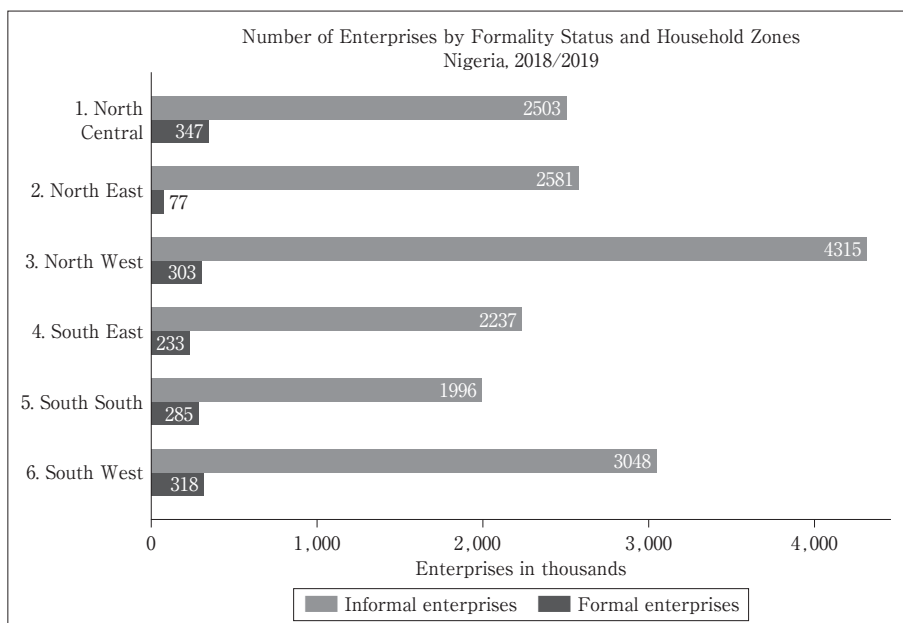
Source : Authors' Creation from LSMS 2018-2019

（2022）argue that remittance recipients may exhibit a moral hazard that precludes them from using remittances productively, such as in entrepreneurship development. However, as shown in Figure A1, remittance recipients in Nigeria tend to own more nonfarm enterprises compared to non-recipients, suggesting a credit alleviation effect that allows individuals to be entrepreneurial. Thus, our interest is to empirically assess the effect of remittances on nonfarm enterprise performance across three outcome indicators — inputs, capital stock, and gross revenue. Similar variables have been used by Thapa（2015）to measure enterprise performance. To advance the extant studies, this study also investigate whether the effect of remittances varies by the formality status of such enterprises. Accordingly, nonfarm enterprises are defined as all business ventures owned by a household member that engage in activities such as manufacturing, services, and trade other than farming. With respect to the outcome variables, gross revenue is defined as the total sales made or income generated from selling goods and rendering services during the last month prior to the living standard measurement survey by each enterprise. The term "revenue" instead of "sales" is used to capture the income of service-based enterprises, following Kharel et al. （2022）. Secondly, capital stock is the value of all physical capital used in the enterprises including buildings, machineries, equipment, cars, among others for the production of goods and services by an enterprise. Lastly, input stock is defined as the monetary value of all inputs or supplies available in the enterprise. These include all raw materials, finished products, and all items that are regularly replaced in the enterprises.

However, two limitations can be envisioned in the analytical framework. The first is the self-selection into nonfarm enterprise ownership and the second is the endogeneity of remittances. In the former, since individuals are not randomly selected to engage in entrepreneurship, estimating a model without controlling for such selection bias may lead to misleading conclusions if certain unobserved factors such as entrepreneurial skills affect the performance of the enterprises. Furthermore, recipients may quit agriculture to start businesses（Alhassan et al., 2024）, giving them an edge over non-recipients. In the second case, remittances are argued to be endogenous due to self-selection of households into migration, reverse causality between remittances and entrepreneurship, and measurement error due to large unrecorded remittances through informal channels（Mbaye, 2015）. Thus, the self-selection into nonfarm enterprise bias is addressed through a two-step Heckman（1979）selection model where in the first stage（selection equation）, a probit model is used to estimate the probability of working in nonfarm enterprises and in the second step（outcome equation）, an ordinary least squares（OLS）is used to estimate the impact of remittances on enterprise performance only for individuals with positive values of labour supply to nonfarm enterprise. Specifically, the empirical specification is a Tobit type-II approach as follows:

$$LogEP = \begin{cases} LogEP^*_{ihc} & \text{if } LSN_{ihc} > 0 \\ - & \text{if } LSN_{ihc} \le 0 \end{cases} \tag{1}$$

where $LogEP^*_{ihc}$ is the latent indicator for the log of enterprise performance that is observed only for each person that self-selects into nonfarm enterprises ownership (LSN_{ihc}; *labour supply to nonfarm enterprise*) and missing if otherwise. Equation (1) indicates that only individuals who are recorded to engage in nonfarm enterprises are observed in the enterprise performance equations below:

$$LogEP^*_{ihc} = \alpha + \beta REM_{hc} + \vartheta F_{ihc} + \gamma(REM_{ihc} * F_{ihc}) + \theta X_{ihc} + \varepsilon_{ihc} \tag{2}$$

$$LSN_{ihc} = \rho Z_{ihc} + \upsilon_{ihc} \tag{3}$$

where REM_{hc} is the predicted log of total remittances received per household h in community c during a year; X_{ihc} is a vector of individual, household, community, and enterprise characteristics that affect enterprise performance (see Table 2); and F_{ihc} is the enterprise formality status with a value of one for formal enterprises and zero if informal. In the Heckman selection model, equation (3) is the first stage (selection equation) estimated using the probit technique to predict self-selection into nonfarm enterprises and generate the inverse Mills ratio (IMR) which measures the effect of unobserved factors that determine enterprise ownership. Z_{ihc} in equation (3) includes individual, household, and community level factors that predict labour supply to nonfarm enterprise (ownership). For the ease of estimation, we adopt the two step Heckman estimator in Stata and verify the independence of the error terms in equations (2) and (3) using the Wald test of exogeneity. Thus, equation (2) estimates the direct effect of remittances on enterprise performance alongside the heterogenous effect by formality status captured by γ, the interaction term between remittances and formal enterprises.

To address the second issue on the endogeneity of remittances stemming from potential reverse causality and measurement error (Mbaye, 2015), we estimate a separate reduced form equation that identifies remittances using two instrumental variables (IV) ― migration network and average remittance per community with improved communication system as in equation (4).

$$logREM_{hc} = \beta + \gamma MigNet_{hc} + \varphi AvrCom_{hc} + \theta X_{ihc} + \varepsilon_{ihc} \tag{4}$$

The first exogenous variable is the migration network ($MigNet_{hc}$) at the primary sampling unit which measures the ratio of households that receive remittances to the overall households in a community. A similar IV is used in Dey (2022) and is assumed to affect remittance receipt since migrants often send remittances through such networks to their families but have no direct effect on labour supply. For the second IV, we use the average amount of remittances received per community with improved communication with exter-

nal environments（$AvrCom_{hc}$）. A variant of this variable is used in Ainembabazi and Ke-meze（2022）. The intuition here is that for communities with improved communication systems, remittances can be easily received through electronic means. However, this does not directly affect the type of jobs individuals in the community engage in. We estimate equation（4）using the OLS technique and use the fitted remittances values in equation（2）to estimate an enterprise performance model.

5．Results and Discussions

5.1．Determinants of Remittances

The empirical analyses begin with the estimation of equation（4）to identify the effect of migration network and average remittances per community with improved communication systems on the log of remittances received by households in Nigeria and present the result in Table 3. Notably, Table 3 shows that both exogenous variables are relevant, given their positive and significant effects on the amount of remittances received per household. This finding suggests that living in a community with extensive migration network and improved communication systems encourages information dissemination that influences migration and the transfer of remittances back to the communities. Additionally, Table 3 includes several individual and community levels control variables. The results show that household income, dependency ratio, and number of educated individuals are positively associated with remittance inflow. The positive effect of household income suggests that households with higher non-remittance income are better positioned to finance the cost of migration and as a consequence, benefit from more remittance inflow compared to poorer households. This result is akin to the argument that remittances increase community-level inequality since only those with information and financial ability to finance migration tend to benefit（Koechlin & Leon, 2007）. On the other hand, households with more dependent children under 5 years of age may receive more remittances as altruistic transfers from the migrants or as transfers for taking care of the left-behind children. Lastly, the household with more educated members may receive international remittances since international migration is more likely to attract the educated. Thus, remittances may be a form of return to education investment for recipients. Next, the fitted values of remittances generated from Table 3 are used in the Heckman selection model in subsequent estimations.

5.2．Remittances and Nonfarm Enterprise Performance

Sequel to the estimation of the determinants of remittances, we estimate the effect of remittances on enterprise performance in Nigeria using the Heckman selection model and present the results of the outcome equation in Table 4 and those of the selection equation

Table 3: Determinants of Remittances

	(1) Remittances
Migration network	10.833*** (.2345)
Avg. comm rem.	.000*** (.0000)
Male = 1	− .018 (.0193)
Age (year)	− .0057* (.0034)
Age squared	.0001** (.000)
Education (years)	.012*** (.0016)
Married = 1	− .0353* (.0192)
Dependency ratio	.2215*** (.0495)
Owns a non-farm enterprise	− .0032 (.0162)
Household income	.0076** (.003)
Household size	.0029* (.0018)
Household head is male	− .0232 (.0326)
Household head is literate	− .0106 (.0183)
Owns agric land	− .0171 (.0229)
Share of 15 + unemployed	− .0008 (.0009)
Infrastructure: road	− .0448** (.0185)
Infrastructure: school	.0136 (.0169)
Urban area	− .0176 (.0223)
Constant	− .1127 (.0718)
Observations	61082
R-squared	.2114
Regional Dummies	YES

Robust standard errors are in parentheses; ***p<.01, **p<.05, *p<.1

in Table A1 of the appendix. Notably, Table A1 shows that remittances have a positive relationship with labour supply to nonfarm enterprises. However, the results are statistically insignificant. For the outcome equation, column 1 of Table 4 shows the results for the outcome equation for input stock as the dependent variable, column 2 for capital stock, and column 3 for gross revenue. Notably, all enterprise performance indicators are measured in natural logs. Table 4 also includes the Wald test of independent equations which tests the validity of the Heckman selection model. The p-values of the Wald test suggest that the error terms for the selection and outcome equations are independent.

The coefficients of the explanatory variables show that remittances have a positive effect on enterprise performance in Nigeria. However, the effect is only significant for capital stock and gross revenue. Specifically, a 10% increase in remittance inflow increases enterprise capital stock by 0.5% and gross revenue by 0.6%, respectively. The result of capital stock. Suggests that remittances are associated with capital investments such as equipment, vehicles, and structures necessary for entrepreneurial success. This finding is novel since our measure of remittances is a combination of monetary transfers and the monetary value of in-kind transfers such as goods. Recent evidence suggests that migrants often send non-monetary products that could be used for entrepreneurship development by recipients（Barrera et al., 2024）. On the other hand, the increase in capital stock and labour supply to nonfarm enterprises increase revenue generation. This finding is contrary to that of Kharel et al.（2022）for Nepal where women reduce the hours worked in enterprises when remittances increase, thereby reducing the revenue generated in those ventures. Instead, our findings point to the productive use of remittances in Nigeria, stimulating investment in capital goods necessary for effective entrepreneurship.

Table 4 further shows the effects of other enterprise, individual, household, and community factors on enterprise performance. Notably, formal enterprises（those registered with the government）perform better than their informal counterparts in all three measures. Similarly, firms with more employees and access to financial credit have higher inputs, capital, and gross revenue. These effects are sizeable and significant at the 1% level, highlighting the importance of access to credit, enterprise formalization, and firm size for increased enterprise performance. For instance, Gichuki et al.（2014）find that merely accessing credit from community credit associations increases enterprise performance in Kenya. Access to credit thus facilitates procurement of inputs and capital stock, leading to higher firm revenue. On the other hand, larger firms are associated with higher performance in terms of productivity. Van Biesebroeck（2005）finds that large firms in Africa are more likely to survive and be productive. Although the firms in our sample are small on average, our finding indicates that increasing firm size may lead to increased need for capital stocks and inputs, thus increasing revenue generation. Lastly, formal enterprises often have more capital and asset stock, thereby improving their revenue generation compared to in-

Table 4: Remittances and Nonfarm Enterprise Performance - Outcome Equations

	(1) Input Stock	(2) Capital Stock	(3) Gross Revenue
Remittances	.0028 (.0233)	.0524*** (.016)	.057*** (.013)
Formal enterprise	.7113*** (.069)	1.0367*** (.0473)	.469*** (.038)
No. of employees	.088*** (.0232)	.0884*** (.0159)	.071*** (.017)
Successfully borrowed	.4292*** (.056)	.2757*** (.0368)	.298*** (.028)
Male＝1	.8605*** (.0449)	1.0458*** (.0336)	.736*** (.028)
Age（year）	.0399*** (.0123)	.0414*** (.0094)	.04*** (.009)
Age squared	−.0004*** (.0001)	−.0004*** (.0001)	.000*** (.000)
Education（years）	.0347*** (.0038)	.0408*** (.003)	.025*** (.002)
Married＝1	−.1391*** (.0412)	−.0092 (.0317)	−.002 (.026)
Dependency ratio	−.2914*** (.1037)	−.1346* (.0756)	−.19*** (.061)
Household size	.0068 (.0057)	.0139*** (.0044)	.026*** (.003)
Household head is male	.1334** (.0639)	−.0082 (.0456)	−.052 (.038)
Household head is literate	.2117*** (.0438)	.2017*** (.0338)	.107*** (.027)
Owns agric land	−.0394 (.0469)	.139*** (.0354)	.081*** (.028)
Share of 15＋ unemployed	.0127*** (.003)	.013*** (.0021)	.002 (.002)
Infrastructure: road	.1249* (.0656)	−.0224 (.0444)	−.01 (.038)
Infrastructure: school	−.0351 (.1104)	.0245 (.0829)	.195*** (.075)
Urban area	.141** (.0596)	.1311*** (.0424)	.082** (.032)
Constant	6.7288*** (.3838)	7.6406*** (.276)	8.382*** (.299)
Observations	54822	59444	60037
Selected observations	10683	15305	15898
Wald test of indp eqn（pvalue）	.6779(0.41)	.059(0.81)	2.55(0.11)
Industry Dummies	YES	YES	YES
Regional Dummies	YES	YES	YES

*Robust standard errors are in parentheses; ***p＜.01, **p＜.05, *p＜.1*

formal small firms. The findings of Ali & Marouani（2020）show that household enterprises in Egypt that register to become formal are more productive and profitable. Although our study does not estimate the profit function of enterprises, higher revenues suggest the possibility of increased profit among formal firms in Nigeria.

Looking at the owner's characteristics, male owned enterprises perform better in all three indicators, suggesting that male owners are more likely to increase labour hours to nonfarm enterprises and invest more in inputs compared to the female counterparts. This finding agrees with Rijkers & Costa（2012）who observe that men-owned enterprises are more productive in rural Ethiopia, Bangladesh, and Sri Lanka. Similarly, an additional year of education increases enterprise performance by about 4% for input and capital stock, and 3% for revenue. This finding suggests that educated Nigerians may be better at running nonfarm enterprises, including bookkeeping activities. However, Thapa（2015）contends that household enterprises require more local economy knowledge that is not dependent of the level of education, hence educational attainment does not matter for microenterprise performance in Nepal. Our find refutes this argument in the case of Nigeria. While local economy knowledge matters, the education of the enterprise owner may increase the need for effective management and replication of business practices learned through education. Lastly, we find a negative but insignificant relationship between marital status with all enterprise performance indicators save input stock which is significant at the 1% level.

In terms of household factors, households with larger dependency ratio experience lower performance in all three indicators. This finding is intuitive since more dependents means fewer hours allocated to enterprise management, thereby affecting its performance. On the contrary, households with more people perform better on capital stock and revenue since they can benefit from more family labour. Although the gender of the household head does not have a robust effect, households with literate heads are more likely to have higher inputs, capital and revenue, buttressing the effect of the years of education of the enterprise owner or manager. In terms of the community variables, we only find consistent positive and significant effect for enterprises in urban areas, suggesting that enterprises in urban areas perform better than their rural counterparts. This finding suggests the existence of urban premium for nonfarm enterprise performance in Nigeria. However, access to road networks only has a positive effect on inputs at the 10% level while the availability of schools in the community only affects revenue positively at 1% level. In all, these findings suggest that in addition to several enterprise, individual, household, and community factors, international remittances are important drivers of nonfarm enterprise performance in Nigeria.

5.3．Remittances, Nonfarm Enterprise Performance, and Formality Status.

Sequel to the preceding findings, this section investigates whether the effect of remit-

Table 5: Remittances and Nonfarm Enterprise Performance-Heterogeneity by Formality Status

	Input Stock		Capital Stock		Revenue	
	(1)	(2)	(3)	(2)	(1)	(2)
	Outcome eqn.	Selection eqn.	Outcome eqn.	Selection eqn.	Outcome eqn.	Selection eqn.
Remittances	.0169 (.0242)	.0006 (.008)	.0637*** (.017)	.0061 (.0054)	.067*** (.013)	.005 (.005)
Formal enterprise	.7817*** (.0776)		1.0916*** (.0523)		.518*** (.041)	
Rem*Formal enterprise	−.111** (.0521)		−.0803** (.0328)		−.072** (.033)	
No. of employees	.0899*** (.0233)		.0892*** (.0158)		.071*** (.017)	
Successfully borrowed	.4296*** (.0559)		.2758*** (.0368)		.298*** (.028)	
Constant	6.7351*** (.3836)	−5.48*** (.0862)	7.6348*** (.2762)	−5.47*** (.0741)	8.375*** (.298)	−5.43*** (.074)
Observations	54,822		59,444		60,037	
Selected observations	10,683		15,305		15,898	
Wald test of indp eqn (pvalue)	.6816(0.41)		.0454(0.83)		2.484(0.12)	
Controls	YES	YES	YES	YES	YES	YES
Industry Dummies	YES	NO	YES	NO	YES	NO
Regional Dummies	YES		YES		YES	

Robust standard errors are in parentheses; ***p＜.01, **p＜.05, *p＜.1

tances varies by the formality status of enterprises. Using the same controls as in Tables 4 and A1, Table 5 presents the abridged results using the full Heckman model based on equations 2 and 3. Notably, the partial effects of remittances and enterprise variables on performance remain similar to those of Table 4, highlighting the relevance of remittances for input, capital, and revenue advancement of nonfarm enterprises in Nigeria. However, the interaction between remittances and formal enterprise status is negative and significant at the 5% level for all measures of enterprise performance. This finding suggests that remittances are more likely to influence the performance of informal firms in Nigeria compared to the formal ones. This finding is crucial as it provides nuanced evidence of the type of enterprises that benefit from remittance inflow at the household level. The extant literature has largely ignored this disparity in the effect of remittances despite the complexities around informality in developing countries. This finding thus shows that while remittances may influence entrepreneurship development, they are mainly directed towards informal enterprises in Nigeria.

6. Conclusion

This study investigates the impact of international remittances on the performance of

nonfarm household enterprises in Nigeria. Using a large dataset of over 60,000 Nigerians from the living standard measurement survey and addressing both self-selection bias and endogeneity concern, the study finds that the remittances improve the performance of enterprises. Specifically, remittances increase the physical capital stock and the gross revenue of nonfarm enterprises. A further investigation reveals that the performance inducing effect of remittances mainly holds for enterprises in the informal sectors. These findings present new insights into the development impact of remittances in developing countries, especially on investments and entrepreneurship development.

The relevance of our findings extends beyond academic contributions. They magnify the role remittances in addressing labour market and general development drawbacks in Nigeria. For instance, although the new definition of unemployment portrays a low unemployment figure for Nigeria, the number of those underemployed remains high as well those in poverty. The results show that remittances can be leveraged to foster the development of small and medium scale manufacturing and service-based enterprises, capable of job creation and improvement of welfare. Thus, some policy insights can be drawn from our findings. For instance, policies that encourage remittance inflow are likely to influence entrepreneurship development at the household level. Although the results do not show the composition of employees in the household enterprises, they show the potential of these enterprises to grow or at most, continue to exist with increasing remittances. Thus, as Ainembabazi & Kemeze (2022) show, inflow of remittances also leads to more employment of labour outside the household, thereby fostering net job creation even if household members withdraw from the labour force. Secondly, our finding on the increased revenue for informal nonfarm enterprises suggests an expansion of the informal sector in Nigeria. However, scholars have argued that despite the usefulness of the informal sector to the poor and unemployed, such sectors come with great economic costs such as tax evasion, environmental damage, and indecent jobs. To address this negative effects of informality without discouraging the use of remittances for enterprise development, we recommend that the Nigerian government introduce programs facilitat the formalization of remittance-based informal enterprises.

Lastly, we acknowledge some limitations of this study and discuss potential scopes for future extensions. First, the cross-sectional nature of the data precludes longitudinal investigation to understand the historical link between remittances and entrepreneurship in Nigeria. Such an investigation is necessary for understanding the role of time-specific shocks that affect remittance inflow and the response of remittance-financed enterprises. Second, our investigation did not disaggregate between financial remittances and remittances in-kind to understand the unique implications of the latter in fostering entrepreneurship through the transfer of goods and ideas from the migrant host countries. Finally, our study did not include the moderating role of financial development and access to domestic credit

for remittance recipients. This investigation is crucial for understanding the role of domestic financial institutions in providing access to credit to support entrepreneurial development among remittance recipients. Future studies should explore these limitations to improve both scholarly and policymakers' understanding of the implications of remittances for national development.

Notes

1) See the complete discussion about the survey from the World Bank microdata: https://microdata.worldbank.org/index.php/catalog/3827

2) At 2019 exchange rate. Source: https://data.worldbank.org/indicator/PA.NUS.FCRF?locations=NG

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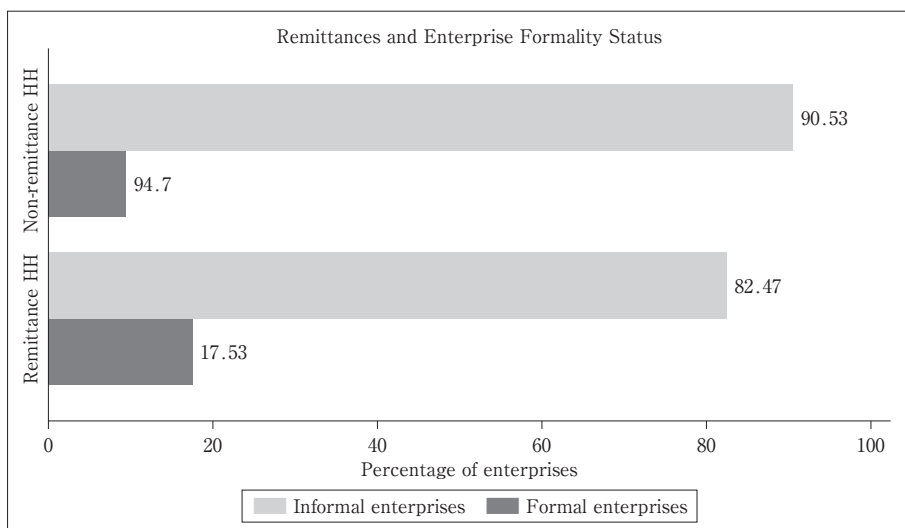
Appendix

Table A1: Remittances and Nonfarm Enterprise Performance-Selection Equations

	(1) Input Stock	(2) Capital Stock	(3) Gross Revenue
Remittances	.0006 (.008)	.0061 (.0054)	.005 (.005)
Male＝1	−.227*** (.0203)	−.151*** (.0189)	−.149*** (.019)
Age（year）	.1856*** (.0038)	.1934*** (.0034)	.193*** (.003)
Age squared	−.002*** (.000)	−.002*** (.000)	−.002*** (.000)
Primary education and below	.1802*** (.0234)	.1368*** (.0207)	.121*** (.021)
Secondary education	.1311*** (.0282)	.1031*** (.0242)	.081*** (.024)
Post-secondary education	−.341*** (.0355)	−.393*** (.0312)	−.407*** (.031)
Married＝1	.1808*** (.0193)	.1709*** (.0178)	.174*** (.018)
Dependency ratio	.3873*** (.0446)	.4462*** (.0406)	.436*** (.04)
Household size	.0019 (.0025)	−.001 (.0021)	−.002 (.002)
Household head is male	−.0652** (.0285)	−.089*** (.0251)	−.091*** (.025)
Household head is literate	.0089 (.0196)	.0406** (.0169)	.04** (.017)
Owns agric land	.057** (.0231)	.0285 (.0201)	.031 (.02)
Share of 15＋ in NFE	.0597*** (.0012)	.0606*** (.001)	.061*** (.001)
Share of 15＋ unemployed	−.002** (.0009)	−.004*** (.0007)	−.003*** (.001)
Infrastructure: road	−.0077 (.019)	.0202 (.0142)	.03** (.014)
Infrastructure: school	.0601** (.0303)	.0607** (.0244)	.059** (.023)
Urban area	.0017 (.0192)	.0216 (.0134)	.028** (.013)
Constant	−5.48*** (.0862)	−5.47*** (.0741)	−5.43*** (.074)
Observations	54822	59444	60037
Industry Dummies	NO	NO	NO
Regional Dummies	YES	YES	YES

*Robust standard errors are in parentheses; ***p＜.01, **p＜.05, *p＜.1*

Figure A1: Nonfarm Enterprise Ownership by Household Remittance Status

Number of Enterprises by Formality Status and Household Zones
Nigeria, 2018/2019
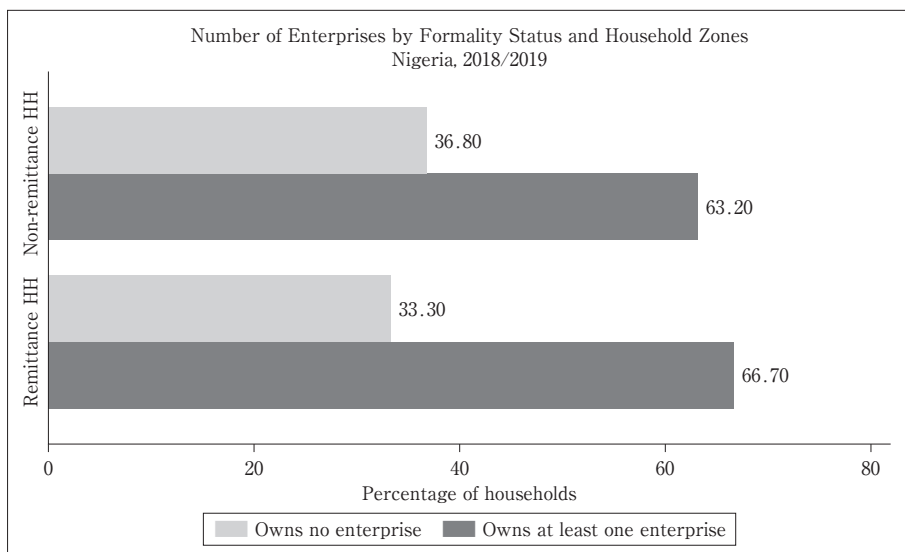
Source: Authors' Creation from LSMS 2018-2019

Figure A2: Average Hours Worked by Educational Attainment Status

Remittances and Enterprise Formality Status

Source: Authors' Creation from LSMS 2018-2019