



The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search

<http://ageconsearch.umn.edu>

aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

No endorsement of AgEcon Search or its fundraising activities by the author(s) of the following work or their employer(s) is intended or implied.

Remittances and employment in family-owned firms: Evidence from Nigeria and Uganda

Ainembabazi John Herbert and Kemeze Francis Hypolite
African Development Bank,
Microeconomic, Institutional & Development Impact Division
Emails: j.ainembabazi@afdb.org and f.kemeze@afdb.org

*Selected Paper prepared for presentation at the 2022 Agricultural & Applied Economics Association
Annual Meeting, Anaheim, CA; July 31-August 2*

Copyright 2022 by Ainembabazi, J. H. and Kemeze, F. H. All rights reserved. Readers may make verbatim copies of this document for non-commercial purposes by any means, provided that this copyright notice appears on all such copies.

Abstract

Despite the importance of remittance inflows to mitigate income and consumption risks faced by those left behind, no statistical evidence exists linking remittances and job creation in migrant sending communities. This paper examines how the varying share of remittance inflows in household income induces employment of family and non-family workers in family-owned firms. The analysis uses the nationally representative panel household data collected from Nigeria and Uganda. We find that as the share of remittance transfers in household income increases, the likelihood of hiring family members decreases as it increases for hired workers. The threshold point occurs when remittance transfers contribute more than a half of household income. We also analyze the role of remittances in job preservation and destruction in family firms. The findings point to a sign of hidden potential of remittances to spur job creation in migrants' communities if right policies to enhance remittance flows prevail.

1. Introduction

The most central motive for migrants to remit is to mitigate income risks and facilitate consumption smoothing of those left behind. This motive underlies much of the new economics of labor migration (Stark 1982; Stark and Bloom 1985) and is the main focus of microeconomic literature on remittance transfers (e.g., Taylor and Wyatt 1996; Taylor et al. 2003; Yang and Choi 2007; Adams 2011; Yang 2011; Böhme et al. 2015). Most of these studies—particularly for the empirical part of the studies—focus on the direct effects of remittance transfers on recipient households. However, consumptive expenditure and investments arising from remittance transfers may also have positive impacts on non-migrant households by providing employment and income, hence contributing to development of wider economy of the migrant sending communities (Stark 1982; Stark and Bloom 1985; Adelman et al. 1988; Durand et al. 1996; Posso 2012)¹. In spite of the potential importance of remittance transfers as a private-sector mechanism for pro-poor growth through income redistribution between migrant and non-migrant households, there is little statistical evidence focusing on specific indicators of development for the non-migrant households.

In this paper, we investigate how migrant remittances influence employment of family and non-family workers into family-owned firms (FOF) operated by recipient households in developing countries. There are a number of studies underlining the importance of remittances as an income source to finance, found and grow new businesses in migrants' home countries (Amuedo-Dorantes and Pozo 2004; López-Córdova and Olmedo 2006; Woodruff and Zenteno 2007; Yang, 2008; Vaaler 2011; Shapiro and Mandelman 2016). But there is hardly any statistical evidence linking the potential

¹ Throughout the paper, a migrant household refers to a household with at least one member who migrated to other locations outside the community in pursuit of employment, while a non-migrant household does not have any of its members who migrated.

importance of remittances as a private mechanism of income redistribution between migrant and non-migrant households through job creation by FOF. Moreover, there appears to be no empirical studies designed to test hypotheses derived from existing theoretical frameworks linking remittances to job creation in the migrants' communities (Taylor et al. 2003; de Haas 2010; Shapiro and Mandelman 2016; Clemens and McKenzie 2018). These studies theorize that provided that remittances contribute to mitigating income risks and smoothing consumption, remittance-caused investment generates employment opportunities for non-migrant households.

One of the means by which remittance transfers can contribute to job creation is through changes in reservation wage of migrant households. As a non-labor income source, remittances are expected to increase reservation wage of those left behind, thereby increasing their consumption for leisure by reducing either the hours worked (Acosta 2007; Grigorian and Melkonyan 2011; Justino and Shemyakina 2012; Jadotte and Ramos 2016; Acosta 2020) or the likelihood of participating in labor markets (Acosta 2007; Justino and Shemyakina 2012; Jadotte and Ramos 2016; Azizi, 2018; Vadean et al. 2019; Acosta 2020). If, when taken together, remittance transfers do indeed facilitate smoothed consumption and income flows leading to increased consumption of leisure and reduced labor supply, then this could crowd in hired labor to sustain some of the income generating activities pursued by migrant households.

We hypothesize that as the share of remittances in household income increases, the likelihood of supplying family labor into FOF falls while the propensity to hire external labor increases. Our hypothesis is based on the assumption that there is an imperfect labor market in which family members can hardly find a job within the community. Due to differences in intrahousehold labor allocation, a particular household may allow some of its members to migrate in pursuit of employment with a hope of sending remittances back home while those left behind continue to supply labor to

family income generating activities. We also speculate that family labor supply into FOF is priced at below the market wage rate given a low opportunity cost for family labor arising from unemployment and low supervision cost of family labor, while hired labor is priced at the market wage rate actually paid.

Based on this background, as the share of remittance inflows in household income increases but contributing a smaller portion than other sources of household income, the reservation wage is initially rising but lower than the market wage. Under this scenario, the FOF employs only family labor. However, as remittance inflows start contributing a dominant share in household income and the reservation wage rises above the market wage rate, then family labor supply into FOF reduces and the likelihood of hiring external labor increases. Indeed, empirical research shows that remittance flows from individual migrants to those left behind increase over time and tend to attain a peak about two decades after migration (de Haas and Plug 2006). That is, the proportion of remittances in household income is initially small and grows larger over time.

We test our hypothesis using nationally representative panel household surveys from Nigeria and Uganda. Overall, we find that when the share of remittances in household income is less than 50%, the likelihood of employing family members into FOF is much higher than that of hired workers but declining with increasing with share of remittances in household income. This suggests that self-employment in form of sole proprietorship prevails when remittances contribute relatively a small proportion to household income. But when remittances begin to contribute a dominant share to household income, the probability of hiring non-family workers into FOF tends be higher than it is for family members.

To test our hypothesis, we first draw from existing literature to understand how remittance transfers are likely to influence household decision-making on labor allocation into FOF. Next, we describe the data used in the analysis. The analysis is based on a system of equations designed to identify the relationship between remittance transfers and employment of both family and hired workers into FOF. We then present and discuss results by type of worker (family or hired workers) and test the sensitivity of our estimates to different estimations methods and data samples. We conclude with a discussion of policy implications of our main results.

2. Heterogeneous effects of remittances

Beyond intrahousehold labor decisions driven by remittances, there is evidence that remittances can raise local wages (de Haas 2006; Mishra 2007) and increase earnings (Hanson 2007) in migrants' communities. On the one hand, this may lead to an income effect, where an increase in local wages results in reduced hours worked and increased leisure consumption. Moreover, remittances not only out compete local wages in receiving communities (Taylor and Lopez-Feldman 2010), but they also trigger further migration among the family members left behind (van Dalen et al. 2005). On the other hand, emigration may create labor scarcity that could raise local wages, which in turn may lead to substitution effects by increasing the labor supply and hours worked (Mendola and Carletto 2012) leading to reduced leisure consumption. The overall effect attributable to remittances on total labor supply might depend on which of these effects dominates. In the context of our study, we postulate that when remittance inflows trigger a raise in local wages leading to an income effect that is stronger than substitution effect, remittance transfers reduce the likelihood of FOF hiring both family and non-family workers. The reverse holds when substitution effect is stronger. That is, remittances have a potential to stimulate job creation by firms operated by remittance-receiving households.

Research on remittances has largely ignored the aspect of an implicit relationship between migrant remittances and job creation in FOF operated by recipients in developing countries. Some literature reviews on remittances (e.g., Brown 2006; Adams 2011; Yang 2011) come to the conclusion that household consumption is the primary usage for remittances. This conclusion runs in contrary with the evidence that remittances increase venture funding availability in developing countries (Vaaler 2013; Martinez et al. 2015), help to overcome credit and liquidity constraints in countries with underdeveloped financial markets (Fayissa and Nsiah 2010; Giuliano and Ruiz-Arranz 2009). Besides, remittances tend to be countercyclical when recipients' businesses face economic crises (Acosta et al. 2008; Mandelman and Zlate 2012) and, over time, can support expansion of micro and small enterprises (MSEs) (Shapiro and Mandelman 2016). The establishment and/or growth of MSEs that are partly supported by remittance transfers reflect(s) another channel through which remittance inflows can create employment opportunities. Evidence shows that self-employment expands during economic downturn as a result of an upsurge in transitions from unemployment—arising from economic downturn—into self-employment (Mandelman and Montes-Rojas 2009; Loayza and Rigolini 2011; Shapiro and Mandelman 2016). By exploring a particular channel through which remittances contribute to create employment opportunities particularly in MSEs in recipient communities, our analysis offers specific policy implications for fostering the kind of private-sector led economic growth rather than the commonly held view—espoused mostly by macroeconomic research—that remittances are compensatory and therefore reduce or do not contribute to economic growth (Chami et al. 2005; Spatafora 2005; Barajas et al. 2009; Clemens and McKenzie 2018; Didia et al. 2018).

Alleviating financial constraints through credit access has been emphasized in the empirical studies as a prerequisite for micro, small and medium enterprises (MSMEs) to create jobs in developing

countries (Beck 2013; Ayyagari et al. 2014; Ayyagari et al. 2016; Brixiová et al. 2020). In presence of credit constraints (Woodruff and Zenteno 2007), migrant remittances are increasingly emerging as an alternative source of external financing for MSMEs in developing countries (Amuedo-Dorantes and Pozo 2004; López-Córdova and Olmedo 2006; Woodruff and Zenteno 2007). There is evidence to support the hypothesis that remittances create access to self-employment activities in the presence of capital constraints (Paulson and Townsend 2004; Woodruff and Zenteno 2007; Yang 2008). Whether remittance inflows help to create jobs in migrants' communities in presence of credit constraints is an empirical question addressed in this paper.

3. Data sources

The paper uses panel household data from Living Standards Measurement Study (LSMS) surveys carried out by the Nigeria National Bureau of Statistics (NBS) and Uganda Bureau of Statistics (UBOS) in collaboration with the World Bank. The LSMS surveys provide information on the migration of household individuals from their communities to other parts of the country or to other foreign countries. Besides, the surveys include data on remittance inflows to the households from household migrants or any other relatives and friends living outside their home communities. The surveys also have detailed information on household ownership of income generating non-farm enterprises and other socioeconomic characteristics at both household and community levels. Most importantly, the surveys provide information on employment of family members and non-family workers into the family-owned businesses.

The analysis uses 4 and 6 waves of LSMS surveys spanning from 2010/11 to 2018/19 and 2005/06 to 2015/16 for Nigeria and Uganda, respectively. In both countries, a large part of the data collected by each of the surveys covered the period of 12 months preceding the survey. The survey design and

sampling details, which we do not repeat here, are available online on the World Bank microdata website².

The LSMS surveys have a panel component that tracks the same households over time. However, not all households selected for panel surveys in the initial year were tracked across all survey waves. There were attritions mainly due to movement of some households to different locations. There were also replacements of households in different waves. In 2010, NBS selected the initial sample of households for panel surveys comprised of a nationally representative sample of approximately 5,000 households that were sampled from the annual General Household Survey (GHS) sample of 22,200 households. The GHS sample is representative of each of the 37 states of Nigeria. In Uganda, based on the 2005/06 survey, the LSMS surveys set out to track a panel of 3,123 nationally representative households for two consecutive years: 2009/10 and 2010/11 after which, parts of the sample would start to be replaced by new households.

Appendix A1 reports details of the sample households tracked and matched across survey waves. After accounting for attrition and missing information on some of the key variables, we end up with a pooled sample of annual observations of 18,085 and 18,735 households in Uganda and Nigeria, respectively. In Uganda, about 93% of the annual observations constitute panel households with each household observed at least twice up to 6 times over a period of 10 years. And about 43% of the original sample of 3,123 households was tracked in all survey waves. Whereas in Nigeria, 79% of the annual observations was revisited at least twice up to 4 times within a period of about 9 years, with 1,267 households surveyed in each survey time period.

² <https://microdata.worldbank.org>, accessed between January and May 2021.

4. Descriptive statistics of key variables

The variables of interest are family business ownership, remittance inflows and employment in the FOF. As mentioned earlier, a FOF is defined as any non-farm trading businesses that were operated in past 12 months preceding the survey. Figure 1 reports the proportion of households owning family business in each of the survey years. In general, more households own family businesses in Nigeria than in Uganda. Across the survey periods, nearly 60% of households in Nigeria owned family businesses compared to about 45% of households in Uganda. These proportions were nearly similar irrespective of whether the analysis considered all households in the sample or those that were tracked in all survey waves (balanced panel) or in some survey waves (unbalanced panel). This gives some comfort that the use of pooled or panel data in the analysis may yield close estimates.

The explanatory variable of interest is the value of remittances, defined as all current transfers in cash or in-kind received by residents in the last 12 months preceding the survey from family members or friends that migrated to other locations within the country or to abroad. The variable is normalized by dividing it by household income. The importance of this measure is that it captures the share of household income contributed by the remittance transfers, but it also reflects income and substitution effects associated with remittance transfers. When remittance transfers contribute a dominant share of household income, we might observe either an income effect of increasing demand for leisure by recipients or a substitution effect if recipients have an incentive to reduce their labor supply in response to large remittance transfers—all of which tend to reduce recipients' labor supply into FOF and perhaps induce employment of non-family workers into FOF.

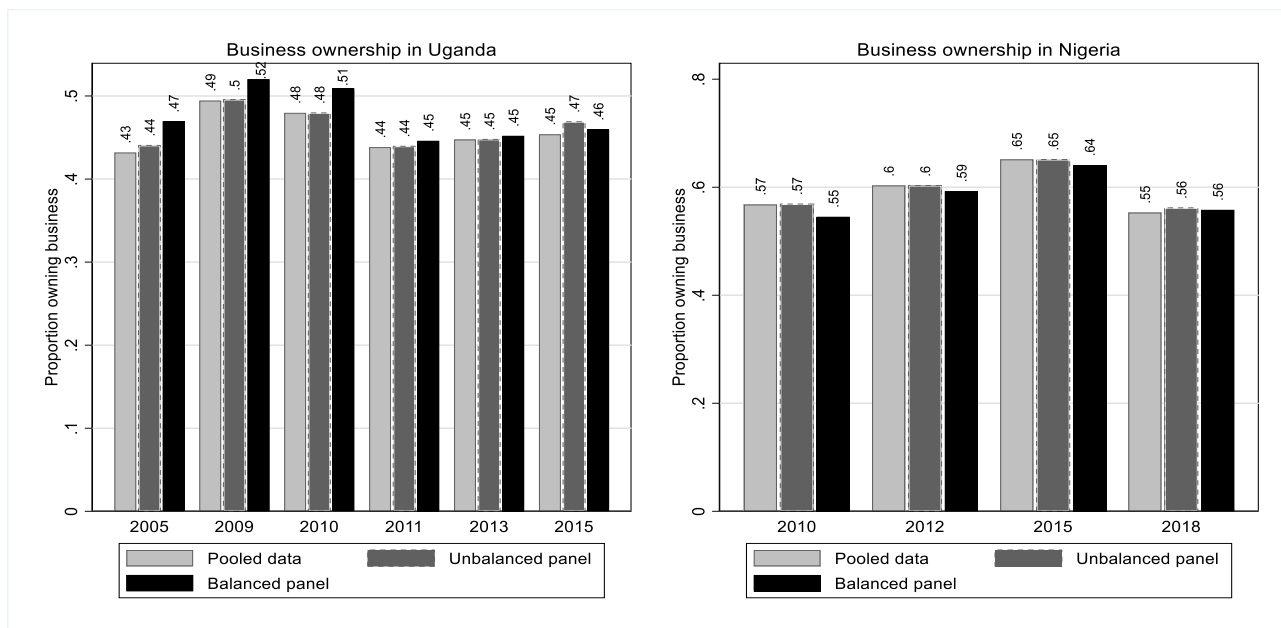


Figure 1. Share of households owning family business across survey waves

Table 1 reports remittance receipts by business ownership. There are significant differences in remittance receipts between households with and without businesses in Uganda but not in Nigeria. About a third of households without family businesses in Uganda receive remittances compared to 27% of households with family business. In Nigeria, about 16% of households receive remittances regardless of whether they own family businesses or not. Most notable, however, is that remittances are an important source of household income among households without family business. Remittances contribute more than a half (54%) of household income in Nigeria and 44% in Uganda. While we find that remittances contribute a small share (13%) of household income among households owning businesses in both countries, a large share of those households has more migrants than their cohorts. More than a third (35%) of households owning businesses in Uganda and about a quarter in Nigeria have migrants compared to 29% and 22% of households without businesses, respectively.

Table 1. Household characteristics by business ownership

Variables	Uganda			Nigeria		
	No business (N=9,818)	Own business (N= 8,267)	t-test statistics	No business (N=7,645)	Own business (N=11,090)	t-test statistics
Age of household head (years)	46.1 (16.9) [N=9,810]	43.0 (13.6) [N= 8,263]	13.398***	52.6 (16.4)	50.1 (14.4)	10.679***
Share of male headed households (1, 0)	0.679 (0.467) [N=9,810]	0.720 (0.449) [N= 8,263]	-5.916***	0.794 (0.404)	0.848 (0.359)	-9.604***
Share of household heads with						
No formal education	0.250 (0.433)	0.168 (0.374)	13.525***	0.449 (0.497)	0.351 (0.477)	13.557***
Primary education	0.517 (0.500)	0.516 (0.500)	0.086	0.215 (0.411)	0.271 (0.445)	-8.677***
Secondary education	0.134 (0.341)	0.199 (0.399)	-11.803***	0.165 (0.372)	0.251 (0.433)	-14.026***
Tertiary education	0.099 (0.298)	0.116 (0.321)	-3.881***	0.171 (0.376)	0.128 (0.334)	8.246***
Household size (number)	5.69 (3.39)	6.42 (3.31)	-14.554***	5.13 (3.21)	6.01 (3.23)	-18.259***
No. of males to household size ratio	0.489 (0.245)	0.484 (0.214)	1.546	0.498 (0.254)	0.489 (0.214)	2.502**
Land owned (acres)	3.63 (15.13)	3.75 (15.66)	-0.529	2.55 (11.2)	2.16 (9.77)	2.548**
Livestock ownership (TLU) ^b	2.28 (13.7)	2.13 (10.7)	0.778	3.01 (16.3)	1.86 (10.5)	5.847***
Value of household assets (USD) ^c	4046 (19562)	6579 (23719)	-7.869***	622 (3151)	812 (5983)	-2.545**
Household annual income (USD) ^c	6625 (33223)	11365 (37657)	-8.987***	3733 (28388)	7564 (30570)	-8.672***
Share of households receiving remittances	0.326 (0.469)	0.272 (0.445)	7.856***	0.156 (0.363)	0.155 (0.362)	0.259
Remittances as a share of income for recipients only	0.435 (0.390)	0.131 (0.184)	34.384***	0.538 (0.400)	0.133 (0.204)	35.705***
Share of households having migrants in at least 5 past years	0.285 (0.451)	0.346 (0.476)	-8.837***	0.219 (0.413)	0.238 (0.426)	-3.107**
No. of members who migrated	2.1 (1.7)	2.3 (1.8)	-5.263***	2.1 (1.6)	2.0 (1.6)	0.885
Household experienced at least one covariate shock in the past period ^d	0.268 (0.443)	0.283 (0.451)	-2.237**	0.173 (0.379)	0.192 (0.394)	-3.199**
Household experienced at least one idiosyncratic shocks in the past period ^d	0.149 (0.356)	0.156 (0.363)	-1.455	0.272 (0.445)	0.279 (0.449)	-1.174
Household owns its dwelling (1, 0)	0.823 (0.382)	0.782 (0.413)	6.868***	0.751 (0.432)	0.673 (0.469)	11.527***
Household location is urban (1, 0)	0.197 (0.398)	0.308 (0.462)	-17.365***	0.224 (0.417)	0.367 (0.482)	-21.142***

Notes: Figures reported in parentheses are standard deviations. ***, **, * denote estimated difference is significantly different from zero at the 1%, 5% and 10% test levels, respectively. Note that age and gender of the household head had missing data in 12 households for 2016 survey period. ^bTLU is the tropical livestock units based on Jahnke (1982). ^cSome households had extremely large values of assets and annual income, such values were dropped for 7 and 14 households from this analysis. ^dThe past period refers to last 12 months for Uganda, while it is 3 – 5 years for Nigeria.

In order to understand how FOF create employment opportunities, we distinguish between two forms of employment: (i) own account employment as employment of family members with or without

pay³; and (ii) entrepreneurship as employment of workers from outside family even though family members may also be hired into the business. With these definitions, we find that nearly all (99%) family firms hire two family members on average in both countries irrespective of whether the household receives remittances or not (Table 2). However, Table 2 also shows that in Nigeria, FOF that hire non-family workers tend to be in remittance recipient households (19%) compared to 17% of non-remittance recipient households. The reverse holds true for Uganda. FOF that hire non-family members are owned by nearly a quarter of households without remittances, while it is 20% of remittance recipient households. About 3 non-family workers, on average, are hired to work in FOF in both Nigeria and Uganda. Table 1 reports other household characteristics, while Table A2 reports community level characteristics.

Table 2. Labor supply and remittances conditional on business ownership

Variable	Nigeria			Uganda		
	No remittances (N= 9,372)	Remittance recipient (N=1,718)	t-value statistic	No remittance (N= 6,015)	Remittance recipient (N=2,252)	t-value statistic
Share of households employing family members into family business	0.989 (0.106)	0.990 (0.102)	-0.302	0.991 (0.093)	0.995 (0.070)	-1.751*
Average number of family workers	1.81 (1.24)	1.66 (1.09)	5.092***	1.58 (0.96)	1.61 (1.04)	-1.325
Share of households employing non-family members	0.172 (0.378)	0.194 (0.395)	-2.165**	0.239 (0.427)	0.201 (0.401)	3.656***
Average number of hired workers	2.86 (3.52)	2.86 (3.46)	-0.017	2.71 (3.40)	2.53 (3.50)	0.993
Average number both family and hired workers	2.28 (2.22)	2.20 (2.31)	1.488	2.23 (2.30)	2.12 (2.25)	1.900*

Figures reported in parentheses are standard deviations. ***, **, * denote estimated difference is significantly different from zero at the 1%, 5% and 10% test levels, respectively.

³ While we note that it would have been more informative to differentiate between paid and unpaid family members, the data used in the analysis do not allow for this differentiation. The data only identify the family members who directly participated in operation of the family business during the last 12 months preceding the survey.

5. Analytical approach

The interest is to investigate how remittances influence job creation in FOF in Nigeria and Uganda. The decision to own a business is a selective process that may be influenced by both observed and unobserved differences in household and community level characteristics. Economic literature emphasizes that wealth is a key determinant of business start-ups, but it also acknowledges that entrepreneurial experience and social networks enable start-ups to obtain external financing, while personality (e.g., risk disposition) lead to self-selection into or out of business entrepreneurship (Cressy 2000; Raijman 2001; Kan and Tsai 2006; van der Zwan et al. 2016). This suggests that there is possible selection bias into business ownership.

Conversely, liquidity constraints and poorly functioning financial markets can hinder households to establish or expand business enterprises (López-Córdova and Olmedo 2006; Giuliano and Ruiz-Arranz 2009; Vaaler 2011; Hanusch and Vaaler 2015). In a bid to overcome financial constraints and market imperfections, the theory of new economics of labor migration posits that households can allow some of its members to migrate who then make remittance transfers back home (Lucas and Stark 1985). That is, business establishment or growth funded by migrant remittances can lead to positive correlations with business expansion along with job creation. Alternately, remittances may reduce households' need to finance or find alternative income sources, leading to a negative relationship between remittances and business establishment/growth and hence reduced opportunities for employment. Besides, households that experience an adverse shock to existing family business may send members to seek for employment in different locations to make up lost income, so that migration and remittances would be negatively correlated with business growth and employment of family (and non-family) workers. There is, therefore, a potential existence of reverse causation between remittances and business growth together with job creation. Overall, we face a challenge of

selection bias and reverse causality. To address this challenge, we follow Wooldridge (2010) by utilizing the following structural model:

$$JC_{ijt} = \mathbf{X}_{ijt}\boldsymbol{\beta} + \alpha_r \text{Remit}_{ijt} + \tau_t + \varepsilon_{ijt} \quad (1)$$

$$\text{Remit}_{ijt} = \max[0, \mathbf{Z}_{ijt}\boldsymbol{\alpha} + \tau_t + u_{ijt}] \quad (2)$$

$$\text{Bizown}_{ijt} = 1[\mathbf{K}_{ijt}\boldsymbol{\delta} + \tau_t + v_{ijt} > 0] \quad (3)$$

Equation (1) is the structural equation of interest, which estimates the effect of remittances (Remit_{ijt}) on job creation (JC_{ijt}) in a family business owned by household i in location j and year t . $\mathbf{X}_{ijt}$ is a vector of household, business and community level characteristics. τ_t denotes survey period dummies to control for differential trends across the years. $\boldsymbol{\beta}$ and α_r are parameters to be estimated and ε_{ijt} is the error term. Equation (2) is a nonlinear projection of potentially endogenous remittances, measured as a share of total household income in household i owning a business in location j in year t . $\mathbf{Z}_{ijt}$ is a vector of exogenous variables including exclusion restriction variable(s) as further described below, $\boldsymbol{\alpha}$ is a vector of parameters to be estimated and u_{ijt} is the error term. Equation (3) is the selection equation of business ownership by household i in location j in year t (Bizown_{ijt}) estimated by a vector of exogenous variables ($\mathbf{K}_{ijt}$) with respective parameters ($\boldsymbol{\delta}$) and error term v_{ijt} .

Identification approach

Given the potential presence of selection bias and endogenous remittances, we assume arbitrary correlation among ε_{ijt} , u_{ijt} and v_{ijt} . To identify equations (1) and (2), it then follows that $(\varepsilon_{ijt}, u_{ijt})$ should be independent of explanatory variables included in vector $\mathbf{K}$. Wooldridge (2010: 809 – 813)

shows that equations (1) and (2) are identified if $\mathbf{K}$ includes at least one exogenous variable that affects selection into business ownership and then at least one instrument for $Remit_{ict}$. Our identification approach follows a three-stage procedure.

Stage I uses a probit regression to estimate the probability of a household owning a business. To control for the potential biases that may arise from non-random selection into business ownership, the probit estimates are used to construct the selection correction term, the inverse Mills ratio (IMR). The IMR is the ratio of the probability density function to the cumulative distribution function of standard normal distribution (Wooldridge 2010). The IMR is then included as one of the explanatory variables in equations (1) and (2) to control for possible selection bias, but its effectiveness relies on the inclusion of exclusion restriction variable(s) in equation (3). The exclusion restriction should have a direct effect on the probability of a household owning a business, but not remittances or job creation.

However, we face a challenge of identifying good exclusion restriction variables because the likelihood of owning a business and/or receiving remittances is somewhat influenced by similar household and community characteristics, allowing the possibility that $\mathbf{K} = \mathbf{Z}$. Allowing $\mathbf{K} = \mathbf{Z}$ implicitly means that equation (2) is likely to suffer from collinearity because then the inclusion of the IMR generated from equation (3) will be a function of the same variables in vector $\mathbf{K}$ (Wooldridge 2010). Because it is difficult to define the properties of good exclusion restrictions other than substantive intuition (Bushway et al. 2007), we follow Leung and Yu (1996) and Certo et al. (2016) to evaluate the strength of exclusion restrictions by examining the correlation between the IMR and the explanatory variables common in outcome equations. Strong exclusion restrictions tend lead to

low correlations. Nevertheless, weak exclusion restrictions lead to unbiased coefficient estimates although with large standard errors (Wooldridge 2010; Certo et al. 2016).

In estimation of equations (1) and (2), we use two different exclusion restrictions as the decision to create jobs for family business differs from the likelihood of receiving remittances. Access to improved road transport in the community is used as an exclusion restriction for business ownership for equation (2). Community exposure to improvements in road network tends to attract new business establishments that create employment at their time of formation, while employment rate in incumbent businesses tends to remain constant (Gibbons et al. 2019). It is unlikely, however, that improvement in road network would increase the likelihood of receiving remittances. This is due to the fact that it is the incumbent businesses that attract remittances (Amuedo-Dorantes and Pozo 2004; López-Córdova and Olmedo 2006; Woodruff and Zenteno 2007) suggesting that business entry establishments are less attractive to remittances⁴.

We also use family business ownership by parents of household head or spouse as an additional exclusion restriction for business ownership. It is more likely that children can be incentivized to establish own family businesses if their parents owned them, but parents' ownership of business may not necessarily influence the receipt of remittances by their children with independent families. For our sample, these two exclusion restriction variables have strong effect on business ownership, but with an insignificant effect on the likelihood to receive remittances conditional on business ownership. For job creation equation (1), we use migration network as an exclusion restriction.

⁴ Although we acknowledge that remittances can stimulate home-country business creation as aforementioned, this effect is often infinitesimal. Evidence shows that for remittances to cause an upsurge in business establishments in migrants' home country, the public sector—measured in terms of state-owned enterprises—must be sufficiently small (Vaalar 2011). Vaalar also finds that the effect diminishes further when time and geographic regional fixed effects are controlled for.

This exclusion restriction is at the same time used as an instrument to control for endogeneity in equation (1) associated with remittances. Details are provided further below.

Stage II addresses the problem of reverse causality between job creation and remittance inflows conditional on a household owning a business. To address this problem, usually a two-stage least squares (2SLS) approach (Wooldridge 2010) would be used to identify structural parameters of job creation regression in presence of endogenous remittances. Instead, we utilize the control function procedure (Wooldridge 2015). Technically, the control function produces estimates similar to those of 2SLS, but the former is preferred because: it provides a straightforward test of the null hypothesis that $Remit_{ict}$ is exogenous as further described below; and it is easily adaptable to nonlinear models which we use in equations (1) and (2), for which 2SLS would have undesirable properties (Wooldridge 2015).

The estimation of control function follows two-steps. In the first step, we regress $Remit_{ict}$ on $\mathbf{Z}$ using a tobit model and obtain the corresponding generalized residuals (see Vella 1992, for details). In the second step, we include generated residuals as an additional regressor in equation (1). Given the endogeneity of $Remit_{ict}$, heterogeneity is achieved in this second step conditional on $\mathbf{Z}$ containing exogenous variables including an exclusion restriction variable⁵. Similar to the selection equation, the exclusion restriction variable is included in $\mathbf{Z}$ but excluded in $\mathbf{X}$. The selected exclusion variable should have a direct effect on remittances but not on job creation. We use different exclusion

⁵ It is important to differentiate the use of the term exclusion restrictions between equations (2) and (3). In equation (3), exclusion restrictions are exogenous variables that are relevant to predict selection into business ownership. On the other hand, exclusion restrictions in equation (2) are exogenous (or instrumental) variables excluded in equation (1) intended to substitute for the endogenous remittances in equation (1).

restriction variables due to lack of standardization of survey instruments between Nigeria and Uganda.

The labor migration literature emphasizes the importance of the migration network as a key determinant of labor migration and remittance transfers. Particularly, empirical studies have shown that personal networks with migrants in the destination locations promote migration, which in turn induce increased remittance transfers in migrants' communities (Boyd 1989; Piotrowski 2006; Garip et al. 2015; Lőrincz and Németh 2019; Gërkhani and Kosyakova 2020). These studies use the number of migrants in the community or the presence of return migrants as proxies for migration network. In addition, marriage migration contributes significantly to a reduction in the variability of farm profitability in rural economies (Rosenzweig and Stark 1989). In this paper, we use the number of individuals who left their homes to search for employment and those who married away as proxies for migration network. We construct the exclusion restriction by summing up individuals who migrated (or married away) from each of the sample households in the community (j) in year t , excluding the individual(s) from household i in computing that sum. That is, exposure of individuals from household i to the network of emigrants from the same community may have direct effects on remittances and entrepreneurship, but such external migration networks may not have direct effect on job creation within the household i 's family business.

In the second step of the control function, equation (1) is estimated including generalized residuals from the first-step tobit (equation (2)) as an additional explanatory variable. These residuals serve as the control function to account for potential endogeneity associated with remittances. The hypothesis of exogeneity of remittances is tested using the t-statistic on the coefficient of generalized tobit

residuals. A significant coefficient suggests presence of endogeneity and standard errors are corrected for the generated regressor by bootstrapping using subsamples drawn from the full sample of observations (Wooldridge 2010).

Stage III estimates the structural equation (1) of interest to identify the effect of remittances on job creation while controlling for both sample selection bias and reverse causality as mentioned earlier. The modified equations (1) and (2) that are estimated are as follows:

$$JC_{ijt} = \mathbf{X}_{ijt}\boldsymbol{\beta} + \alpha_r \text{Remit}_{ijt} + \gamma_r \hat{\lambda}_{ijt} + \rho \hat{u}_{ijt} + \tau_t + \varepsilon_{ijt} \quad (4)$$

$$\text{Remit}_{ijt} = \mathbf{Z}_{ijt}\boldsymbol{\alpha} + \gamma \hat{\lambda}_{ijt} + \tau_t + u_{ijt} \quad (5)$$

where $\hat{\lambda}_{ijt}$ is the inverse Mills ratio generated from equation (3). $\hat{u}_{ijt}$ are residuals generated from equation (5). And γ_r , γ and ρ are parameters to be estimated. Other elements are as earlier defined. The hypothesis of exogeneity, $\rho = 0$, is tested using the t-statistic for $\hat{u}_{ijt}$. We use pooled data to estimate equations (3) through (5).

Under the estimation conditions described in stages I and II, Wooldridge (2010) provides proof that equations (4) and (5) yield consistent estimates. However, equations (3) through (5) do not control for possible unobserved heterogeneity across households and communities or shocks that could influence the likelihood of: owning a family business; receiving remittances; and hiring workers into family business. As a robustness check on the sensitivity of our estimates, we use an unbalanced subsample of panel households to control for unobserved heterogeneity. Let h_i denote unobserved

household-specific heterogeneity, and let equations (3) through (5) be represented by a single equation incorporating h_i as follows:

$$y_{ijte} = \mathbf{W}_{ijte}\boldsymbol{\eta}_e + h_{ije} + \epsilon_{ijte} \quad (6)$$

Then, following Papke and Wooldridge (2008) and Wooldridge (2019), h_i can be modeled as follows:

$$h_{ije} = \bar{\mathbf{W}}_{ije}\boldsymbol{\eta}_e + \ell_{ije} \quad (7)$$

where subscript e represents individual equations (3) through (5) and other subscripts are as defined earlier, $\bar{\mathbf{W}}_{ije} = \frac{1}{T} \sum_{t=1}^T \mathbf{W}_{ijte}$ is the vector of time averages over the number of time periods T of respective vectors of time-varying variables in equation e , $\boldsymbol{\eta}_e$ is the vector of parameters to be estimated, and ϵ_{ijte} and ℓ_{ije} are the error terms. Substituting equation (7) into equations (3) to (5), we control for unobserved heterogeneity as follows:

$$JC_{ijt} = \mathbf{X}_{ijt}\boldsymbol{\beta} + \bar{\mathbf{X}}_{ij}\boldsymbol{\beta}_h + \alpha_r \text{Remit}_{ijt} + \alpha_h \overline{\text{Remit}}_{ij} + \gamma_h \widehat{\lambda}h_{ijt} + \rho_h \widehat{u}h_{ijt} + a_{ijt} \quad (8)$$

$$\text{Remit}_{ijt} = \mathbf{Z}_{ijt}\boldsymbol{\alpha} + \bar{\mathbf{Z}}_{ij}\boldsymbol{\alpha}_h + \gamma_h \widehat{\lambda}h_{ijt} + b_{ijt} \quad (9)$$

$$\text{Bizown}_{ijt} = 1[\mathbf{K}_{ijt}\boldsymbol{\delta} + \bar{\mathbf{K}}_{ij}\boldsymbol{\delta}_h + c_{ijt} > 0] \quad (10)$$

where $\widehat{\lambda}h_{ijt}$ is the IMR generated from equation (10); $\widehat{u}h_{ijt}$ are generated residuals obtained from equation (9); a_{ijt} , b_{ijt} and c_{ijt} are composite errors consisting of ℓ_{ije} and respective errors from

equations (4), (5) and (3); elements with subscript h are parameters to be estimated. Other elements are as defined earlier.

Based on Wooldridge (2019), the following four considerations are noteworthy. First, by construction, the inclusion of time averages of covariates in equations (8) through (10) yields the fixed effects estimates of β , α_r , α and δ . Second and most important, equation (8) allows us to test whether remittances are exogenous to unobserved heterogeneity, after controlling for time averages of $\bar{X}_{ij}$, where we can test the null hypothesis: $\alpha_h = 0$ using a robust t statistic. A failure to reject the null hypothesis provides a justification to drop $\overline{Remit}_{ij}$ from equation (8), which could lead to a substantially precise estimate of α_r . Third, the covariates in equations (8) through (10) must include time dummies and their time averages. In unbalanced panel scenario, time period averages are $\frac{1}{T_i} \sum_{t=1}^T$; $t = 1, \dots, T$, and these vary across household i when different time periods are missing for different households. Additionally, the inclusion of time dummies controls for sample selection bias. And fourth, we include community variables and household level characteristics (such as education and gender of household head) in equations (8) through (10), which have limited variation across time, but are important to control for unobserved heterogeneity. For these variables with limited variation over time, their time averages are not included in equations (8) through (10). This is because the degree of collinearity between time averages of such covariates and their raw levels increases as time variation in raw covariates decreases, leading to inefficient estimates.

6. Results and discussion

6.1. Business ownership and remittance receipts

In this sub-section we implement our proposed analytical strategy to address selection bias associated with business ownership. Then, we test the validity of our proposed instrumental variables (exclusion restrictions) for controlling endogeneity associated with remittances in estimation of job creation by FOF. To address the selection bias problem, as aforementioned, we use two exclusion restriction variables: access to improved transportation infrastructure in the community and whether parents of the household head or spouse owned business. Table A3 reports the determinants of business ownership estimated using equations (3) and (10) on the pooled full sample of annual observations and a sub-sample of panel households, respectively. The latter was used to control for unobserved household heterogeneity that might influence household's decision to own family business. Although the inclusion of time dummies in Table A3 helps to control for sample selection bias (Wooldridge 2019), we further control for attrition in the sub-sample of panel households. Appendix B provides a brief description of overcoming attrition and Table B1 reports determinants of business ownership where attrition is controlled for.

The results in Tables A3 and B1 show significant F-tests for joint significance of exclusion restrictions and significant t-statistics for some of the exclusion restriction variables across different specifications and datasets. This is indicative of the strength and predictive power of the selected exclusion restrictions for business ownership. The inclusion of these exclusion restrictions in outcome equations (5) and (9) yielded low predictive power with none of them attaining the minimum acceptable significance level of 10%.

Tables A4 and B2 report the determinants of the likelihood of receiving remittances conditional on the household owning a business. Table A4 includes specifications that control for unobserved household fixed effects (equation (9)), while Table B2 controls for attrition bias. The significant F-test for joint significance of time averages of household variables shows that receipt of remittances is correlated with unobserved household fixed effects, suggesting that random effects tobit would be inappropriate choice. Similarly, attrition bias is present in our sample as evidenced by joint significance of attrition variables. The presence of unobserved fixed effects and attrition bias was controlled for by correcting standard errors using bootstrapping approach (refer to section 5 and Appendix B for details).

Importantly, we included, as one of the explanatory variables, the inverse mills ratio (IMR) generated from the estimation of the business ownership (first stage regression). As reported in Tables A4 and B2, the coefficients on the IMR are not significantly different from zero, suggesting failure to reject the null hypothesis that selection bias exists in our sample. That is, the likelihood of a household receiving remittances is not essentially influenced by the ownership of family business. This finding remains consistent even after controlling for unobserved heterogeneity across households and sample selection (attrition) bias. This further suggests that IMR can be excluded in the estimation of remittance equations without loss of efficiency in generating residuals to be used in the third stage estimations of job creation.

To further test the strength of our exclusion restrictions, Leung and Yu (1996) demonstrate that valid exclusion restrictions included in the selection equation (business ownership) yield low collinearity between IMR and explanatory variables in the outcome equations. Leung and Yu show that

collinearity can be evaluated by examining the correlation between the IMR and regressors in the outcome equations or using a condition number of the data matrix of explanatory variables including IMR that should be less than 30⁶. The low condition numbers indicate the presence of low collinearity. Results in Tables A4 and B2 show that the average correlation values between IMR and regressors in the outcome equations is up to 17% and the highest condition number is about 6 across the different specifications and sample datasets from the two countries. This further supports the validity of our selected exclusion restrictions and the insignificant t-tests on the coefficient of IMR provide evidence of absence of selection bias associated with business ownership.

6.2. Job creation and remittances

Non-parametric regression results

We first present the bivariate non-parametric regression of job creation on remittance receipts. The use of non-parametric regression allows us to observe the predetermined distributional relationship between job creation and remittances shaped according to information derived from the data. Figure 2 presents marginal effects of additional remittances on job creation estimated using non-parametric regressions. The Figure shows that there is a probable non-linear relationship tending to a U-shaped relationship between job creation and share of remittances in household income, especially in Uganda and particularly for hired workers and all types of workers combined. For family workers in FOF in Uganda, there appears to be an inverse relationship between job creation and share of remittances in income. In Nigeria, job creation appears to decline sharply when remittances contribute about less than half of the total household income regardless of type of worker. But, when remittances exceed

⁶ The condition number is defined as the square root of the ratio of the largest to the smallest eigenvalue of the data matrix (Belsley et al. 1980). These authors set the threshold condition number at 30, above which is indicative of collinearity problems.

50% of household income, the decline in job creation tends to stagnate for different types of workers and all types of workers combined.

Worth noting in Figure 2 is the spread of the confidence intervals observed for each curve. The confidence interval widens as the income share of remittances increases. On the one hand, the narrow confidence interval implies that a parametric analysis assuming a linear relationship between FOF's job creation and income share of remittances yields a strong negative relationship. On the other hand, the wide confidence interval may imply that we have little knowledge about the precise effect of remittances on job creation by FOF when remittances are a major source of household income, and that further investigation is needed. In the next two sub-sections, we explore these implications by using parametric methods to control for other observed factors and unobserved heterogeneity following the analytical procedure described in the preceding section.

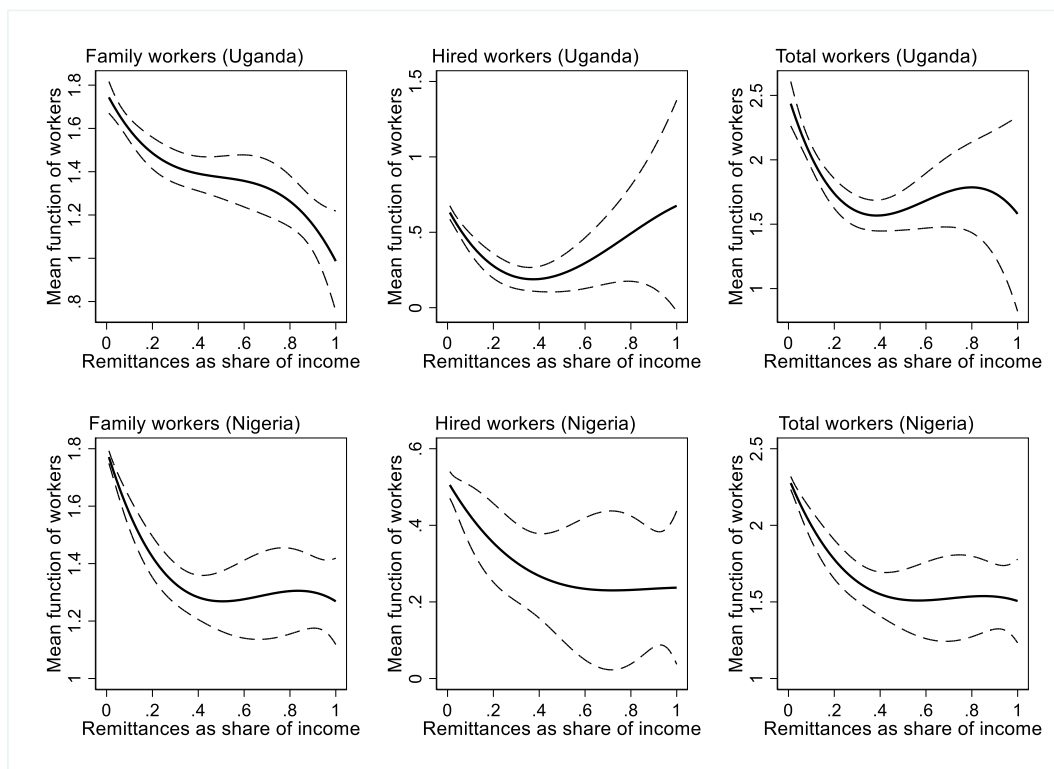


Figure 2. Marginal effect of remittances on job creation in family firms by type of workers

Parametric regression results

To investigate the potential non-linear relationship between job creation by FOF and remittances observed using non-parametric regression, we use quadratic polynomial functions of the share of remittances in household income⁷. Table 3 reports results estimated using the pooled tobit estimator in equation (4) reported in columns (1)–(2) and (5)–(6), and the fixed effects (FE) estimator in equation (8) reported in columns (3)–(4) and (7)–(8), for different types of workers: family members, hired workers and all workers combined. All estimations control for observed household, community and trend effects. Business characteristics including business location and source of capital for initial business startup are included in columns (2), (4), (6) and (8)⁸. It is notable that omission of business characteristics may lead to an upward bias in the estimated effects of remittances on job creation.

With exception of job creation for family workers in Uganda, the results reveal evidence of a significant U-shaped relationship between job creation by FOF and share of remittance transfers in household income. These results support the non-parametric relationships observed in Figure 2. On the one hand, the coefficients on squared terms for the share of remittances in household income for Uganda are barely significant. Moreover, the turning points for the share of remittance transfers in household income are greater than one. This means that the turning point is outside the range of the actual values of share of remittance transfers in household income which is capped at 100%. That is, the U-shaped relationship is not valid in this case but an inverse relationship is. This is consistent

⁷ We ran different polynomial regressions of orders 2, 3 and 4, all but order 2, generated insignificant coefficients.

⁸ In Uganda, information on business location characteristics was not collected in the 2005 survey year. We ran pooled estimations in columns (6) and (8) with business location characteristics for survey years 2009, 2010, 2011, 2013 and 2015. Then we also ran similar estimations without business location characteristics but including the 2005 observations. Comparing the estimates generated with and without business characteristics, the estimates of interest on remittances retained consistent sign throughout all estimations and the magnitude of their coefficients did not change appreciably. We, therefore, reported only estimates generated using all survey years throughout the paper. Results with business location characteristics are available from authors on request.

with the relationship observed in Figure 2 for job creation for family workers and share of remittances in household income in Uganda.

On the other hand, the rest of the results, in general, confirm that the marginal effect of share of remittances in household income on job creation exhibit a significant U-shaped relationship. The turning points for the share of remittance transfers in household income are reported at the bottom of each panel of results and varies by country and type of worker. Considering estimates in columns (4) and (8) that control for household observed and unobserved heterogeneity, community and business characteristics, there is a strong inverse relationship (IR) between job creation by family firms and remittance transfers. In Nigeria, the IR is observed between zero and up to about 54% and 56% share of remittances in household income for family and hired workers respectively, beyond these thresholds, the relationship turns positive. Whereas in Uganda, the corresponding IR for hired workers is observed up to 60%, above which the relationship turns positive. When we consider all types of workers combined, the IR is upheld up to 63% share of remittances in household income in Nigeria and 74% in Uganda, beyond which remittances can contribute to job creation in family firms.

As can be seen in Table 3, two key findings are noteworthy. First, for different types of workers, the magnitude of the coefficient on the share of remittances in household income is larger for hired workers than family workers in all specifications. This suggests that as the share of remittances in household income increases, the likelihood of employing hired workers decreases much more than it is for family members. But when the share of remittances in household income increases beyond a certain threshold, the likelihood of employing hired workers is greater than that of hiring family members. Second, in all model specifications, high employment opportunities are concentrated in family firms where the family receives smallest amount of remittances relative to the household income. The descriptive evidence in Figure 2 indicates that this high employment concentration is limited to about two family members and one hired worker.

Table 3. Job creation and remittance transfers

	Nigeria (columns 1 – 4)				Uganda (columns 5 – 8)			
	Pooled tobit (1)	Pooled tobit (2)	FE tobit (3)	FE tobit (4)	Pooled tobit (5)	Pooled tobit (6)	FE tobit (7)	FE tobit (8)
<i>Job creation for family labor</i>								
Remittances	-1.376*** (0.307)	-0.716** (0.290)	-1.188** (0.375)	-0.439* (0.230)	-1.360*** (0.343)	-1.208*** (0.350)	-1.383*** (0.395)	-1.169** (0.396)
Remittances squared	0.974*** (0.249)	0.518** (0.233)	0.859** (0.325)	0.404 (0.258)	0.565* (0.322)	0.528 (0.329)	0.672* (0.407)	0.549 (0.397)
Inverse Mills Ratio (IMR)	-0.484*** (0.079)	-0.250*** (0.071)	-0.580*** (0.079)	-0.329*** (0.075)	-0.196 (0.151)	-0.173 (0.144)	-0.400** (0.131)	-0.352** (0.136)
Control function	0.264** (0.107)	0.156 (0.098)	0.152 (0.112)		0.385** (0.124)	0.357** (0.117)	0.412*** (0.125)	0.371** (0.126)
Turning point	0.706	0.691	0.692	0.543	1.204	1.144	1.029	1.065
<i>Job creation for hired labor</i>								
Remittances	-15.321*** (3.534)	-10.661*** (2.984)	-12.721** (3.946)	-6.628** (2.695)	-12.627*** (2.824)	-11.973*** (2.761)	-9.011** (3.294)	-8.249** (2.961)
Remittances squared	11.386*** (3.199)	7.726** (2.866)	10.388** (3.518)	5.879* (3.389)	12.182*** (2.829)	11.658*** (2.856)	7.474** (3.718)	6.845** (3.325)
Inverse Mills Ratio (IMR)	1.800** (0.705)	1.980** (0.715)	1.212* (0.684)	1.335* (0.715)	-9.512*** (1.149)	-8.798*** (1.217)	-7.685*** (1.108)	-7.181*** (1.059)
Control function	2.575** (0.897)	1.818** (0.851)	1.236 (0.952)		0.870 (0.831)	0.831 (0.845)	0.835 (0.882)	0.744 (0.873)
Turning point	0.673	0.690	0.612	0.564	0.518	0.514	0.603	0.603
<i>Job creation for total labor</i>								
Remittances	-4.282*** (0.668)	-2.750*** (0.627)	-2.770*** (0.483)	-1.912*** (0.452)	-3.625*** (0.738)	-3.384*** (0.737)	-2.728*** (0.777)	-2.387** (0.859)
Remittances squared	3.035*** (0.526)	1.806*** (0.479)	2.276*** (0.536)	1.527** (0.515)	2.826*** (0.738)	2.757*** (0.748)	1.800** (0.784)	1.608* (0.883)
Inverse Mills Ratio (IMR)	-0.311* (0.186)	-0.046 (0.180)			-0.954*** (0.277)	-0.889** (0.283)	-1.055*** (0.268)	-0.986*** (0.243)
Control function	0.754** (0.235)	0.522** (0.220)			0.538** (0.273)	0.491* (0.275)	0.594* (0.313)	0.521* (0.315)
Turning point	0.705	0.761	0.609	0.626	0.641	0.614	0.758	0.742
Household variables (HV)	yes	yes	yes	yes	yes	yes	yes	yes
Time averages of HV	no	no	yes	yes	no	no	yes	yes
Firm variables (FV)	no	yes	no	yes	no	yes	no	yes
Time averages of FV	no	no	no	yes	no	no	no	yes
Community variables	yes	yes	yes	yes	yes	yes	yes	yes
Time dummies (TD)	yes	yes	yes	yes	yes	yes	yes	yes
Time variables of TD	no	no	yes	yes	no	no	yes	yes
Number of observations	11,090	11,090	8,957	8,957	8,144	8,144	7,723	7,723

Figures in parentheses are standard errors (S. E). ***, **, * denote estimated parameter is significantly different from zero at the 1%, 5% and 10% test levels, respectively. All estimates in the Table that have significant coefficients on either IMR or control function terms were obtained after bootstrapping with 300 replications to correct the S. E. for the generated regressors. Note that some of the insignificant coefficients on IMR and control function terms were significant before the bootstrapping exercise. Where coefficients on both IMR and control function terms were insignificant, as discussed in section 5, the terms were dropped before generating the reported results. Refer to Table A2 for details of community variables.

6.3. Mechanisms through which remittances contribute to job creation

While the mechanism behind the observed U-shaped relationship is beyond the scope of this paper, we examine the extent to which remittance transfers support local economic growth through employment opportunities of non-family workers into FOF and persistence of created jobs. As aforementioned, an initial increase in share of remittances in household income reduces the likelihood of FOF from creating jobs for both family members and hired workers, with the likelihood being higher and stronger for the latter than the former. The former finding appears to be consistent with closely related studies (Adams 2011; Grigorian and Melkonyan 2011), which find that remittances reduce labor supply or the likelihood of participating in labor market by recipients. This is because remittances increase reservation wage to a level at which recipients are unwilling to supply labor. This may have implications for job creation opportunities and their persistence. Increased reservation wages for recipients of remittances may reduce the incentive of family members to supply labor into FOF and hence induce FOF to employ workers from outside the family. Alternatively, increased reservation wages may translate into increased household income which may trigger either: increased job destruction by FOF and/or exit from family business operations or increased job creation and possible new entries into FOF. We provide simple analysis of these implications below.

Remittances and employment intensity of family and hired workers in FOF

In this sub-section, we aim test our hypothesis that an initial increase in the share of remittances in household income reduces the likelihood of supplying family labor into FOF but increases the propensity to hire external labor. Figure 3 presents non-parametric regression of family and hired workers measured as the share of total workers in the FOF. As can be seen, in Nigeria, we observe both non-linear inverse and direct relationships between share of family and hired workers,

respectively, and the share of remittance transfers in household income. Particularly, when remittances contribute about less than 20% of household income, the share of family workers in the FOF rises sharply and stagnates at about 90% of total employment, while that of hired workers drops and stagnates at 10% of total employment. That is, in Nigeria, family workers dominate hired workers when remittances contribute relatively a small share to household income.

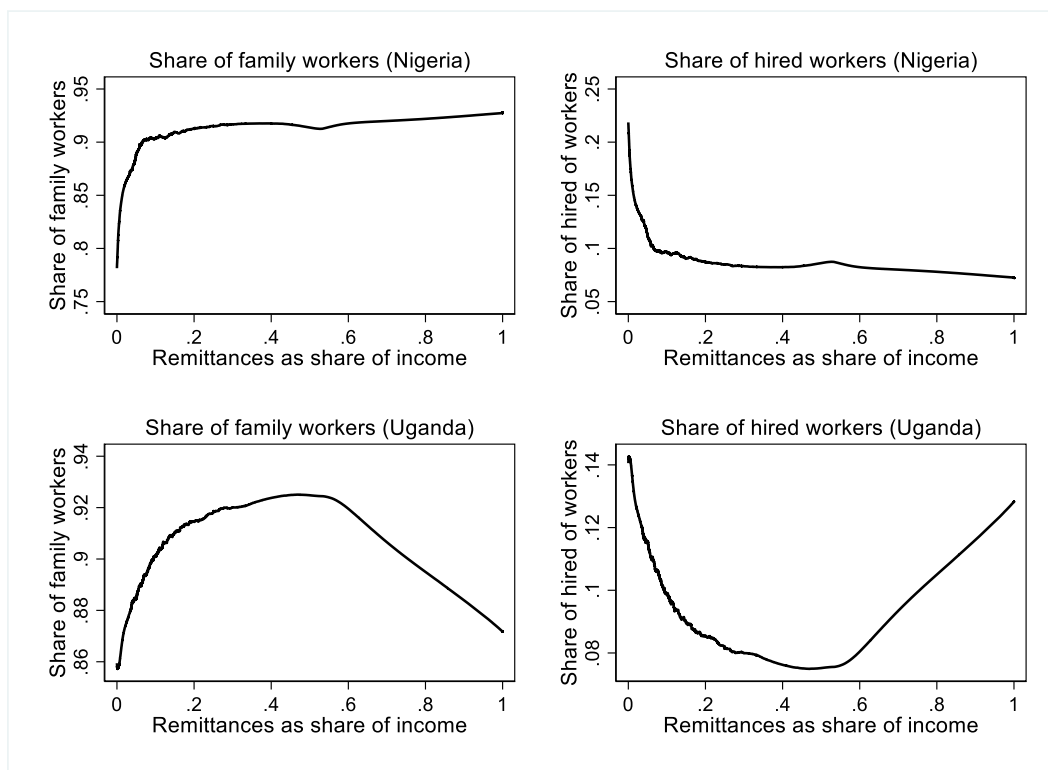


Figure 3. Non-parametric regression of share of family and hired workers on remittances

Whereas in Uganda, we observe pronounced inverted-U and U-shaped relationships between family and hired workers, respectively, and share of remittance transfers in household income. That is, the share of family workers in FOF increases at the decreasing rate as the share of remittances increases in household income from zero up to about 50% when the share of family workers starts to fall. A reverse relationship holds for the share of the hired workers. We test the robustness of these bivariate

relationships using parametric regressions that control for observed and unobserved household heterogeneity, community and business characteristics. Table 4 reports the results.

Table 4. Remittances and employment intensity of family and hired workers in family firms

	Nigeria (columns 1 – 4)				Uganda (columns 5 – 8)			
	Pooled tobit (1)	Pooled tobit (2)	Fixed effects (3)	Fixed effects (4)	Pooled tobit (5)	Pooled tobit (6)	Fixed effects (7)	Fixed effects (8)
<i>Share of family workers</i>								
Remittances	0.363*** (0.080)	0.266*** (0.078)	0.342** (0.107)	0.253** (0.101)	0.231** (0.085)	0.224** (0.086)	0.248*** (0.060)	0.244*** (0.061)
Remittances squared	-0.249*** (0.074)	-0.163** (0.069)	-0.265** (0.101)	-0.183* (0.097)	-0.277** (0.103)	-0.273** (0.104)	-0.244** (0.098)	-0.242** (0.097)
Inverse Mills Ratio (IMR)	-0.082*** (0.016)	-0.082*** (0.017)	-0.064*** (0.018)	-0.063*** (0.017)	0.207*** (0.036)	0.198*** (0.035)	0.142*** (0.029)	0.139*** (0.034)
Control function	-0.065** (0.024)	-0.050* (0.026)	-0.035 (0.029)	-0.026 (0.026)	0.022 (0.027)	0.023 (0.028)		
Turning point	0.729	0.816	0.645	0.691	0.417	0.410	0.508	0.504
<i>Share of hired workers</i>								
Remittances	-2.028*** (0.485)	-1.436** (0.488)	-1.641** (0.668)	-1.120* (0.630)	-1.505*** (0.415)	-1.436*** (0.392)	-1.303*** (0.324)	-1.237*** (0.326)
Remittances squared	1.487** (0.467)	1.029** (0.493)	1.349** (0.617)	0.929 (0.624)	1.539*** (0.466)	1.482** (0.460)	1.245** (0.490)	1.187** (0.480)
Inverse Mills Ratio (IMR)	0.375*** (0.097)	0.394*** (0.097)	0.261** (0.103)	0.273** (0.097)	-1.460*** (0.165)	-1.364*** (0.197)	-1.101*** (0.158)	-1.039*** (0.154)
Control function	0.355** (0.126)	0.255** (0.120)	0.160 (0.150)	0.092 (0.141)	0.034 (0.115)	0.033 (0.108)		
Turning point	0.682	0.698	0.608	0.603	0.489	0.484	0.523	0.521
Household variables (HV)	yes	yes	yes	yes	yes	yes	yes	yes
Time averages of HV	no	no	yes	yes	no	no	yes	yes
Firm variables (FV)	no	yes	no	yes	no	yes	no	yes
Time averages of FV	no	no	no	yes	no	no	no	yes
Community variables	yes	yes	yes	yes	yes	yes	yes	yes
Time dummies (TD)	yes	yes	yes	yes	yes	yes	yes	yes
Time variables of TD	no	no	yes	yes	no	no	yes	yes
Number of observations	11,090	11,090	8,957	8,957	8,144	8,144	7,723	7,723

Figures in parentheses are standard errors (S. E). ***, **, * denote estimated parameter is significantly different from zero at the 1%, 5% and 10% test levels, respectively. All estimates in the columns in the Table that have significant coefficients on either IMR or control function terms were obtained after bootstrapping with 300 replications to correct the S.E. for the generated regressors. Note that some of the insignificant coefficients on IMR and control function terms were significant before the bootstrapping exercise. Where coefficients on both IMR and control function terms were insignificant, as discussed in section 5, the terms were dropped before generating the reported results. Refer to Table A2 for details of community variables.

Unlike the bivariate relationships observed in Figure 3 for Nigeria, the parametric results in Table 4 show existence of an inverted-U relationship between share of family workers in the business and

share of remittances in household income, and a U-shaped relationship for hired workers. Similar relationships are observed for Uganda. The observed relationships are consistent across different specifications in Table 4.

Overall, the results in Table 4 suggest that employment opportunities in family firms are high for family members in households receiving small remittance transfers relative to household income. When remittances exceed 50% of household income, the propensity of family members working in family business starts to decline, while the demand for hired workers starts to rise. Similar to estimates reported in Table 3, the magnitude of coefficients on share of remittances in household income in Table 4 is considerably higher for hired workers than it is for family workers. This further strengthens our earlier finding that the effects of remittances are much stronger on job creation for hired workers than family members. That is, relatively small proportions of remittances in household income promote job creation for family members in family firms, while large proportions of remittances in household income create employment opportunities for individuals outside the migrants' homes, which is indicative of growth in business entrepreneurship.

Job growth and persistence of job creation and destruction

The measurement of firm growth follows the approach employed by Davis and Haltiwanger (1992) that is commonly used in labor economics literature. The growth rate of an individual firm is defined as the change in firm's employment from time $t - 1$ to t , divided by the simple average of firm's employment at time t and $t - 1$. This measure generates a growth rate that is symmetrical about zero and a closed interval between -2 and 2. That is, the measure allows to identify households that establish new family firms during the survey year corresponding to the growth rate of 2, households exiting FOF denoted by growth rate of -2 and continuing firms whose growth rates lie between -2

and 2. Figure 4 plots the growth rate density, relating to job creation and destruction by the state of receipt of remittances.

The left half of Figure 4 plots a share of job destruction for firms experiencing growth rates between 0 and -2 (-2 is denoted as Exit), while the right half plots a share of job creation for firms experiencing growth rates between 0 and 2 (2 is denoted as Entry). Firms operated by recipients of remittances experience growth rates accounting for 20% (14%) of job creation and 21% (18%) of job destruction in Nigeria (Uganda). The figure also shows that the mass of the distribution is much more concentrated about the center and at the tail ends than it is between the center and the tail ends. Specifically, 24% and 28% of annual growth rate observations for Uganda and Nigeria, respectively, are concentrated about zero, suggesting existence of stagnation in employment growth. Exits from business operations accounted for 19% of the annual growth rate observations in Nigeria and 23% in Uganda among the beneficiaries of remittances compared to 12% and 20%, among non-beneficiaries of remittances, respectively. Whereas new entrants into business operations appear appreciably the same between beneficiaries and non-beneficiaries of remittances, accounting for about 16% of the annual growth rate observations in Nigeria and 22% in Uganda, respectively.

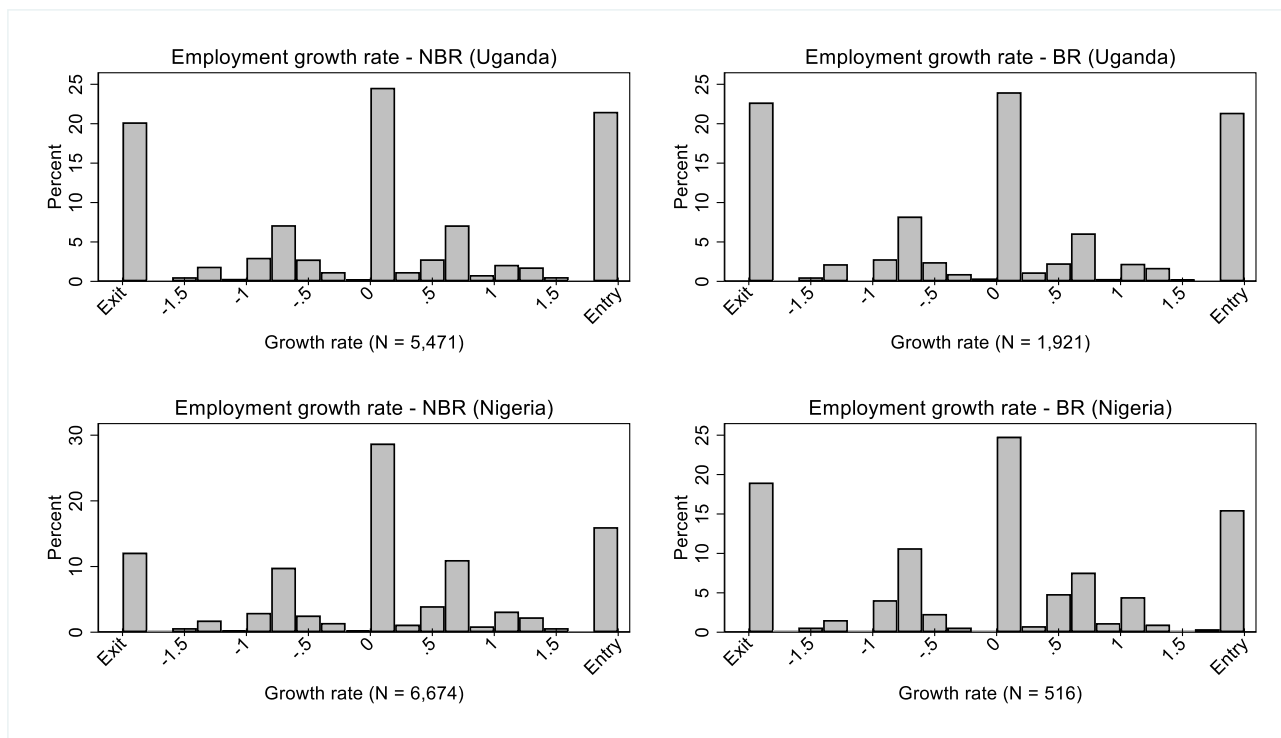


Figure 4. Job growth rate distribution. Note: NBR refers to non-beneficiary of remittances, BR refers to beneficiary of remittances, and N is the number of annual observations

Figure 4 reveals two notable aspects of job creation and destruction. First, relative to job destruction rates which appear not to vary with the status of remittance receipts, job creation exhibits higher concentration in firms operated by non-recipients than recipients of remittances. Second, exits from business operations are somewhat common among beneficiaries of remittances compared to non-beneficiaries. To the extent that receipt of remittances is associated with low job creation rates and high exit rates from business operations, it is instructive to examine the relationship between remittance transfers and the persistence of job creation and destruction. We use the analytical approach presented in equations (8) through (10) in section 5. The persistence of job creation is as measured as the proportion of newly created jobs in year t that continue to be present in year $t + n$ (see Davis and Haltiwanger 1992 for detailed formulation). Where n is the number of survey years observed in our sample. The persistence of job destruction is defined analogously. Table 5 reports the results.

The estimates in Table 5 show that the extent to which remittance transfers influence the persistence of job creation and destruction varies by country. The changes in the proportion of remittance transfers in household income do not influence changes in persistence of job creation and destruction in Nigeria. This is consistent with the results reported in Figure 4, which shows that job creation and destruction rates in Nigeria between recipients and non-recipients of remittances are, respectively, nearly the same: 20% and 21% of annual growth observations. A similar pattern is observed for Uganda in case of persistence of job destruction, but not job creation. An increase in the share of remittances in household income is significantly associated with job creation persistence in Uganda. When remittances contribute small share to household income, the persistence of job creation initially reduces with the increasing share of remittances in household income up to about 40% beyond which additional increases in share of remittances in household income are associated with increases in persistence of job creation.

5. Remittances and persistence of job creation and destruction

	Nigeria (columns 1 and 2)		Uganda (columns 3 and 4)	
	Fixed effects (1)	Fixed effects (2)	Fixed effects (3)	Fixed effects (4)
<i>Job creation persistence</i>				
Remittances	-0.634 (0.497)	-0.529 (0.518)	-0.657*** (0.182)	-0.646*** (0.182)
Remittances squared	0.467 (0.976)	0.332 (0.898)	0.816*** (0.230)	0.813*** (0.231)
Inverse Mills Ratio (IMR)	0.094* (0.048)	0.122** (0.046)	-0.085* (0.048)	-0.070 (0.045)
Control function	0.120 (0.077)	0.120 (0.075)	0.095** (0.047)	0.092* (0.048)
Number of observations	994	994	2364	2364
<i>Job destruction persistence</i>				
Remittances	-0.258 (0.211)	-0.792* (0.450)	0.137 (0.095)	0.153 (0.245)
Remittances squared	0.424** (0.191)	0.899* (0.497)	-0.095 (0.076)	-0.191 (0.305)
Inverse Mills Ratio (IMR)	0.144*** (0.025)	0.186*** (0.043)	-0.064* (0.033)	-0.398*** (0.068)
Control function	-0.076 (0.056)	0.007 (0.079)	-0.039 (0.043)	0.014 (0.072)
Number of observations	2241	1285	3083	1213
Household variables (HV)	yes	yes	yes	yes
Time averages of HV	yes	yes	yes	yes
Firm variables (FV)	no	yes	no	yes
Time averages of FV	no	yes	no	yes
Community variables	yes	yes	yes	yes
Time dummies (TD)	yes	yes	yes	yes
Time averages of TD	yes	yes	yes	yes
Attrition terms included	no	no	no	no

Figures in parentheses are standard errors (S. E). ***, **, * denote estimated parameter is significantly different from zero at the 1%, 5% and 10% test levels, respectively. All estimates in the columns in the Table that have significant coefficients on either IMR or control function terms were obtained after bootstrapping with 300 replications to correct the S.E. for the generated regressors. Note that some of the insignificant coefficients on IMR and control function terms were significant before the bootstrapping exercise. Refer to Table A2 for details of community variables.

7. Sensitivity analysis of key estimates and robustness checks

The validity of our estimates in both Tables 3 and 4 is examined through controlling for selection bias, endogeneity of remittances and unobserved heterogeneity. As indicated in Tables 3 and 4, the IMR term is significant in most of the specifications, implying presence of selection bias in business ownership. The inclusion of IMR—as described in section 5—controls for selection bias, and standard errors were adjusted for these generated regressors by bootstrapping.

Our estimations also test whether the likelihood of employing workers into FOF is endogenously influenced by the receipt of remittances. As can be seen in Tables 3 and 4, the coefficient on control function term is significant in some specifications and not others. This makes it difficult to determine whether indeed employment in family firms is jointly influenced by receipt of remittances. A significant term signifies the presence of endogeneity problem. Results in Table 3 show that the presence of endogeneity appears to vary by type of worker (family member or hired worker) and location. In general, when we consider total workers in the firm, we find that employment in FOF is jointly influenced by receipt of remittances. The inclusion of control terms as one of the covariates, as aforementioned, controls for endogeneity, and standard errors were adjusted for these generated regressors by bootstrapping.

We test the consistency of our estimates by employing an alternative approach to control for endogenous remittances. We follow Manski (1993) and Aterido et al. (2011) to construct an alternative instrument to control for endogenous remittances. Specifically, we generate an instrumental variable for remittance inflows for household i in community j in year t by averaging the share of remittances in household income for sample households in the same community, excluding the observation from household i in computing that average. The idea is that remittance inflows to household i are correlated with the average remittance inflows to the community in which household i resides. But these average remittance inflows do not have a direct effect on job creation in the family business of household i . We do not report the results of this alternative approach to save space, but the results are available from authors upon request. Although the alternative approach to addressing endogeneity yields estimates that have relatively small magnitude of coefficients, the relationships observed in Tables 3 and 4 remain significant and consistent.

While our estimates are based on both pooled and unbalanced panel data, the discussion of results relies on the estimates generated from panel data. However, as noted in section 3, there is attrition of some households, which likely biases the estimates. Appendix B provides a brief description of how we addressed attrition bias. In Appendix B, we replicate all econometric results reported in Tables 3 through 5 by controlling for attrition bias. Our key findings remain consistent even after controlling for attrition. Overall, our results are robust to selection bias, reverse causality associated with remittances, unobserved heterogeneity and attrition bias.

8. Conclusions and implications

Research on remittance transfers has paid much attention on their effects on household consumption and alleviation of credit and liquidity constraints faced by recipients. However, little is known about the effects of remittance transfers on job creation by firms operated by recipients. We use nationally representative samples of panel households in Nigeria and Uganda to examine the relationship between job creation in family-owned firms and remittance transfers. The overall picture emerging from our analysis is that there is a U-shaped relationship between job creation in family-owned firms and the share of remittance transfers in household income. This suggests that there is a minimum share of remittance transfers in household income required to induce job creation in firms operated by recipients. The relationship is upheld even when controlling for selectivity bias into business ownership, sample selection bias, potential reverse causality associated with remittance transfers, unobserved heterogeneity across households and observed business characteristics.

Particularly, we find that when remittance transfers contribute less dominant share in household income, the likelihood of employing both family and hired workers into family businesses reduces. This implies that self-employment (firm owners) is high in households receiving small amounts of

remittances relative to the household income. However, as the share of remittance transfers in household income increases, the likelihood of hiring workers decreases at a decreasing rate down to a certain threshold beyond which the likelihood of creating jobs for both family and hired workers starts to increase with increasing share of remittance transfers in household income. The threshold point appears to occur when remittance transfers contribute more than a half of household income. We find that this threshold point varies by country and type of worker: being generally higher (lower) in Uganda (Nigeria) for family members than hired workers.

The findings of this study demonstrate that the effects of remittance transfers on job creation are particularly larger for non-family workers than family members. In other words, the likelihood of hiring non-family workers is considerably much lower than it is for family members when a household receives small amounts of remittance transfers relative to household income. However, the likelihood of hiring non-family workers becomes much higher than that of family members when remittance transfers start to dominate household income. This differential effect could be a sign of hidden potential of remittances to spur job creation in migrants' communities if policies to increase the size of remittance transfers are put in place.

Furthermore, we demonstrate that the employment intensity of hired workers (measured as hired workers as a share of total workers in the business) decreases while that of family members increases when remittance transfers contribute less than 60% in Nigeria and 50% in Uganda to household income. Correspondingly, when remittance transfers contribute to household income beyond these thresholds, the employment intensity of hired workers increases. The implication of these findings is that remittance transfers induce an income effect by increasing reservation wage of members in recipient households and hence reduces their likelihood of working in family business, which in turn opens up employment opportunities for non-migrant households in the community. This further

implies that non-family individuals seeking to work have a lower wage reservation and, therefore, there is an income redistribution effect leading to pro-poor growth.

Our findings also show that exits from family business operations are somewhat common among beneficiaries of remittances compared to non-beneficiaries. However, we further find that remittance transfers are not associated with the persistence of job destruction in both Nigeria and Uganda. That is, although we find that inconsequential contribution of remittance transfers to household income is associated with reduced likelihood of employing additional workers into the family business, remittance transfers are not associated with persistent destruction of already created jobs. In fact for Uganda, we find that having more than 40% of household income contributed by remittance transfers is significantly associated with the preservation (or persistence) of already created jobs by family firms.

The findings presented here shed light on how policies affecting migrant workers can affect job creation by family-owned firms in migrants' communities. More generally, our findings suggest that policies expanding employment and earning opportunities for migrant workers can stimulate employment opportunities in migrant sending communities. However, future research is needed to extend the analytical approach employed in this paper to medium-sized and large enterprises and test consistence of our findings. By the nature of the data used in this paper, the firms studied included micro and small enterprises, employing between one and 49 workers. Carrying out further research using similar analytical strategy based on firms employing relatively large number of workers would provide further understanding our key findings.

References

- Acosta P. 2007. "Entrepreneurship, Labour Market and International Remittances: Evidence from El Salvador." In *International Migration, Economic Development and Policy*, Edited By Özden Ç and Schiff M., Vol. Chapter 4, 141–159. Washington, DC: World Bank and Palgrave Macmillan.
- Acosta, P. 2020. "Intra-household Labour Allocation, Migration, and Remittances in Rural El Salvador." *Journal of Development Studies* 56(5): 1030-1047
- Acosta, P., Calderón, C., Fajnzylber, P. and López, J.H., 2008. "What is the Impact of Remittances on Poverty and Inequality in Latin America?" *World Development* 36 (1): 89–114.
- Adams, R. H. Jr. 2011. "Evaluating the Economic Impact of International Remittances on Developing Countries using Household Surveys: A Literature Review." *Journal of Development Studies* 47(6): 809–828.
- Adelman, I., Taylor, J. E. and Vogel, S. 1988. "Life in a Mexican Village: A Sam Perspective." *Journal of Development Studies* 25(1): 5–24.
- Amuedo-Dorantes, C. and Pozo, S. 2004. "Workers' Remittances and the Real Exchange Rate: A Paradox of Gifts." *World Development* 32 (8): 1407–1417.
- Aterido, R., Hallward-Driemeier, M. and Pagés, C. 2011. "Big Constraints to Small Firms' Growth? Business Environment and Employment Growth Across Firms." *Economic Development and Cultural Change* 59(3): 609-647.
- Ayyagari, M., Demirgüç-Kunt, A. and Maksimovic, V. 2014. "Who Creates Jobs in Developing Countries?" *Small Business Economics* 43: 75-99.
- Ayyagari, M., Juarros, P., Martinez Peria, S. M., and Singh, S. 2016. "Access to Finance and Job Growth Firm-Level Evidence Across Developing Countries." *Policy Research Working Paper* 7604, World Bank. DOI: 10.13140/RG.2.2.17896.93445
- Azizi, S. 2018. "The Impacts of Workers' Remittances on Human Capital and Labor Supply in Developing Countries." *Economic Modelling* 75: 377-396.
- Barajas, A., Chami, R., Fullenkamp, C., Gapen, M. and Montiel, P. 2009. "Do Workers' Remittances Promote Economic Growth?" IMF Working Paper. WP/09/153. International Monetary Fund.
- Beck, T. 2013. "Bank Financing for SMEs – Lessons from the Literature." *National Institute Economic Review* 225(1): R23-R38. Doi: [10.1177/002795011322500105](https://doi.org/10.1177/002795011322500105)
- Belsley, D.A., Kuh, E. and Welsch, R. E. 1980. *Regression Diagnostics: Identifying Influential Data and Sources of Collinearity*. Wiley-Interscience, John Wiley and Sons, Inc., New York.
- Böhme, M.H., Persian, R., and Stöhr, T. 2015. "Alone but Better off? Adult Child Migration and Health of Elderly Parents in Moldova." *Journal of Health Economics* 39: 211-227.

- Boyd, M. 1989. "Family and Personal Networks in International Migration: Recent Developments and New Agendas." *International Migration Review* 23(3): 638 - 670.
- Brixiová, Z., Kangoye, T. and Yogo, T. U. 2020. "Access to Finance among Small and Medium-Sized Enterprises and Job Creation in Africa." *Structural Change and Economic Dynamics* 55: 177 – 189.
- Brown, S. S. 2006. "Can Remittances Spur Development? A Critical Survey." *International Studies Review* 8(1): 55–75
- Bushway, S., Johnson, B. D. and Slocum, L. A. 2007. "Is the Magic Still there? The use of the Heckman Two-Step Correction for Selection Bias in Criminology." *Journal of Quantitative Criminology* 23(2): 151–178.
- Certo, S. T., Busenbark, J. R., Woo, H.-S., and Semadeni, M. 2016. "Sample Selection Bias and Heckman Models in Strategic Management Research." *Strategic Management Journal* 37: 2639-2657
- Chami, R., Fullenkamp, C. and Jahjah, S. 2005. "Are Immigrant Remittance Flows a Source of Capital for Development?" *IMF Staff Papers* 52(1): 55-81
- Clemens, M. A. and McKenzie, D. 2018. "Why don't Remittances appear to Affect Growth?" *The Economic Journal* 128 (612): F179–F209. Doi: 10.1111/Ecoj.12463
- Cressy, R., 2000. "Credit Rationing or Entrepreneurial Aversion? An Alternative Explanation for the Evans and Jovanovic Finding." *Economics Letters* 66: 235–240.
- Davis, S. J. and Haltiwanger, J. 1992. "Gross Job Creation, Gross Job Destruction, and Employment Reallocation." *The Quarterly Journal Of Economics* 107(3): 819-863
- De Haas, H. 2006. Migration, Remittances and Regional Development in Southern Morocco. *Geoforum* 37(4): 565–580.
- De Haas, H. 2010. "Migration and Development: A Theoretical Perspective." *International Migration Review* 44(10): 227 – 264. DOI: 10.1111/J.1747-7379.2009.00804.X
- De Haas, H. and Plug, R. 2006. "Cherishing The Goose with the Golden Eggs: Trends in Migrant Remittances from Europe to Morocco 1970–2004." *International Migration Review* 40(3): 603–634.
- Didia, D., Didia, L. and Ayokunle, P. 2018. "Accounting for Diaspora Remittances in the Economic Development of Sub-Saharan Africa." *Journal of Applied Economics and Business Research* 8(2): 109-121
- Durand, J., Kandel, W., Parrado, E. A. and Massey, D. S. 1996. "International Migration and Development in Mexican Communities." *Demography* 33(1): 249–264.

- Fayissa, B. and Nsiah. C. 2010. “The Impact of Remittances on Economic Growth and Development in Africa.” *The American Economist* 55(2): 92 – 103.
- Garip, F., Eskici, B. and Snyder, B. 2015. “Network Effects in Migrant Remittances: Evidence from Household, Sibling, and Village Ties in Nang Rong, Thailand.” *American Behavioral Scientist*, 59(9): 1066–1082
- Gërzhani, K., and Kosyakova, Y. 2020. “The Effect of Social Networks on Migrants’ Labor Market Integration: A Natural Experiment.” Working Paper No. 20203, Institute for Employment Research (IAB), Nürnberg
- Gibbons, S., Lyytikäinen, T., Overman, H. G. and Sanchis-Guarner, R. 2019. “New Road Infrastructure: The Effects on Firms.” *Journal of Urban Economics* 110: 35–50
- Giuliano P., Ruiz-Arranz M. 2009. “Remittances, Financial Development, and Growth.” *Journal of Development Economics* 90:144–152.
- Grigorian, D. A. and Melkonyan, T. A. 2011. “Destined to Receive: The Impact of Remittances on Household Decisions in Armenia.” *Review Of Development Economics* 15(1): 139–153.
- Hanson, G. 2007. Migration, Labor Supply, and Earnings in Mexico. In *Mexican Immigration to the United States*, Edited By Borjas, G., 289–328. Chicago, IL: University of Chicago Press.
- Hanusch, M. and Vaaler, PM., 2015. “Migrant Remittances, Capital Constraints and New Business Starts in Developing Countries.” World Bank Group, Macroeconomics and Fiscal Management Note No. 8. [Http://Worldbank.Org/Macroeconomics](http://Worldbank.Org/Macroeconomics)
- Jadotte, E. and Ramos, X. 2016. “The Effect of Remittances on Labour Supply in the Republic of Haiti.” *Journal of Development Studies* 52(12): 1810–1825
- Jahnke, H. E. 1982. “Livestock Production Systems and Livestock Development in Tropical Africa.” Kieler Wissenschaftsverlag Vauk.
- Justino, P., and Shemyakina, O. N. 2012. “Remittances and Labor Supply in Post-Conflict Tajikistan.” *IZA Journal of Labor & Development* 1(8): 1 – 28.
- Kan, K. and Tsai, W. D. 2006. “Entrepreneurship and Risk Aversion.” *Small Business Economics*. 26(5): 465-474. Doi:10.1007/S11187-005-5603-7
- Loayza, N. V. and Rigolini, J. 2011. “Informal Employment: Safety Net or Growth Engine?” *World Development* 39(9): 1503-1515.
- Leung, S. F. and Yu, S. 1996. “On the Choice between Sample Selection and Two-Part Models.” *Journal of Econometrics* 72(1): 197–229.
- López-Córdova, J.E. and Olmedo, A. 2006. “International Remittances and Development: Existing Evidence, Policies and Recommendations.” Buenos Aires: INTAL-ITD Occasional Paper No 41, Inter-American Development Bank; 2006.

- Lőrincz, L. and Németh, B. 2019. “Network Effects in Internal Migration.” IEHAS Discussion Papers, No. MT-DP - 2019/13, Hungarian Academy of Sciences, Institute of Economics, Budapest.
- Lucas, R. E. B. and Stark, O. 1985. “Motivations to Remit: Evidence from Botswana.” *Journal of Political Economy* 93(5): 901-918.
- Mandelman, F., Montes-Rojas, G., 2009. “Is Self-Employment and Micro-Entrepreneurship a Desired Outcome?” *World Development* 37(12): 1914–1925.
- Mandelman, F. and Zlate, A. 2012. “Immigration, Remittances and Business Cycles.” *Journal of Monetary Economics* 59 (2): 193–213.
- Manski, C. F. 1993. Identification of Endogenous Social Effects: The Reflection Problem. *Review of Economic Studies* 60(3): 531–542.
- Martinez, C., Cummings, M. E. and Vaaler, P. M. 2015. “Economic Informality and the Venture Funding Impact of Migrant Remittances to Developing Countries.” *Journal of Business Venturing* 30: 526–545
- Mendola, M. and Carletto, C. 2012. “Migration and Gender Differences in the Home Labour Market: Evidence from Albania.” *Labour Economics* 19: 870–880.
- Mishra, P. 2007. “Migration and Wages in Source Countries: Evidence from Mexico.” *Journal of Development Economics* 82: 180–199.
- Papke, L. E. and Wooldridge, J.M. 2008. “Panel Data Methods for Fractional Response Variables with an Application to Test Pass Rates.” *Journal of Econometrics* 145: 121–133.
- Paulson, A. L. and Townsend, R. 2004. “Entrepreneurship and Financial Constraints in Thailand.” *Journal of Corporate Finance* 10: 229–262. Doi:10.1016/S0929-1199(03)00056-7
- Piotrowski, M. 2006. “The Effect of Social Networks at Origin Communities on Migrant Remittances: Evidence from Nang Rong District.” *European Journal Of Population* 22(1): 67 – 94
- Posso, A. 2012. “Remittances and Aggregate Labor Supply: Evidence from Sixty-Six Developing Nations.” *Developing Economies* 50(1): 25–39.
- Raijman, R. 2001. “Determinants of Entrepreneurial Intentions: Mexican Immigrants in Chicago.” *Journal of Socio-Economics* 30(5): 393-411.
- Rosenzweig, M. R. and Stark, O. 1989. “Consumption Smoothing, Migration, and Marriage: Evidence from Rural India.” *Journal of Political Economy* 97 (4): 905-926
- Spatafora, N. 2005. “Worker Remittances and Economic Development.” *World Economic Outlook*, International Monetary Fund, April, Pp. 69–94.

- Shapiro, A.F. and Mandelman, F. S. 2016. "Remittances, Entrepreneurship, and Employment Dynamics over the Business Cycle." *Journal of International Economics* 103: 184–199.
- Stark, O. 1982. "Research on Rural-to-Urban Migration in LDCs: The Confusion Frontier and Why we Should Pause to Rethink Afresh." *World Development* 10(1): 63 – 70. [https://doi.org/10.1016/0305-750X\(82\)90080-8](https://doi.org/10.1016/0305-750X(82)90080-8)
- Stark, O. and Bloom, D. 1985. "The New Economics of Labor Migration." *American Economic Review* 75(2): 173–178.
- Taylor, T. E. and Lopez-Feldman, A. 2010. "Does Migration make Rural Households more Productive? Evidence From Mexico." *Journal of Development Studies* 46(1): 68 – 90.
- Taylor, J. E., Rozelle, S. and De Brauw, A. 2003. "Migration and Incomes in Source Communities: A New Economics of Migration Perspective from China." *Economic Development and Cultural Change* 52(1): 75–101.
- Taylor, J. E. and Wyatt, T. J. 1996. "The Shadow Value of Migrant Remittances, Income and Inequality in A Household-Farm Economy." *Journal of Development Studies* 32(6): 899-912.
- Vaalar, P.M. 2011. "Immigrant Remittances and the Venture Investment Environment of Developing Countries." *Journal of International Business Studies* 42: 1121–1149
- Vaaler, P.M. 2013. "Diaspora Concentration and the Venture Investment Impact of Remittances." *Journal of International Management* 19(1): 26–46.
- Vadean, F., Randazzo, T. and Piracha, M. 2019. "Remittances, Labour Supply and Activity of Household Members Left-Behind." *The Journal of Development Studies* 55(2): 278 – 293.
- Van Dalen, H.P., Groenewold, G. and Schoorl, J. J. 2005. "Out of Africa: What Drives the Pressure to Emigrate?" *Journal of Population Economics* 18: 741–778
- Van Der Zwan, P., Thurik, R., Verheul, I. and Hessels, J. 2016. "Factors Influencing the Entrepreneurial Engagement of Opportunity and Necessity Entrepreneurs." *Eurasian Business Review* 6(3): 273-295.
- Vella, F. 1992. "Simple Tests for Sample Selection Bias in Censored and Discrete Choice Models." *Journal of Applied Econometrics* 7(4): 413-421.
- Woodruff, C. and Zenteno, R., 2007. "Migration Networks and Microenterprises in Mexico." *Journal of Development Economics* 82(2): 509–528
- Wooldridge, J. M. 2010. *Econometric Analysis of Cross Section and Panel Data* (2nd Ed.). Cambridge, MA: MIT Press.
- Wooldridge, J. M., 2015. "Control Function Methods in Applied Econometrics." *Journal of Human Resources* 50(2): 420–445.

- Wooldridge, J. M. 2019. Correlated Random Effects Models with Unbalanced Panels. *Journal of Econometrics*, 211 (1): 137–150.
- Yang, D., 2008. International Migration, Remittances and Household Investment: Evidence from Philippine Migrants' Exchange Rate Shocks. *The Economic Journal* 118 (528): 591–630.
- Yang, D. 2011. Migrant Remittances. *Journal of Economic Perspectives* 25 (3): 129-152.
- Yang, D. and Choi, H. 2007. Are Remittances Insurance? Evidence from Rainfall Shocks in the Philippines. *World Bank Economic Review*, 21(2): 219–248.

Appendix A

Appendix A1. Distribution of sample households across survey waves

Number of times a household was visited	1	2	3	4	5	6	Total per survey wave
Survey wave	Number of households visited per survey wave in Uganda						
2005/06	476	117	146	859	189	1,336	3,123
2009/10	52	165	276	875	271	1,336	2,975
2010/11	10	50	225	851	242	1,336	2,714
2011/12	98	59	256	861	239	1,336	2,849
2013/14	131	1,164	129	75	284	1,336	3,119
2015/16	433	1,155	123	63	195	1,336	3,305
Total visited	1,200	2,710	1,155	3,584	1,420	8,016	18,085
Percent of total	6.6	15.0	6.4	19.8	7.9	44.3	
Survey wave	Number of households visited per survey wave in Nigeria						
2010/11	296	477	2,937	1,267			4,977
2012/13	1	399	2,910	1,267			4,577
2015/16	3	106	2,937	1,267			4,313
2018/19	3,574	0	27	1,267			4,868
Total visited	3,874	982	8,811	5,068			18,735
Percent of total	20.7	5.2	47.0	27.1			

Table A2. Community level characteristics

Variables	Nigeria (N=548)	Uganda (N=1473)
<i>Share of communities reporting presence of infrastructure</i>		
Savings and credit cooperatives	0.201 (0.401)	
Nursery school	0.555 (0.497)	
Primary school	0.828 (0.377)	
Government primary school		0.314 (0.464)
Private primary school		0.246 (0.431)
Secondary school	0.568 (0.496)	
Government secondary school		0.044 (0.205)
Private secondary school		0.097 (0.296)
Health center	0.599 (0.491)	
Public hospital or health unit	0.257 (0.438)	0.098 (0.297)
Private hospital	0.279 (0.449)	
Private clinic	0.321 (0.467)	0.022 (0.146)
Non-governmental organization health unit or hospital		0.141 (0.348)
Bank	0.182 (0.387)	
Microfinance institution	0.172 (0.377)	
Bank or microcredit institution		0.041 (0.199)
Market	0.628 (0.484)	
Feeder road in the community (1,0)		0.364 (0.481)
Murram road in the community (1,0)		0.193 (0.395)
Tarmac road in the community (1,0)		0.143 (0.350)
<i>Share of communities reporting changes in service provision compared to past 3 – 5 years</i>		
Access to transport services remained the same	0.288 (0.453)	
Access to transport services got worse	0.168 (0.374)	
Access to transport services got better	0.544 (0.499)	
Communication beyond community borders remained the same	0.214 (0.410)	
Communication beyond community borders got worse	0.088 (0.283)	
Communication beyond community borders got better	0.699 (0.459)	
Availability of commercial manufactured goods remained the same	0.369 (0.483)	
Availability of commercial manufactured goods got worse	0.150 (0.357)	
Availability of commercial manufactured goods got better	0.482 (0.500)	
Quality of primary education remained the same	0.299 (0.458)	
Quality of primary education got worse	0.157 (0.364)	
Quality of primary education got better	0.544 (0.499)	
Quality of secondary education remained the same	0.330 (0.471)	
Quality of secondary education got worse	0.235 (0.425)	
Quality of secondary education got better	0.434 (0.496)	
Access to non-farm business credit remained the same	0.456 (0.499)	
Access to non-farm business credit got worse	0.328 (0.470)	
Access to non-farm business credit got better	0.215 (0.411)	
Employment opportunities remained the same	0.562 (0.497)	
Employment opportunities got worse	0.343 (0.475)	
Employment opportunities got better	0.095 (0.293)	

Notes: Figures in parentheses are standard deviations.

Table A3. Determinants of family business ownership in Nigeria and Uganda

Independent variables	Nigeria		Uganda	
	Pooled probit	FE probit	Pooled probit	FE probit
Age of household head (years)	-0.005*** (0.001)	-0.004* (0.002)	-0.009*** (0.001)	-0.001 (0.002)
Male headed household (1,0)	0.151*** (0.032)	0.139*** (0.037)	0.011 (0.024)	0.010 (0.025)
Head has primary education cf no education (1, 0)	0.150*** (0.027)	0.101*** (0.031)	0.102*** (0.027)	0.092** (0.028)
Head has secondary education cf no education (1, 0)	0.078** (0.031)	0.043 (0.037)	0.131*** (0.036)	0.115** (0.038)
Head has tertiary education cf no education (1, 0)	-0.576*** (0.038)	-0.589*** (0.045)	-0.098** (0.041)	-0.107** (0.043)
Household size	0.044*** (0.004)	0.046*** (0.011)	0.032*** (0.003)	0.026*** (0.007)
Ratio of male members to household size	-0.347*** (0.047)	-0.441*** (0.115)	-0.136** (0.045)	-0.029 (0.096)
Log of land owned (acres)	-0.069*** (0.012)	0.003 (0.022)	0.016 (0.012)	0.031* (0.019)
Livestock ownership (TLU)	-0.028** (0.012)	0.043* (0.024)	-0.001 (0.012)	0.020 (0.019)
Log of asset value (USD)	0.122*** (0.008)	0.085*** (0.014)	0.076*** (0.006)	0.066*** (0.009)
Ownership of dwelling (1, 0)	-0.119*** (0.025)	0.006 (0.050)	-0.108*** (0.031)	-0.099* (0.054)
Household located in urban area (1, 0)	0.256*** (0.027)	0.275*** (0.032)	0.208*** (0.029)	0.176*** (0.031)
No. married away in community sample (excluding own) ^a	0.043*** (0.012)	0.012 (0.020)	-0.019*** (0.004)	0.005 (0.006)
Migrants in community sample (excluding own) ^a	-0.049*** (0.014)	-0.009 (0.022)	0.011*** (0.003)	-0.001 (0.004)
Access to mobile phone services ^b	0.041*** (0.006)	0.013 (0.009)	0.227*** (0.024)	0.189*** (0.034)
Access to internet services ^b	-0.044*** (0.010)	-0.006 (0.016)		
No. of members with banks accounts	-0.039** (0.014)	0.023 (0.024)		
No. of members with third party access to bank account	0.014 (0.013)	0.017 (0.020)		
Idiosyncratic shock experience	0.030** (0.009)	0.002 (0.012)	0.138*** (0.023)	0.053* (0.029)
Covariate shock experience	0.008 (0.006)	0.003 (0.008)	0.004 (0.027)	0.026 (0.033)
Community variables	yes	yes	yes	yes
Time averages of household variables	no	yes	no	yes
Time dummies	yes	yes	yes	yes
Time averages of time variables	no	yes	no	yes
<i>Exclusion restrictions in business ownership equation with respect to receipt of remittances</i>				
Parents of head or spouse owned business (1, 0)	0.432*** (0.022)	0.436*** (0.026)		
Access to transport in community changed to worse condition relative to no change in past 3 -5 years (1, 0)	-0.075** (0.032)	-0.079** (0.038)		
Access to transport in community changed to better condition relative to no change in past 3 -5 years (1, 0)	0.066** (0.026)	0.087** (0.030)		
Presence of feeder road in the community (1, 0)			-0.053** (0.021)	-0.047** (0.022)
Presence of murram road in the community (1, 0)			0.039 (0.024)	0.035 (0.025)
Presence of tarmac road in the community (1, 0)			0.091** (0.031)	0.073** (0.032)
Joint significance of exclusion restrictions (F-statistic)	412.714***	313.698***	23.793***	9.641**
Number of observations	18,735	14,861	17,789	16,716

^aTotal number of members who married away (or migrated) from sample households in a particular community, excluding those who married away (or migrated) from household *i* in computing that total (refer to Section 5 for details). ^bIn Nigeria access to mobile phone and internet services are measured as the total number of household members with such access, while in Uganda the former was measured as binary dummy where a household was coded as 1 if at least one member had access to mobile phone services and 0 otherwise. *, **, and *** refer to significance level at 10%, 5% and 1% respectively. Figures in parenthesis are robust standard errors. Refer to Table A2 for details of community variables.

Table A4. Determinants of receipt of remittances in Nigeria and Uganda

Independent variables	Nigeria		Uganda	
	Pooled tobit	FE tobit	Pooled tobit	FE tobit
Age of household head (years)	0.004*** (0.000)	0.003** (0.001)	0.005*** (0.000)	0.003** (0.001)
Male headed household (1,0)	-0.110*** (0.015)	-0.107*** (0.019)	-0.200*** (0.010)	-0.191*** (0.010)
Head has primary education cf no education (1, 0)	0.025** (0.012)	0.019 (0.017)	0.018 (0.011)	0.017 (0.011)
Head has secondary education cf no education (1, 0)	0.023 (0.014)	0.016 (0.020)	0.023 (0.015)	0.019 (0.015)
Head has tertiary education cf no education (1, 0)	0.060*** (0.018)	0.046* (0.025)	0.055*** (0.016)	0.055*** (0.017)
Household size	-0.006** (0.002)	0.003 (0.005)	0.001 (0.001)	-0.003 (0.002)
Ratio of male members to household size	-0.041* (0.023)	-0.071 (0.062)	0.015 (0.018)	-0.011 (0.037)
Log of land owned (acres)	-0.014** (0.005)	0.006 (0.011)	-0.002 (0.004)	0.008 (0.006)
Livestock ownership (TLU)	-0.006 (0.006)	-0.009 (0.013)	-0.007* (0.004)	-0.011* (0.006)
Log of asset value (USD)	0.013*** (0.004)	0.004 (0.008)	-0.004 (0.002)	-0.000 (0.003)
Ownership of dwelling (1, 0)	-0.012 (0.011)	0.013 (0.026)	-0.003 (0.011)	-0.000 (0.021)
Idiosyncratic shock experience	0.014*** (0.003)	0.009* (0.005)	0.005 (0.010)	-0.001 (0.010)
Covariate shock experience	0.001 (0.003)	-0.008* (0.005)	-0.006 (0.009)	0.004 (0.011)
Household located in urban area (1, 0)	0.006 (0.012)	0.008 (0.017)	0.014 (0.010)	0.002 (0.011)
Access to mobile phone services ^b	-0.000 (0.003)	0.002 (0.005)	0.018* (0.010)	0.007 (0.013)
Access to internet services ^b	-0.001 (0.004)	-0.005 (0.007)		
No. of members with banks accounts	0.014** (0.005)	-0.007 (0.010)		
No. of members with third party access to bank account	0.012** (0.004)	0.002 (0.008)		
Community variables	yes	yes	yes	yes
Time averages of household variables	no	yes	no	yes
Time dummies	yes	yes	yes	yes
Time averages of time variables	no	yes	no	yes
<i>Exclusion restrictions in receipt of remittances equation with respect to job creation</i>				
No. married away in community sample (excluding own) ^a	-0.013** (0.005)	0.015 (0.011)	-0.005** (0.002)	-0.001 (0.002)
Time average of married way members ^a		-0.037** (0.015)		-0.009** (0.003)
Migrants in community sample (excluding own) ^a	0.009 (0.006)	0.009 (0.011)	0.002** (0.001)	-0.000 (0.001)
Time average of migrants ^a		0.001 (0.015)		0.005** (0.002)
<i>Diagnostic statistical test</i>				
Joint significance of time averages of household variables (F-statistic)		2.730***		2.655**
Joint significance of time averages of period dummy variables (F-statistic)		1.865		2.046*
Average of absolute correlation values between IMR and the explanatory variables common in all equations	0.142 [0.100]	0.139 [0.100]	0.165 [0.156]	0.162 [0.148]
Condition number	6.158	5.610	6.457	4.997
Inverse Mills Ratio (IMR) ^c	-0.019 (0.037)	-0.006 (0.049)	0.021 (0.127)	0.024 (0.141)
Number of observations	11,090	8,957	8,144	7,723

Refer to Table A2 for description of superscripts a and b. ^cAll regressions were estimated without generated IMR from first stage since it was insignificant (see Section 5 for details). The reported coefficients on IMR were obtained before final estimations of the reported results. *, **, and *** refer to significance level at 10%, 5% and 1%, respectively. Figures in parenthesis and square brackets are robust standard errors and standard deviations, respectively.

Appendix B. Controlling for attrition

The control for attrition bias is limited to the panel data sample. In order to control for attrition bias in equations (8) through (10), we follow a two-stage procedure described in Wooldridge (2010) to test and control for attrition bias. The first stage involves estimating the probability of individuals participating in future surveys conditional on being in the random sample at time $t-1$ as follows:

$$\Pr(S_{it} | A_{it}, S_{i,t-1} = 1), \quad t = 2, \dots, T. \quad (\text{B.1})$$

Where S_{it} is the selection indicator coded 1 if a household at $t = 1$ is observed in other future survey periods, and coded 0 otherwise. A_{it} is a vector of exogenous variables observed when $S_{i,t-1} = 1$. That is, $S_{i1} \equiv 1$ for all i . Since we are unable to observe anything about the household that attrits from the sample, then $S_{i,t-1} = 0$ implies that $S_{it} = 0$. This makes a probit model to be an appropriate model to estimate equation (B.1). We estimate a sequence of probits, whereby for $t = 2$, we use the entire sample to estimate a probit for still being in the sample in the second period. For $t = 3$, we estimate a probit for those households still in the sample as of $t = 2$. And so on. For each $t \geq 2$, we obtain the inverse Mills ratios, $\hat{\lambda}_{it} \equiv \lambda(A_{it}\hat{\delta}_t)$, where $\hat{\delta}_t$ is a vector of estimated parameters from equation (B.1).

Equation (B.1) was estimated using a vector of independent variables included in $\mathbf{K}_{ijt}$ in equation (10) in addition to a number of household members that were not always available at home including school going children and job seekers; a dummy indicating if any member of the household had gainful employment; agricultural productivity (measured as value of crop and livestock production per unit land owned); dummy for indicating if household faced a situation when it did have enough

food in the past 12 months preceding the survey (included for Nigeria only); and value of own-production as a share of total value of food crop consumption in the past 12 months preceding the survey (included for Uganda only). To save space, we do not report probit estimates for attrition, but are available from authors on request.

In the second stage, equations (8) through (10) were estimated with the generated inverse Mills ratios ($\hat{\lambda}_{it}$) from the first stage included as explanatory variables. Using the selected sample ($S_{it} = 1$) and allowing equations (8) through (10) be represented by single equation, a test for attrition bias is as follows:

$$y_{it} = \mathbf{A}_{it}\boldsymbol{\delta}_a + \delta_2 P2_t \hat{\lambda}_{it} + \delta_3 P3_t \hat{\lambda}_{it} + \cdots + \delta_T PT_t \hat{\lambda}_{it} + e_{ie} \quad (\text{B.2})$$

where interacting time periods ($P2, P3, \dots, PT$) with $\hat{\lambda}_{it}$ is required because of the nature of the sequential procedure of estimating $\hat{\lambda}_{it}$. $\boldsymbol{\delta}_a$, δ_2 and δ_T are parameters to be estimated and e_{ie} is the error term. A joint test of significance of the inverse Mills ratio terms, is a valid test of the null hypothesis of no attrition bias. If there is evidence of attrition bias (significant value of joint test), then asymptotic variance matrix of estimates in the equations (8) through (10) needs to be adjusted for the generated regressors from the first stage via bootstrapping observations. Tables B1 through B5 report results based on the analytical procedure described above and are analogous to estimates reported in the main text.

Table B1. Determinants of family business ownership in Nigeria and Uganda

Independent variables	Nigeria	Uganda
	FE probit	FE probit
Age of household head (years)	-0.003 (0.002)	-0.005** (0.002)
Male headed household (1,0)	0.146*** (0.039)	0.017 (0.027)
Head has primary education cf no education (1, 0)	0.106** (0.033)	0.114*** (0.031)
Head has secondary education cf no education (1, 0)	0.034 (0.038)	0.109** (0.042)
Head has tertiary education cf no education (1, 0)	-0.562*** (0.044)	-0.125** (0.046)
Household size	0.050*** (0.013)	0.024*** (0.007)
Ratio of male members to household size	-0.426** (0.132)	-0.112 (0.108)
Log of land owned (acres)	-0.010 (0.024)	0.046** (0.020)
Livestock ownership (TLU)	0.042 (0.027)	0.024 (0.019)
Log of asset value (USD)	0.084*** (0.015)	0.067*** (0.009)
Ownership of dwelling (1, 0)	0.057 (0.052)	-0.116* (0.060)
Household located in urban area (1, 0)	0.226*** (0.034)	0.140*** (0.033)
Log of no. married away in community sample (excluding own) ^a	0.033 (0.022)	-0.007 (0.006)
Log of migrants in community sample (excluding own) ^a	0.011 (0.023)	-0.004 (0.005)
Access to mobile phone services ^b	0.016* (0.009)	0.158*** (0.038)
Access to internet services ^b	0.001 (0.019)	
No. of members with banks accounts	0.017 (0.024)	
No. of members with third party access to bank account	-0.011 (0.024)	
Idiosyncratic shock experience	0.004 (0.014)	0.026 (0.031)
Covariate shock experience	0.001 (0.009)	0.037 (0.036)
Community variables	yes	yes
Time averages of household variables	yes	yes
<i>Exclusion restrictions in business ownership equation with respect to receipt of remittances</i>		
Parents of head or spouse owned business (1, 0)	0.461*** (0.025)	
Access to transport in community changed to worse condition relative to no change in past 3 -5 years (1, 0)	-0.082** (0.039)	
Access to transport in community changed to better condition relative to no change in past 3 -5 years (1, 0)	0.070** (0.032)	
Presence of feeder road in the community (1, 0)		-0.051** (0.025)
Presence of murram road in the community (1, 0)		0.033 (0.029)
Presence of tarmac road in the community (1, 0)		0.069* (0.037)
Joint significance of exclusion restrictions (F-statistic)	304.152***	6.923*
<i>Attrition controls</i>		
$\hat{\lambda}_a year_{t-1}$	0.397** (0.177)	0.158 (0.120)
$\hat{\lambda}_a year_{t-2}$	0.667*** (0.142)	0.384** (0.141)
$\hat{\lambda}_a year_{t-3}$	0.219*** (0.035)	0.672*** (0.201)
$\hat{\lambda}_a year_{t-4}$		-0.021 (0.055)
$\hat{\lambda}_a year_{t-5}$		0.545** (0.222)
Joint significance of attrition variables (F-statistic)	40.800***	19.994**
Number of observations	13,567	13,912

Refer to Table A2 for description of superscripts a and b. $\hat{\lambda}_a year_{t-n}$ for $n = 1, \dots, 4$ is the interaction between IMR generated from attrition estimations described in Appendix C and survey year dummies. The estimates in the table were obtained after bootstrapping with 300 replications to correct the standard errors for the first-stage estimation. *, **, and *** refer to significance level at 10%, 5% and 1%, respectively. Figures in parenthesis are robust standard errors.

Table B2. Determinants of receipt of remittances in Nigeria and Uganda

Independent variables	Nigeria	Uganda
	FE tobit	FE tobit
Age of household head (years)	0.004** (0.001)	0.002 (0.001)
Male headed household (1,0)	-0.126*** (0.026)	-0.194*** (0.011)
Head has primary education cf no education (1, 0)	0.019 (0.022)	0.017 (0.013)
Head has secondary education cf no education (1, 0)	-0.006 (0.027)	0.023 (0.016)
Head has tertiary education cf no education (1, 0)	0.032 (0.033)	0.050** (0.017)
Household size	0.002 (0.008)	-0.002 (0.002)
Ratio of male members to household size	-0.069 (0.087)	-0.009 (0.040)
Log of land owned (acres)	0.009 (0.017)	0.002 (0.007)
Livestock ownership (TLU)	0.010 (0.017)	-0.013** (0.006)
Log of asset value (USD)	0.008 (0.010)	-0.005 (0.004)
Ownership of dwelling (1, 0)	0.037 (0.036)	0.005 (0.023)
Idiosyncratic shock experience	0.011 (0.008)	0.000 (0.011)
Covariate shock experience	-0.009 (0.007)	-0.009 (0.011)
Household located in urban area (1, 0)	0.025 (0.021)	0.017 (0.012)
Access to mobile phone services ^b	-0.003 (0.006)	-0.009 (0.013)
Access to internet services ^b	0.001 (0.011)	
No. of members with banks accounts	-0.008 (0.013)	
No. of members with third party access to bank account	-0.001 (0.011)	
Community variables	yes	yes
Time averages of household variables	yes	yes
<i>Exclusion restrictions in receipt of remittances equation with respect to job creation</i>		
No. married away in community sample (excluding own) ^a	-0.031** (0.015)	-0.009*** (0.002)
Time average of married way members ^a	-0.005 (0.018)	0.001 (0.003)
Migrants in community sample (excluding own) ^a	0.006 (0.015)	-0.002 (0.002)
Time average of migrants ^a	-0.006 (0.021)	0.007** (0.002)
<i>Diagnostic statistical test</i>		
Inverse Mills Ratio (IMR) ^c	0.051 (0.061)	
$\hat{\lambda}_{a,year_{t-1}}$	0.403*** (0.103)	0.056 (0.050)
$\hat{\lambda}_{a,year_{t-2}}$	-1.669*** (0.314)	-0.012 (0.074)
$\hat{\lambda}_{a,year_{t-3}}$	-0.175*** (0.032)	0.008 (0.095)
$\hat{\lambda}_{a,year_{t-4}}$		-0.026 (0.020)
$\hat{\lambda}_{a,year_{t-5}}$		-0.150* (0.078)
Joint significance of attrition variables (F-statistic)	88.179***	10.419*
Joint significance of time averages of household variables (F-statistic)	28.029**	25.202**
Average of absolute correlation values between IMR and the explanatory variables common in all equations	0.138 [0.100]	0.162 [0.148]
Condition number	5.486	5.164
Number of observations	8,230	6,415

Refer to Table A2 for description of superscripts a and b. $\hat{\lambda}_{a,year_{t-n}}$ for $n = 1, \dots, 4$ is the interaction between IMR generated from attrition estimations described in Appendix C and survey year dummies. The estimates in the table were obtained after bootstrapping with 300 replications to correct the standard errors for the first-stage estimation. *, **, and *** refer to significance level at 10%, 5% and 1%, respectively. Figures in parenthesis and square brackets are robust standard errors and standard deviations, respectively.

Appendix B3. Job creation and remittances

	Nigeria (columns 1 and 2)		Uganda (columns 3 and 4)	
	Fixed effects (1)	Fixed effects (2)	Fixed effects (3)	Fixed effects (4)
<i>Job creation for family labor</i>				
Remittances	-1.005*** (0.261)	-0.635** (0.227)	-1.487*** (0.440)	-1.275** (0.413)
Remittances squared	0.892** (0.296)	0.617** (0.265)	0.715 (0.452)	0.589 (0.427)
Inverse Mills Ratio (IMR)	-0.636*** (0.086)	-0.375*** (0.080)	-0.591*** (0.151)	-0.550*** (0.137)
Control function			0.443** (0.143)	0.403** (0.137)
$\hat{\lambda}_a year_{t-1}$	-0.539*** (0.135)	-0.447*** (0.125)	-0.174 (0.130)	-0.183 (0.122)
$\hat{\lambda}_a year_{t-2}$	0.298** (0.128)	0.321** (0.116)	0.058 (0.173)	0.008 (0.165)
$\hat{\lambda}_a year_{t-3}$	0.051* (0.031)	0.048* (0.027)	-1.060*** (0.236)	-0.810*** (0.229)
$\hat{\lambda}_a year_{t-4}$			-0.244*** (0.056)	-0.223*** (0.057)
$\hat{\lambda}_a year_{t-5}$			-0.413* (0.222)	-0.433** (0.204)
Joint test on attrition terms	51.074***	35.104***	42.603***	30.225***
<i>Job creation for hired labor</i>				
Remittances	-8.432** (2.793)	-6.459** (2.858)	-8.647** (3.181)	-7.856** (3.276)
Remittances squared	7.816** (3.115)	5.972* (3.339)	7.061** (3.365)	6.493* (3.707)
Inverse Mills Ratio (IMR)	1.129* (0.651)	1.151* (0.698)	-8.389*** (1.143)	-7.878*** (1.183)
Control function			0.804 (0.970)	0.697 (0.889)
$\hat{\lambda}_a year_{t-1}$	0.696 (1.230)	0.452 (1.018)	0.939 (0.934)	0.946 (0.921)
$\hat{\lambda}_a year_{t-2}$	-2.509** (1.070)	-1.734* (0.972)	-0.566 (1.205)	-0.523 (1.128)
$\hat{\lambda}_a year_{t-3}$	-0.871*** (0.234)	-0.714** (0.220)	-5.523** (1.785)	-4.452** (1.757)
$\hat{\lambda}_a year_{t-4}$			0.111 (0.390)	0.202 (0.409)
$\hat{\lambda}_a year_{t-5}$			-0.894 (1.572)	-0.707 (1.624)
Joint test on attrition terms	19.796***	13.686**	17.155***	13.947**
<i>Job creation for total labor</i>				
Remittances	-2.987*** (0.522)	-2.148*** (0.491)	-2.501** (0.842)	-2.153** (0.843)
Remittances squared	2.544*** (0.568)	1.787** (0.547)	1.452 (0.908)	1.253 (0.830)
Inverse Mills Ratio (IMR)			-1.435*** (0.281)	-1.374*** (0.290)
Control function			0.547* (0.321)	0.472 (0.330)
$\hat{\lambda}_a year_{t-1}$	-0.236 (0.278)	-0.273 (0.271)	0.188 (0.346)	0.152 (0.344)
$\hat{\lambda}_a year_{t-2}$	-0.274 (0.215)	-0.168 (0.208)	-0.226 (0.450)	-0.316 (0.465)
$\hat{\lambda}_a year_{t-3}$	-0.009 (0.052)	-0.012 (0.049)	-2.255*** (0.499)	-1.813*** (0.535)
$\hat{\lambda}_a year_{t-4}$			-0.272** (0.122)	-0.225* (0.125)
$\hat{\lambda}_a year_{t-5}$			-0.384 (0.560)	-0.393 (0.641)
Joint test on attrition terms	0.714	0.449	29.099***	21.092***
Household variables (HV)	yes	yes	yes	yes
Time averages of HV	yes	yes	yes	yes
Firm variables (FV)	no	yes	no	yes
Time averages of FV	no	yes	no	yes
Community variables	yes	yes	yes	yes
Time dummies (TD)	yes	yes	yes	yes
Time averages of TD	yes	yes	yes	yes
Number of observations	8,230	8,230	6,415	6,415

$\hat{\lambda}_a year_{t-n}$ for $n = 1, \dots, 4$ is the interaction between IMR generated from attrition estimations described in Appendix C and survey year dummies. The estimates in the table were obtained after bootstrapping with 300 replications to correct the standard errors for the first-stage estimation. *, **, and *** refer to significance level at 10%, 5% and 1%, respectively. Figures in parenthesis are robust standard errors.

Table B4. Employment intensity and remittances (family and hired workers as a share of total workers)

	Nigeria (columns 1 and 2)		Uganda (columns 3 and 4)	
	Fixed effects (1)	Fixed effects (2)	Fixed effects (3)	Fixed effects (4)
<i>Share of family workers</i>				
Remittances	0.300** (0.118)	0.216* (0.123)	0.230** (0.072)	0.224*** (0.067)
Remittances squared	-0.243** (0.106)	-0.166 (0.115)	-0.215* (0.114)	-0.212* (0.111)
Inverse Mills Ratio (IMR)	-0.060*** (0.018)	-0.058** (0.018)	0.168*** (0.035)	0.165*** (0.036)
Control function	-0.019 (0.028)	-0.010 (0.026)		
$\hat{\lambda}_a year_{t-1}$	-0.080** (0.037)	-0.061 (0.038)	-0.099** (0.039)	-0.098** (0.042)
$\hat{\lambda}_a year_{t-2}$	0.076** (0.031)	0.062** (0.031)	-0.037 (0.051)	-0.035 (0.052)
$\hat{\lambda}_a year_{t-3}$	0.020*** (0.006)	0.017** (0.006)	0.097 (0.072)	0.081 (0.067)
$\hat{\lambda}_a year_{t-4}$			-0.004 (0.014)	-0.006 (0.015)
$\hat{\lambda}_a year_{t-5}$			-0.017 (0.055)	-0.017 (0.062)
Joint test on attrition terms	27.590***	15.934**	14.327**	10.683*
<i>Share of hired workers</i>				
Remittances	-1.335** (0.632)	-0.907 (0.690)	-1.224*** (0.345)	-1.147*** (0.338)
Remittances squared	1.191* (0.615)	0.840 (0.662)	1.182** (0.514)	1.119** (0.487)
Inverse Mills Ratio (IMR)	0.224** (0.109)	0.221** (0.100)	-1.180*** (0.160)	-1.117*** (0.164)
Control function	0.071 (0.127)	0.021 (0.138)		
$\hat{\lambda}_a year_{t-1}$	0.164 (0.170)	0.116 (0.170)	0.200 (0.130)	0.202 (0.136)
$\hat{\lambda}_a year_{t-2}$	-0.335** (0.164)	-0.228 (0.157)	0.061 (0.160)	0.069 (0.157)
$\hat{\lambda}_a year_{t-3}$	-0.139*** (0.033)	-0.116*** (0.035)	-0.595** (0.250)	-0.478** (0.237)
$\hat{\lambda}_a year_{t-4}$			0.027 (0.058)	0.036 (0.059)
$\hat{\lambda}_a year_{t-5}$			-0.075 (0.215)	-0.059 (0.220)
Joint test on attrition terms	26.162***	15.036**	15.291**	13.628**
Household variables (HV)	yes	yes	yes	yes
Time averages of HV	yes	yes	yes	yes
Firm variables (FV)	no	yes	no	yes
Time averages of FV	no	yes	no	yes
Community variables	yes	yes	yes	yes
Time dummies (TD)	yes	yes	yes	yes
Time averages of TD	yes	yes	yes	yes
Number of observations	8,230	8,230	6,415	6,415

Refer to Table A2 for description of superscripts a and b. $\hat{\lambda}_a year_{t-n}$ for $n = 1, \dots, 4$ is the interaction between IMR generated from attrition estimations described in Appendix C and survey year dummies. The estimates in the table were obtained after bootstrapping with 300 replications to correct the standard errors for the first-stage estimation. *, **, and *** refer to significance level at 10%, 5% and 1%, respectively. Figures in parenthesis are robust standard errors.

Table B5. Remittances and persistence of job creation and destruction

	Nigeria (columns 1 and 2)		Uganda (columns 3 and 4)	
	Attrition FE (1)	Attrition FE (2)	Attrition FE (3)	Attrition FE (4)
<i>Job creation persistence</i>				
Remittances	0.020 (0.422)	-0.111 (0.483)	-0.322* (0.176)	-0.309* (0.167)
Remittances squared	-0.059 (0.452)	0.070 (0.508)	0.466* (0.273)	0.453* (0.264)
Inverse Mills Ratio (IMR)	0.090** (0.046)	0.107** (0.046)	0.127** (0.047)	0.145** (0.046)
$\hat{\lambda}_a year_{t-2}$	-0.0512 (0.068)	-0.056 (0.070)	0.410*** (0.065)	0.409*** (0.065)
$\hat{\lambda}_a year_{t-3}$	-0.108*** (0.018)	-0.107*** (0.017)	-0.391*** (0.119)	-0.382*** (0.112)
$\hat{\lambda}_a year_{t-4}$			-0.120*** (0.030)	-0.122*** (0.028)
$\hat{\lambda}_a year_{t-5}$			-0.200* (0.106)	-0.206** (0.096)
Joint test on attrition terms	26.954***	26.970***	227.381***	249.865***
Number of observations	727	727	2069	2069
<i>Job destruction persistence</i>				
Remittances	-0.233 (0.635)	-0.262 (0.619)	0.335 (0.218)	0.345 (0.233)
Remittances squared	0.358 (2.652)	0.406 (1.365)	-0.416 (0.335)	-0.421 (0.370)
Inverse Mills Ratio (IMR)	0.068* (0.038)	0.071* (0.041)	-0.244** (0.076)	-0.240** (0.084)
$\hat{\lambda}_a year_{t-2}$	0.014 (0.059)	0.005 (0.060)	0.533*** (0.110)	0.535*** (0.115)
$\hat{\lambda}_a year_{t-3}$	-0.159*** (0.013)	-0.158*** (0.012)	-0.201 (0.153)	-0.195 (0.154)
$\hat{\lambda}_a year_{t-4}$			-0.029 (0.034)	-0.027 (0.034)
$\hat{\lambda}_a year_{t-5}$			-0.519*** (0.150)	-0.518** (0.161)
Joint test on attrition terms	203.785***	249.735***	79.034***	88.527***
Number of observations	1132	1132	925	925
Household variables (HV)	yes	yes	yes	yes
Time averages of HV	yes	yes	yes	yes
Firm variables (FV)	no	yes	no	yes
Time averages of FV	no	yes	no	yes
Community variables	yes	yes	yes	yes
Time dummies (TD)	yes	yes	yes	yes
Time averages of TD	yes	yes	yes	yes
Attrition terms included	yes	yes	yes	yes

Figures in parentheses are standard errors (S. E). ***, **, * denote estimated parameter is significantly different from zero at the 1%, 5% and 10% significance levels, respectively. $\hat{\lambda}_a year_{t-n}$ for $n = 2, \dots, 4$ is the interaction between IMR generated from attrition estimations described in Appendix C and survey year dummies. The estimates in the table were obtained after bootstrapping with 300 replications to correct the S.E for the first-stage estimation.