WPS8186

Policy Research Working Paper 8186

Moving Out and Up

Panel Data Evidence on Migration and Poverty in Uganda

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WORLD BANK GROUP
Africa Region
&
Gender Cross Cutting Solution Area
September 2017

Policy Research Working Paper 8186

Abstract

This paper examines the relationship between spatial and economic mobility in Uganda using longitudinal data from 2005 through 2012. The study relies on a detailed panel tracking survey and exploits exogenous variation in the spatial intensity of violent conflict, rainfall shocks, distance from the regional capital, and ethnic networks in urban areas. The analysis finds significant welfare gains of 58 percentage points due to migration. However, the returns to migration vary with the direction of the move. Moving to a rural destination yields welfare returns of 56 percentage points; the returns to urban moves, at 65 percentage points, are markedly higher. Policies to capture the welfare gains from migration to cities should focus on further urbanization, the development of road infrastructure, and investments in education for men and women in rural areas.

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Moving Out and Up: Panel Data Evidence on Migration and Poverty in Uganda*

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Keywords: migration, poverty, structural transformation, gender, Uganda
JEL classification: J61, O15, R23, I31, F24

* The views presented in this paper are those of the authors and do not represent those of the World Bank. Any remaining errors are our own. We thank Ruth Hill, Joao Montalvao, Francis Mwesigye, Clarence Tsimpo, and Sami Bensassi for detailed comments and suggestions. Corresponding author: Michael O'Sullivan (email: mosullivan@worldbank.org; address: 1818 H St. NW, Washington, DC, 20433).

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I. Introduction

A wide strand of the economic development literature has addressed linkages between the spatial and economic mobility of people. Early theoretical contributions viewed the mobility of labor from the rural to urban sectors – fueled by wage differentials – as the key to growth and development (Lewis 1954), while later models called into question the capacity of urban labor markets to absorb a large influx of low-skilled workers (Harris and Todaro 1970). More recent work, meanwhile, viewed migration decisions through the lens of the sending household, which seeks to diversify its income sources and insure against risk (Stark and Bloom 1985; Rosenzweig and Stark 1989). However, despite the voluminous body of theoretical and empirical work on internal migration in developing countries, a key question of policy relevance remains: Is moving up the welfare ladder simply a matter of moving out of one's household?

We aim to address this question in the context of Uganda, a country characterized by a relatively high degree of spatial mobility. Previous analyses of nationally-representative data revealed that 1 in 10 household heads had migrated in the previous five years (World Bank 2006). Migration patterns are likely tied to the country's substantial regional and rural-urban wealth disparities, which shape the sets of economic opportunities available to households.[3] For example, the share of households who primarily rely on subsistence agriculture for their income is particularly high among the bottom 40 percent of the welfare distribution. An analysis of 2002 census data, meanwhile, found that – though rural and urban populations are mobile – most migration events in Uganda occur within the same region and the majority of migrants into Kampala come from the adjoining Central region (Mukwaya et al. 2012).

Despite the mobility of its population, most of Uganda's rural migrants tend to move within their own region or to another rural area, where the returns to moving are likely lower (World Bank 2006). This fact poses a bit of a puzzle against the backdrop of Uganda's urbanization patterns (de Brauw, Mueller, and Lee 2014). While the bulk of Uganda's 35 million inhabitants live in rural areas, the country is urbanizing at a considerable pace. According to recent census data, the country's overall population density grew by 41 percent between 2002 and 2014 and the share of Uganda's population living in urban areas increased by more than 50 percent (from 12.1 percent to 18.4 percent) over the same period (Uganda Bureau of Statistics 2014). Yet some of this expansion is due to a redefinition of administrative boundaries for urban areas. An alternative measure of urbanization that is comparable across countries, the agglomeration index, suggests that Uganda's urban share is even higher – at 25 percent (World Bank 2012).

While there are some studies that examine migration in Uganda, most rely on cross-sectional data that pose methodological challenges for identification. Moreover, none of these analyses provides causal evidence of the impact of migration on welfare. In this paper, we examine the relationship between spatial and economic mobility in Uganda using data from 2005 through 2012. The paper makes two principal contributions to the literature. First, it contributes to the policy and academic literature on internal migration and structural transformation in developing countries through the use of multiple waves of panel evidence. The use of longitudinal data confers an advantage over cross-sectional analyses which, though more common in the literature, fail to properly account for time-invariant factors that can

[3] While economic considerations lead many of Uganda's migrants to move, other factors also drive migration decisions. For example, insecurity and conflict, particularly in the North of the country during the 2000s, prompted the displacement and forced migration of large segments of the rural population (Mulumba and Olema 2009). A period of reverse migration then followed, with an influx of displaced residents returning to the North (World Bank 2012).

influence migration decisions and outcomes. To shed light on the drivers of work migration, we further exploit the time dimension of these data by using lagged explanatory variables that precede the migration event. Second, the paper relies on a robust panel tracking exercise to contribute to the growing literature on the causal impact of internal migration on welfare. We rely on exogenous variation in the intensity of conflict, rainfall shocks for the main staple crop, distance from the capital city, and ethnic migrant networks in urban areas to explain migration decisions and estimate their welfare impact. Given the importance of rural-urban migration for the structural transformation of Uganda's economy, we also estimate the added marginal impact of moving to an urban area and compare it to that of moving to a rural area.

Drawing on a rich set of nationally-representative panel data, we find that migrants experience a 58 percentage point gain in per capita consumption after moving. Moving to an urban area, meanwhile, generates even larger returns: urban migrants enjoy a 65 percentage-point increase in per capita consumption growth versus a 56 percentage-point increase in per capita consumption growth for rural migrants during the 2005-2010 period. Despite these potential gains from urban migration, the bulk of Uganda's migration flows still occur *within* rural areas. Several key drivers of these moves emerge from the analysis. Among young adults, rainfall shocks on maize production spur an exit from agriculture in favor of urban areas. Meanwhile, living in a remote area constrains individuals from affording the long and costly move to urban areas, leading them to migrate to closer rural destinations. The intensity of violent conflict and thin ethnic migrant networks in urban areas are further found to facilitate rural migration. Being a child of the household head, irrespective of gender, and being a more educated individual is associated with a higher propensity to migrate. Policies to capture the welfare improvement from rural-urban migration should thus address the development of road infrastructure and urbanization, as well investments in the education of male and female children in rural areas.

The remainder of this paper is structured as follows. Section II assesses the contributions from the theoretical and empirical literatures on migration. In Section III, we provide a description of the panel data being used for the descriptive analysis and an overview of the tracking survey data. Section IV uses the full panel data set to identify the drivers of household-level work migration choices in Uganda. In Section V, we exploit a tracking panel survey to identify the causal impact of migration on welfare. We provide a set of conclusions in Section VI.

II. Literature

Early theoretical contributions on migration focused on economic mobility as a one-way and one-off move from rural to urban sectors to increase wages, while modern theories have placed an emphasis on strategic household decisions to send a migrant, the reliance on kinships and networks, and the links between migrants and their families through remittances.

The classical model for labor migration proposed by Lewis (1954), as well that of Harris and Todaro (1970), attempted to characterize the effects of migration from the rural to urban sectors. According to the Lewis (1954) model, labor surpluses in the rural sector can be reallocated to the urban sector through the rural-urban migration of workers and reduced rural unemployment. Labor migration thus serves to increase the marginal productivity of labor-intensive technologies in the urban sector and contributes to capital accumulation and economic growth. While Lewis' model and extensions find rural-urban migration beneficial, Harris and Todaro instead critique the argument that the urban sector can exploit an unlimited supply of excess rural labor. According to their model, as long as wage differentials are favorable in the urban sector, rural-urban migration flows will continue and can lead to an increased unemployment rate

in the urban sector. The model's predictions thus suggest a more restrictive approach to rural-urban migration. Beyond their divergent support for migration, both the Lewis (1950s and 1960s) and Harris-Todaro (1970s and 1980s) schools of thought ignored rural-rural migration and return migration to rural areas, as well as the social relationships that surround migration decisions.

In contrast, the new economics approach to migration, stemming from the works of Stark and Bloom (1985), Rosenzweig and Stark (1989), and Stark (1991), postulates that migration decisions are part of a collective household strategy to diversify family income and self-insure under missing and imperfect markets. Migration accordingly represents an important socio-economic decision made by households to not only maximize income, but also minimize risk, diversify income sources, and relax the constraints existing in the markets for factors of production (capital, credit, land, and labor) through remittances (Azam and Gubert 2006). In this view, migration can be international or internal – and go in any direction (rural-urban, urban-rural, etc.) – for various economic and non-economic purposes. Moreover, whether within or outside the country, economic migration requires an initial capital endowment to bear the costs of leaving the original residence and a potential period of unemployment at the destination. Networks thus play a strong role in lowering migration costs and risks, as largely evidenced in the international migration literature (Ilahi and Jafarey 1999; Massey et al. 1993; D. McKenzie and Rapoport 2007). Furthermore, remittances can take any form as part of the contractual arrangements between the individuals sent out for migration and the rest of their families.

In addition to the theoretical contributions, there is a considerable body of empirical work on the welfare effects of internal migration in developing countries. Much of this work, however, fails to establish a causal link between internal migration and welfare. Perhaps the only available experimental evidence of the impact of internal migration comes from Bangladesh, where Bryan et al. (2014) find large consumption gains among households randomly chosen to receive a small monetary incentive for migration transport costs. Recent work from Sub-Saharan Africa relies on panel data with tracking survey components to assess the welfare effects of moving. Beegle et al. (2011) exploit multiple rounds of panel data over a 13-year period to examine the links between migration and consumption in Tanzania. The study is novel in its application of a rigorous individual tracking protocol: approximately 93 percent of baseline households (and 82 percent of non-deceased individuals) were re-interviewed at least more than a decade after the preceding survey. After accounting for individual and household fixed effects, the authors uncover a 36 percent impact on per capita consumption among migrants who left their original communities. Using a similar approach, de Brauw et al. (2013) find even larger welfare gains from migration in Ethiopia.

The available evidence from Uganda, meanwhile, relies primarily on cross-sectional data sets. Using one round of data from the 2002/03 UNHS, Herrin et al. (2009) observe a negative relationship between wealth accumulation and the number of moves undertaken by a household head in Uganda. They also find that long-distance moves are correlated with declines in asset values for migrating households. The authors suggest that this finding could be linked to regional and linguistic differences in Uganda that potentially raise barriers to wealth accumulation from migration. However, the reliance on cross-sectional data raises questions about the robustness of these findings. Strobl and Valfort (2015) combine 2002 census data with weather information to examine the impact of weather-induced migration on employment outcomes for non-migrants in Uganda. They uncover an adverse effect of migration on employment outcomes for residents in receiving communities—particularly in areas with fewer roads (a proxy for low capital mobility). Meanwhile, an unpublished analysis of the 2005/06 UNHS found a positive correlation between labor mobility and per capita expenditure (World Bank 2008).

Cultural and linguistic barriers may also contribute to the segmentation of migration destinations and restrict the choice set for migrants in Uganda. Matsumoto et al. (2006) find cross-sectional evidence that speaking multiple local languages is positively associated with migration status in Uganda. Muto (2012), meanwhile, uses panel data from 94 rural villages across Uganda to explore the relationship between information and ethnic migration networks. Using cell network coverage as an instrument, she finds that households with a mobile phone are more likely to send out a migrant for employment and that this effect is larger for households with smaller ethnic networks in Kampala. Mwesigye and Matsumoto (2013) also find that communities with a higher relative share of migrants are more likely to experience land conflicts.

Recent work using panel data, meanwhile, offers new insights on migration in the Ugandan context. An analysis on the links between migration and schooling, which uses the Uganda National Panel Survey (UNPS) data sets, finds that attendance drops among schoolchildren whose households have lost an adult due to migration. However, school attendance is found to increase when the child migrates either solo or with his or her parents (Ferrone and Giannelli 2015). Gray (2011) analyzes panel data from three regions in Uganda and finds a positive correlation between high quality soil and non-labor migration. And recent unpublished work using the UNPS sample suggests that remittances can be a vehicle for financial inclusion. The authors rely on household fixed effects estimations and uncover a positive relationship between internal remittances and formal credit (Gross and Ntim 2014).

III. Data

This analysis relies primarily on nationally-representative data from the Uganda National Household Survey (2005/06) and the three successive panel waves of the Uganda National Panel Survey (UNPS, 2009/10, 2010/11, 2011/12). The multi-topic surveys elicit rich sets of information on a range of socio-economic topics, including consumption and migration. The questionnaires were administered at the individual, agricultural plot, household, and community levels. The original 2005/06 household sample used for this longitudinal analysis is made up of 3,123 households. The final 2011/12 survey wave is composed of 2,835 households, of which three-quarters are drawn from the original sample (Table 1).[4]

Table 1. Survey attrition by UNHS/UNPS wave

	Sample	Original sample retention (%)	Split-off HHs	Total
2005/06	3,123	100	0	3,123
2009/10	2,607	83.5	367	2,974
2010/11	2,564	82.1	305	2,869
2011/12	2,356	75.4	479	2,835

Source: Uganda Bureau of Statistics (2013)

These detailed panel data sets allow us to examine spatial mobility in Uganda from a number of different angles. First, in Section IV, we estimate the drivers of a household's decision to send a permanent work migrant. We focus our analysis on work migrants in that section given the importance of labor mobility for individual welfare and for an economy's structural transformation and development. To identify households who have sent work migrants, we rely on questions in the household roster regarding the

[4] All estimates presented here are calculated using statistical weights that take into account the complex survey design and survey attrition. See Uganda Bureau of Statistics (2010) for a detailed discussion of the weighting procedure.

departures of previous household members and their primary motivation for leaving the household. Any household that reported having at least one member (aged 15 or older) permanently leave the household in the 12 preceding months for work is considered as having sent out a work migrant.

Next, in Section V, to identify the causal impact of migration on poverty, we draw on a sub-sample of the UNPS panel data sets, using the 2005/06 and 2009/10 rounds, for which an intensive individual and household tracking exercise was conducted. Two households per enumeration area (approximately 20 percent of surveyed households) from the 2005/06 sample were randomly selected for intensive tracking during the 2009/10 UNPS round. Survey enumerator teams relied on available contact information and local resource persons to locate those households within the tracking sample that had permanently moved. In addition, any individuals who had left their original 2005/06 household during the intervening period (referred to as "split-offs") were also tracked.[5] This yielded a total panel sample of 15,646 individuals who did not move, 1,163 individuals from intact mover households, and 1,791 split-off individuals who had migrated from their original household during the intervening period. The information collected by the tracking teams allows us to construct an individual-level panel of those who remained in their 2005/06 place of residence (referred to here as "stayers") and those who migrated elsewhere (referred to here as "movers"). In line with the lag of four to five years between the first two surveys, individuals aged at least 10 during the 2005/06 survey wave are retained in the panel sample as they may be migrants during the 2009/10 survey wave. The structure of this tracking data set is presented in greater detail in Section V.

To construct a set of explanatory variables for these analyses, we also draw on complementary data sources, including the ACLED (Armed Conflict Location and Event Data) database (Raleigh et al. 2010), the WRSI (Water Requirement Satisfaction Index) computed using FAO data (World Bank 2011), 2002 national census data (Minnesota Population Center 2015), and market price data collected by the Uganda Bureau of Statistics.

IV. Drivers of household migration decisions

In this section, we focus our analysis at the household level, arguably the central locus of decision-making around migration, to examine the drivers behind sending out a work migrant. We draw here on information from the UNPS household roster on the residential status of individuals in the household and, for those who have left, their reason for out-migration.[6] We use this information to construct our outcome variable of interest, whether a household has sent a permanent migrant (aged 15 and above) for work in the preceding 12 months. To analyze the potential drivers of this household migration decision, we rely on a multivariate framework that exploits the panel dimension of the survey data.

To examine the correlates associated with a household's decision to send a permanent work migrant, we first consider the following linear probability model:

[5] The robust individual-level tracking exercise took place for those household members who no longer resided in their original 2005/06 location and who were related to the household head biologically or through marriage. Servants and non-relatives living in the household were not tracked.

[6] The reason for out-migration is reported by the household members still residing in the household. With the exception of the sub-set of households and individuals included in the tracking sample, no information was collected on these out-migrants after their departure from the household. Moreover, issues with missing observations and limited information on the type (rural or urban) of out-migrant destination prevent us from analyzing the household's decision to send a migrant to a rural or urban area. This question is analyzed in detail in Section V.

$$M_{h\,t+1} = \alpha_1 + \beta_1 \times \mathrm{X}_{h\,t} + \lambda_1 \times W_{h\,t} + \varepsilon_{1\,h\,t} \quad (1)$$

where the outcome of interest $M_{h\,t+1}$ is an indicator variable for the decision of household h to send a work migrant at time *t+1* (i.e., in the following survey wave). We define X as the vector of other observed household characteristics that influence a household's decision to migrate. These covariates thus serve as lagged explanatory variables that predate the migration event and thus address the simultaneity problem associated with regressing migration decisions on contemporaneous outcomes.[7] Meanwhile, $W_{h\,t}$ represents a set of exogenous factors, such as price and conflict shocks, which may drive a household's decision to send a work migrant. The model also includes region and year (to account for time trends) dummies for time *t*, and clusters standard errors at the enumeration area level. Despite the reliance on lagged predictors, this specification cannot account for unobserved factors that determine a household's migration behavior, nor can it control for the possible anticipatory changes in behavior that a household might adopt in advance of sending out a work migrant.

To partially mitigate the concern of endogeneity, we also specify a model as follows:

$$M_{h\,t+1} = \alpha_2 + \beta_2 \times \mathrm{X}_{h\,t} + \lambda_2 \times W_{h\,t} + \eta_{2h} + \varepsilon_{2\,h\,t} \quad (2)$$

where η_{2h} represents the time-invariant household factors that shape a household's migration decisions. By applying a household fixed-effects approach in Equation (2), we are accounting for those household characteristics – observed or unobserved – that do not vary across the survey waves and are correlated with the error term in Equation (1). In addition, the parameter β_2 captures the within-household variation of observed characteristics across time. While this non-experimental framework will not fully erase the bias from our estimates, it will offer insights into the factors associated with a household's decision to send a migrant.

Before presenting the econometric results, we provide the household-level means for sending a permanent work migrant (Table 2). While only 3 to 5 percent of households reported sending out a work migrant during the first two survey waves, the corresponding share in the latter two waves is markedly higher. This jump may be tied to a change in the way the household roster module was administered, since 2010/11 was the first year in which the UNPS employed computer-assisted personal interviewing methods for data collection. The increase may also be tied to survey fatigue among third-wave respondent households, since the remainder of the roster would not be administered for that individual. To account for this possible discrepancy, we include year dummies for all regressions that rely on Equation (1) and Equation (2).

[7] Note that the reliance on lagged explanatory variables obliges us to ignore all household-level observations from the 2011/12 UNPS data set, aside from the panel household's decision to send a work migrant in the preceding 12 months.

Table 2. Share of households who sent a work migrant, by region, location, and year

	2005/06	2009/10	2010/11	2011/12
All households	*0.03*	*0.05*	*0.13*	*0.13*
	(0.20)	(0.22)	(0.31)	(0.33)
Regions				
Kampala	0.06	0.03	0.17	0.18
Central	0.04	0.06	0.14	0.17
Eastern	0.02	0.03	0.11	0.11
Northern	0.02	0.02	0.09	0.09
Western	0.04	0.07	0.16	0.16
Rural/urban				
Rural	0.03	0.05	0.12	0.12
Urban	0.05	0.03	0.15	0.16

Source: Authors' calculations with UNPS. Standard deviations reported in parentheses.

Table 3 relies on Equation (1) and Equation (2) to estimate the lagged correlates associated with a household's decision to send a work migrant (while excluding the other potential drivers, $W_{h\,t}$, as covariates).[8] The results in column (1) reveal that, on average, migrant-sending households are more likely to be headed by a woman[9] and by men who are more educated. In addition, having a larger relative supply of household labor, including adult women and men, is associated with a higher probability of sending out a work migrant in the next survey wave. Living in an urban area, meanwhile, is not correlated with sending out a work migrant. The OLS results also point to spatial variation in sending households: those found in poorer regions of Uganda (Eastern and Northern) are three to five percentage points less likely to send work migrants when compared with households in Kampala. The bulk of these variables fail to retain their significance after controlling for household fixed effects in column (2).

[8] Lagged summary statistics for work migrant sending and non-sending households can be found in Appendix Table 1.

[9] We distinguish here between *de facto* female heads of household, who report being married, and *de jure* female heads who report being single, divorced, or widowed (with male heads of household serving as the reference category).

Table 3. Lagged correlates of sending a work migrant, household level

VARIABLES	(1)	(2)
De facto female-headed household	0.06***	0.03
	(0.01)	(0.02)
De jure female-headed household	0.03***	0.03
	(0.01)	(0.03)
Age of household head	0.00***	0.00
	(0.00)	(0.00)
Primary incomplete (head)	0.03***	-0.04*
	(0.01)	(0.02)
Primary complete (head)	0.05***	-0.02
	(0.01)	(0.03)
Secondary incomplete (head)	0.07***	-0.02
	(0.01)	(0.03)
Secondary complete (head)	0.08***	-0.02
	(0.02)	(0.05)
Post-secondary technical (head)	0.12***	0.00
	(0.02)	(0.05)
University and higher (head)	0.07*	-0.17
	(0.04)	(0.13)
# of adult males (15-59) in HH	0.04***	0.02
	(0.01)	(0.01)
# of adult females (15-59) in HH	0.04***	0.01
	(0.01)	(0.01)
# of adults aged 60+ in HH	0.03**	-0.01
	(0.01)	(0.02)
Urban household	-0.02	-0.04
	(0.01)	(0.03)
Central (excl. Kampala)	0.03*	
	(0.02)	
Eastern	-0.03*	
	(0.02)	
Northern	-0.05***	
	(0.02)	
Western	0.01	
	(0.02)	
Constant	-0.17***	0.01
	(0.02)	(0.05)
Household fixed effects?	No	Yes
Observations	8,345	8,345
R-squared	0.09	0.59
F	17.50	8.094

Source: UNPS. Also includes year fixed effects. Robust standard errors, clustered at the enumeration area level, in parentheses. Significance levels are reported as follows: * p<0.10, ** p<0.05, *** p<0.01.

Next, we examine in Table 4 the relationship between the decision to send out a work migrant and the household's welfare status prior to the migration event. We find evidence of a positive relationship between welfare and sending a migrant for work. Even after controlling for a number of related factors, such as education level and the size of the household, we still find that households who send work migrants are better off economically. Indeed, we observe in column (1) a positive relationship between a household's per capita consumption level and its decision to send a work migrant in the next survey wave. While poor households are as likely as non-poor households to send a work migrant (cols. (3) and (4)), the poorest 40 percent of households are 2 percentage points less likely (col. 5) to do so. None of these explanatory variables remains significant when household fixed effects are applied.

Table 4. Lagged welfare status and sending of work migrant, household level

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES						
Log of per capita expenditure (constant prices)	0.03***	0.00				
	(0.01)	(0.01)				
Poor household			-0.01	0.01		
			(0.01)	(0.01)		
Poorest 40% of households					-0.02**	-0.00
					(0.01)	(0.01)
Constant	-0.51***	-0.01	-0.17***	0.01	-0.17***	0.01
	(0.07)	(0.11)	(0.03)	(0.05)	(0.02)	(0.05)
Household fixed effects?	No	Yes	No	Yes	No	Yes
Observations	8,302	8,302	8,302	8,302	8,345	8,345
R-squared	0.09	0.59	0.09	0.59	0.09	0.59

*Source: Authors' calculations with UNPS. Regressions include all lagged covariates reported in Table 3 and year fixed effects. Region fixed effects are included in the specification without household fixed effects. Robust standard errors, clustered at the level of the enumeration area, are in parentheses. Significance levels are reported as follows: * p<0.10, ** p<0.05, *** p<0.01.*

We now turn our attention to other observed exogenous factors, identified as $W_{h\,t}$ in Eqs. (1) and (2), which could induce a household to send a permanent work migrant. The variables in Table 5 are grouped into categories – such as prices, shocks, and access to networks – which have been previously identified as potential push and pull factors for migration. While a number of these factors have been theorized and identified in the literature, we still know comparatively little about their relative importance for migration decisions (D. McKenzie and Yang 2012).

First, in columns (1) and (2) of Table 5, we examine the relationship between lagged market prices for crops and a household's decision to send a work migrant. We observe in col. (1) that a 1 percent increase in the average price of maize, one of Uganda's principal agricultural crops, is associated with a 0.09 percent higher likelihood of sending a work migrant in the next panel wave. After controlling for household-level unobservables that remain constant across time, we observe in column (2) that a similar positive relationship holds between maize prices and household migration decisions. There is, meanwhile, an inverse relationship between the prices of matoke – a key staple that is also traded – and sending work migrants. These results suggest that variation in agricultural market prices can influence household migration decisions.

In cols. (3) and (4), we test whether household shocks shape future migration decisions. After controlling for household fixed effects in column (4), we uncover a positive and significant 4 percentage point relationship between a household experiencing a theft or fire and future out-migration, which suggests that migration may be an economic coping mechanism for these types of households. Agricultural shocks and the loss of a household member, meanwhile, do not induce a similar response. We also do not observe a significant relationship between conflict and violence and the decision to send a work migrant (cols. (5) and (6)). These null findings may be tied to the timing of these shock events (which can be acute but short in duration) and the four-year time gap between the first and second survey panel waves. Indeed, the relationship between fatality events and sending a work migrant is positive and significant when examining the contemporaneous relationship with household fixed effects (results available upon request).

Next, we test whether public service availability influences future household migration in columns (7) through (10). A previous analysis from Uganda found that a lack of service amenities is associated with greater out-migration (World Bank 2012). We find further evidence in support of this assertion. Having a primary school within an hour of the household is associated with a two percentage point lower likelihood (sig. at 10 percent level) of sending a work migrant in the next wave.

Liquidity and credit access can also shape household migration decisions. Panel evidence from rural South Africa, for example, suggests that relaxing the credit constraints of households via transfer schemes can boost employment through labor migration (Ardington, Case, and Hosegood 2009). We examine whether these factors matter for the Ugandan context in columns (11) through (14). Having a formal loan and a formal savings account increases the likelihood of being a migrant-sending household in the next wave (by 3 and 6 percentage points, respectively). The results in columns (11) and (13) suggest that facilitating households' access to these savings and credit products could help them overcome liquidity constraints to migration. We explore this question in further detail in Section V.

Access to information and migration networks has also been found to play a role in migration decisions in Uganda (Muto 2012). Despite its relevance for individual-level migrant networks (see appendix, we find that the density of migrants within the household head's ethnicity does not predict future household out-

migration (Table 5, columns (15) and (16)). However, we uncover a strong and positive relationship when regressing a household's *current* work migrant status on the share of migrants within the head's ethnicity – along with a set of contemporaneous covariates (results available upon request). We also find in column (17) that a household's reliance on networks for insuring against shocks is associated with a 3 percentage points lower likelihood of sending out a migrant in the next survey round. This finding suggests that households with less robust local support networks could instead rely on spatial diversification (through migration) to deal with risk. In line with Muto (2012), we further find that mobile phone ownership positively predicts household migration decisions (col. (19)).[10] This result suggests that information received through mobile technologies can facilitate spatial mobility.

Finally, in column (21), we assess whether a household's pre-migration distance from Kampala is associated with sending out a migrant (fixed effects results are not reported here since this variable does not change over time for most households). While holding all other covariates from Table 3 constant, we find no evidence of a significant relationship between these two variables. Intuitively, we could expect this insignificant result, especially for households not living in the Central Region, due to the prevalence of intra-regional migration trends in Uganda.

[10] One may suspect that some of these household-level variables, such as access to formal savings and mobile phones, are merely correlates of having a higher level of welfare (which is also associated with out-migration). However, we find that these results are robust to the inclusion of lagged household welfare levels, suggesting that these point estimates are not merely artifacts of higher pre-migration consumption levels.

Table 5. Lagged drivers of sending a permanent work migrant, household level

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
VARIABLES	*Prices*		*Shocks*		*Insecurity*		*Service availability*			
Log of avg. monthly real price of maize	0.09***	0.19**								
	(0.03)	(0.08)								
Log of avg. monthly real price of matoke	-0.03	-0.08***								
	(0.02)	(0.02)								
Log of avg. monthly real price of cassava	-0.01	-0.03								
	(0.01)	(0.02)								
HH shock: agriculture (pests/disease/drought)			0.01	0.00						
			(0.01)	(0.01)						
HH shock: death of HH member			0.01	-0.01						
			(0.01)	(0.02)						
HH shock: theft or fire			0.02	0.04***						
			(0.01)	(0.02)						
Log of # of fatalities near HH					-0.00	-0.00				
					(0.00)	(0.00)				
Elementary school within one hour of HH							-0.02*	-0.01		
							(0.01)	(0.01)		
Health center/clinic within one hour of HH									0.01	-0.00
									(0.01)	(0.01)
Constant	-0.50***	-0.54	-0.18***	-0.01	-0.16***	0.00	-0.17***	0.05	-0.18***	0.01
	(0.19)	(0.41)	(0.02)	(0.05)	(0.03)	(0.05)	(0.03)	(0.06)	(0.03)	(0.06)
Household fixed effects?	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Observations	8,345	8,345	8,316	8,316	7,837	7,837	6,919	6,919	7,261	7,261
R-squared	0.09	0.59	0.09	0.59	0.09	0.58	0.09	0.61	0.09	0.59

*Source: Authors' calculations with UNPS. Regressions include all lagged covariates reported in Table 3 and year fixed effects. Region fixed effects are included in the specification without household fixed effects. Robust standard errors, clustered at the enumeration area level, are in parentheses. Significance levels are reported as follows: * p<0.10, ** p<0.05, *** p<0.01.*

Table 5 (cont.). Lagged drivers of sending a permanent work migrant, household level

	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)
VARIABLES		*Credit & savings*					*Networks & Information*				*Distance*
HH has a formal loan of any type	0.03***	0.01									
	(0.01)	(0.02)									
Any HH member has a savings account with a formal institution			0.06***	-0.01							
			(0.01)	(0.02)							
Share of migrants within head's ethnicity					0.07	0.16					
					(0.05)	(0.27)					
Reliance on networks for insuring shocks							-0.03***	-0.01			
							(0.01)	(0.01)			
HH owns a mobile phone									0.03***	0.00	
									(0.01)	(0.01)	
Log of HH's distance from Kampala (km)											-0.00
											(0.01)
Constant	-0.17***	0.01	-0.17***	0.00	-0.19***	-0.03	-0.16***	0.01	-0.18***	0.00	-0.18***
	(0.02)	(0.05)	(0.03)	(0.05)	(0.03)	(0.06)	(0.03)	(0.05)	(0.02)	(0.05)	(0.03)
Household fixed effects?	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Observations	8,295	8,295	8,281	8,281	7,795	7,795	8,266	8,266	8,306	8,306	7,780
R-squared	0.09	0.59	0.09	0.59	0.09	0.58	0.09	0.59	0.09	0.59	0.09

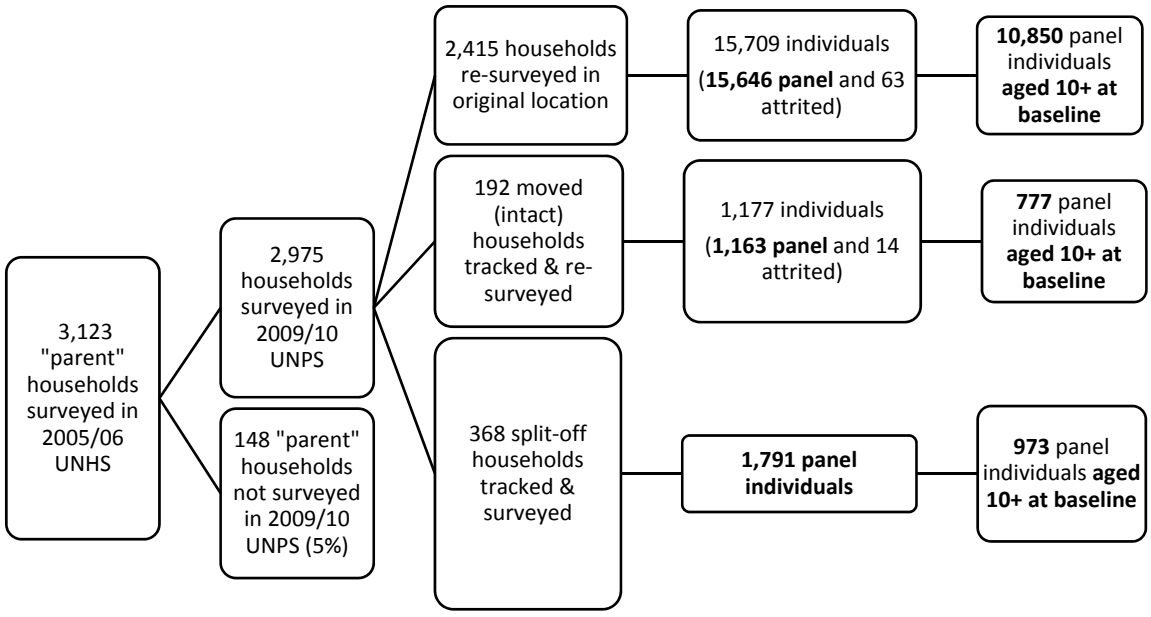
*Source: Authors' calculations with UNPS. Regressions include all lagged covariates reported in Table 3 and year fixed effects. Region fixed effects are included in the specification without household fixed effects. Robust standard errors, clustered at the enumeration area level, are in parentheses. Significance levels are reported as follows: * p<0.10, ** p<0.05, *** p<0.01.*

V. Impact of migration on welfare in Uganda

Measuring the causal impact of migration on welfare is not a straightforward task. McKenzie and Sasin (2007) identify three main methodological problems. The first relates to selection bias as individuals who elect to migrate tend to differ from non-migrants on a range of characteristics and dimensions, and these differences may also shape welfare outcomes. The second problem is omitted variable bias, which arises if there are certain unobserved or unobservable characteristics that simultaneously drive the decision to migrate and welfare outcomes – but are unaccounted for in the estimation model. Another problem is reverse causality, which can occur when an outcome of interest actually causes the migration event. Moving out might result in one being less poor, but the non-poor might be those who are actually moving out. McKenzie and Sasin (2007) thus propose the use of randomized experiments to surmount these problems and measure a causal link between migration and poverty. In the absence of experimental data, however, the use of migrant panel data can address most of these methodological concerns in assessing the welfare impact of migration (McKenzie and Sasin 2007; Beegle, De Weerdt, and Dercon 2011).

This section draws on two rounds of longitudinal data to estimate the returns to migration through an instrumental variables approach. We make use of an individual migrant panel sample covering the period 2005/06 to 2009/10. A panel sample of 18,600 individuals was tracked from 3,123 parent households originally surveyed in 2005/06 (Figure 1). After restricting the individual panel sample to those aged 10 and above at baseline (2005/06), the final sample used in this section consists of a panel of 12,600 individuals, 10,850 (86%) of whom had remained in their original communities ("stayers") and 1,750 (14%) of whom had migrated to other communities ("movers") by 2009/10. Among movers, 38% were rural-rural migrants, 5% were urban-rural migrants, 29% were rural-urban migrants, and 28% were urban-urban migrants. Descriptive evidence presented later in this section shows differences in per-capita consumption between movers and stayers, and between movers to rural areas versus movers to urban areas. However, these differences might not necessarily arise from migration itself or the migration destination choice, and would hence require the use of an appropriate methodology for assessing the welfare impact of migration.

Figure 1: UNHS 2005/6 and UNPS2009/10 Household and Individual Tracking Sample



To empirically investigate the causal link between migration and poverty during the period 2005/06 through 2009/10 in Uganda, we employ the instrumental variables methodological framework used by Beegle et al. (2011) and de Brauw et al. (2013). We model the out-migration decision and assess the welfare impact of moving out, and then we model the decisions to migrate to urban and rural destinations to assess the welfare impact of those specific moves. While some variables affect both migration and welfare, others (the excluded instruments) affect migration without directly influencing the consumption paths of migrants and non-migrants. We include as endogenous regressors for migration and welfare the following set of variables: marital status, individual's level of education, household composition, gender, and age. Unmarried individuals will face different propensities to migrate than married individuals, while educated individuals will be more likely to move and grasp opportunities outside their communities, likely leading to increases in their consumption levels relative to non-educated individuals. Household composition variables may also interact with the gender and age of individuals, given their different incentives for migration. Additional variables used in Beegle et al. (2011) such as the father's level of education and mother's level of education are explored in the sample descriptive statistics, but are not included in the estimations due to the frequency of missing values. We explore as well a measure of financial inclusion that captures whether or not the individual has received a loan from any source (formal or informal), as credit access may influence the initial capital for migration and generate different levels of migration; however, we do not include this variable in the estimations due to the endogeneity problem with migration.

McKenzie and Sasin (2007) discuss four common types of instruments found in the migration literature: economic shocks; natural shocks; distance; and cultural, historical, community and political factors. We rely on the latter three categories of variables as excluded instruments, which may influence an individual's migration decision without affecting consumption paths. We use the water requirement satisfaction index for maize as a proxy for rainfall shocks on agricultural production and food security. The motivation behind this variable is that rural individuals affected by rainfall deficits for a key agricultural crop may rely on migration as a livelihood strategy. In addition to this natural shock instrument, one's distance from the regional capital is used as an instrument for migration because it may facilitate or impede one's spatial mobility. We also use the share of one's ethnicity living in urban areas as a proxy for urban migration networks. The motivation behind this variable is mixed in that individuals may find it easier to move to areas where they have an established network, but according to the social identity theoretical argument, they may also prefer to move to urban areas where they do not have a large ethnic network. Another excluded instrument pertains to the intensity of deadly conflict as a proxy for the existence of community or political violence, which may force or impede migration. The final set of excluded instruments, drawn from Beegle et al. (2011) and de Brauw et al. (2013), consists of an individual's position within the household, including household headship – as heads or spouses likely face different cultural and family pressures to move compared to other household members such as children.

The welfare impact of moving is specified as follows:

$$\Delta lnC_{iht+1,t} = \alpha_h + \beta M_{it+1} + \gamma X_{it} + \varepsilon_{it}, \qquad (3)$$

where $\Delta lnC_{iht+1,t}$ is $(lnC_{iht+1} - lnC_{iht})$ the change in the logarithm of per capita consumption in the household *h* in which individual *i* is residing at time *t* or (*t+1*) – i.e., the growth rate of per capita consumption. M_{it+1} is the dummy variable capturing whether the individual *i* has moved from the household during the period *t* to (*t+1*). The difference-in-difference specification in equation (1) controls

for X_{it} representing initial individual-level characteristics (marital status, individual educational attainment, gender, and age) which might influence the level of consumption, and for α_h representing the initial household-level fixed effects on consumption. The inclusion of initial household fixed effects aims to identify the impact of migration using variation between members of the initial household (Beegle, De Weerdt, and Dercon 2011). The difference-in-difference approach eliminates all time-invariant additive selection bias, and its combination with household fixed effects makes it possible to eliminate observable heterogeneity in time-invariant individual characteristics within the household. The remaining time-varying individual-level omitted heterogeneity is eliminated through the instrumental variables approach.

For reasons introduced earlier, Equation (3) is not only estimated through an OLS procedure, but also through a 2SLS procedure after identifying variables that influence the decision to migrate, but not consumption growth. Exclusion variables that are used are those instruments not correlated with changes in per capita consumption except through the migration channel. Several instruments are adapted to our data to satisfy the exclusion tests.[11] Five excluded instruments were retained. First, an individual's position within the household – whether he or she is a head or spouse of the head; child of the head; and male child of the head – is used as an excluded instrument as this reflects the social and family norms that generate variation in the likelihood of migration among household members. If a family were to choose the member who will migrate, then the household would need to assess its impact on family labor needs and weigh the expected costs and benefits of migration before choosing whether the head, spouse, or other members would be the mover. Depending on the existing migration opportunities and the demand for certain skills for jobs at the destination, the head or spouse could be the one to migrate. We can also expect male children of the head or any child of the head – irrespective of the gender – to be more likely to leave the home community than others in the household. These individual positions in the household are used as excluded instruments because head or spouse, children, or male children will have the same per capita consumption levels unless they migrate.

The second excluded instrument is the interaction between the share of migrants with their same ethnicity in urban areas (based on census data) and being a young adult at baseline (aged 15 to 24 years). This interaction term reflects one's urban migrant network coupled with different migration opportunities and incentives for young adults (male and female) to engage in low-skill labor or for young female adults to migrate for marriage purposes. The use of the share of migrants with the same ethnicity in urban areas—drawn from the 2002 census data—as an instrument is not only inspired by recent panel tracking studies, but also by Muto (2012), who points to the importance of shared ethnicity as a factor for migration destination decisions in Uganda. This instrument is expected to positively influence urban migration or negatively influence rural migration. It can be assumed that, if two individuals with different urban migrant networks have different welfare paths, it will be due to differences in their migration status – after controlling for the individual characteristics in X_{it}.

The interaction between the log of the number of fatalities from conflict and being a young adult (aged 15 to 24 years) is the third excluded instrument; a negative coefficient expresses that, in communities

[11] The interaction between an individual's age rank in the household and being a young adult (aged 14-24 years) was used to indicate a higher probability for older adults to migrate than younger adults. This variable did not prove to be a valid instrument (IV model satisfying instrument relevance, lack of over-identification, and efficiency over OLS).

subject to violent conflict, older adults migrate more easily than younger adults; a positive coefficient expresses that, among young adults, those located in conflict-prone communities are more likely to migrate than those not in such communities. The number of reported fatalities from conflict events is sourced from the geo-referenced Armed Conflicts Location Events Data (ACLED). It captures the incidence of violent conflict per year in a 25-kilometer vicinity of each household, and is thus not associated to specific ethnicities but to spatial intensities of violence. This conflict-related variable was interacted with being a young adult to express a lower probability of migration for younger rather than older adults, under the same level of conflict. If we had not controlled for this conflict-age interaction, the level of spatial intensity of violence might also determine the consumption growth of the household, rather than solely through the migration channel.

The fourth excluded instrument is the interaction between the log of the Water Requirement Satisfaction Index (WRSI) for maize and being a young adult at baseline (aged 15 to 24 years), as a proxy measure of a push factor for the migration for young adults. The WRSI for a crop, in a given geographic region and during a growing period or the entire season, represents a function of the water available in the soil relative to the water required by the crop to grow; the lower the rainfall, the heavier the water stress for the crop, and thus, the lower the WRSI (World Bank 2011). This rainfall shock-related variable interacted with being a young adult in 2005/06 expresses a lower probability of migration among those of age to migrate in 2009/10, should the rainfall be high or sufficient to allow for maize crop production. A negative coefficient of this instrument is expected to be associated with migration. In a context of inexistent or weak crop insurance mechanisms, rainfall deficits in origin areas will likely not drive rural migration because it can be expected that the neighboring rural areas, which will be the most likely rural migration destinations, will also face a rainfall deficit. As a consequence, a rainfall deficit would prompt one to leave a rural area in favor of urban migration. While this instrument does determine migration, it does not determine the consumption growth of the household outside the migration channel because poor (respectively rich) households can still be found in high (respectively low) rainfall areas.

Finally, the interaction between the log of the distance to the regional capital and being a young adult at baseline (aged 15 to 24 years) is used as a measure of the increased opportunities for young adults living near the regional capital city when compared with young adults living further away. It can be expected that, among males of age to migrate in 2009/10, an increase in their distance to the regional capital at baseline will be associated with rural rather than urban migration. Distance to the regional capital is used as an excluded instrument since distance to cities generates cost differentials among candidates for migration without directly affecting their consumption paths.

The exclusion variables thus appear in the first-stage regression of the decision to migrate, but not in the second-stage regression specified in Equation (3). As part of goodness-of-fit checks for Equation (3), the relevance of the excluded instruments was assessed through the Cragg-Donald Wald F statistic and Sanderson-Windmeijer multivariate F test of excluded instruments in the first-stage regression, the non-over-identification of restrictions through the Sargan test, and the Hausman test for endogeneity of the migration variable (Baum, Schaffer, and Stillman 2003).

To estimate the effect of moving to an urban destination (defined at the enumeration area level) on consumption growth, Equation (3) is modified into Equation (4) by replacing M_{it+1}, the dummy variable for migration, with U_{it+1}, the dummy variable for migration to urban destinations, taking a value of 1 for

movers to urban destinations and a null value for stayers; U_{it+1} is not defined for movers to rural destinations:

$$\Delta lnC_{iht+1,t} = \alpha_h + \beta U_{it+1} + \gamma X_{it} + \varepsilon_{it}, \quad (4)$$

Likewise, to estimate the effect of moving to a rural destination (defined at the enumeration area level) on consumption growth, Equation (3) is modified into Equation (5) by replacing M_{it+1}, the dummy variable for migration, with R_{it+1}, the dummy variable for migration to rural destinations, taking a value of 1 for movers to rural destinations and a null value for stayers; R_{it+1} is not defined for movers to urban destinations:

$$\Delta lnC_{iht+1,t} = \alpha_h + \beta R_{it+1} + \gamma X_{it} + \varepsilon_{it}, \quad (5)$$

Equation (4) and Equation (5) are also estimated through a 2SLS procedure. The same explanatory variables instrumenting mover status in Equation (3) are used in the first-stage regressions for Equation (4) and Equation (5), with the same exclusion variables. Sample size limitations for the move direction do not allow for heterogeneity analysis on the sub-sample of individuals initially living in rural areas and the sub-sample of individuals initially living in urban areas (in other words, to estimate the welfare impact of rural-urban and urban-urban migration); similarly, the welfare impact of rural-rural and urban-rural migration could not be isolated. In addition, estimations on the sub-sample who move specifically to Kampala were not possible due to sample size restrictions.

Differences in the baseline characteristics of individuals who stayed and moved between 2005/06 and 2009/10 are presented in Table 6. There are significant differences in welfare characteristics between movers and stayers at baseline (2005/06) which need to be accounted for in the econometric analysis. Baseline consumption levels are dissimilar. Although movers come from households that are just as likely to be poor as stayers at baseline, movers to urban areas are less poor than stayers (18.2% versus 22.4%), while movers to rural areas are poorer than stayers (29.6% versus 22.4%). Fewer movers are in the bottom 40 percent of the welfare distribution than stayers (13.8% versus 39.8%).

There are also differences in demographic characteristics between movers and stayers at baseline, although movers and stayers have similar shares of males and females in their sub-samples (Table 6). Movers are more likely to be young adults (15-24 age category) and less likely to be old adults and seniors (35-49, 50-65, and 66+ age categories) than stayers. In addition, there are differences in the individual position in the household between movers and stayers, with movers less likely to be a head or spouse, or male or female child of the head when compared to stayers. In terms of marital status, movers are more likely than stayers to be unmarried. Unmarried females are particularly more associated with urban movers than stayers.

Educational differences also emerge between movers and stayers. While movers have completed 0.25 more years of schooling than stayers, the gap between movers to urban areas and stayers is more than twice as large; in contrast, movers to rural areas have completed 0.21 fewer years of schooling than stayers (Table 6). Fathers of movers tend to be better educated than those of stayers, while mothers of movers have received less education than those of stayers.

In addition, compared with stayers, movers are less likely to have received a loan at baseline, suggesting that those who migrate may be less financially constrained. The gap in credit access between rural movers

and stayers is three times as large as the gap between urban movers and stayers, suggesting that migration to urban areas demands more initial capital than migration to rural areas.

Furthermore, movers live closer to Kampala and to their regional capital at baseline when compared with stayers – yet rural movers are located further away from Kampala and their regional capital than stayers. Movers have a lower maize WRSI than stayers, indicating a higher rainfall deficit among movers; the rainfall deficit faced by urban movers relative to stayers is twice as large as the one for rural movers. Movers come from areas that are more prone to violent conflict than stayers, with an even larger incidence of conflicts for urban movers than for rural movers. The share of urban migrants within one's ethnicity is slightly larger for movers (14.1%) than for stayers (12.6%), with a larger share for urban movers than for rural movers. At baseline, movers (especially urban movers) are more likely to have a high age rank when compared with stayers. All the above baseline characteristics of movers and stayers, however, are descriptive in nature and do not control for factors that may influence migration or consumption.

Table 6. Balance test at baseline (2005/06) for stayers and movers

Variables	Mean Stayers (1) (N=10,850)	Mean All Movers (2) (N=1,750)	Mean Movers to urban (3) (N=1,002)	Mean Movers to rural (4) (N=748)	Diff (1)-(2)	Diff (1)-(3)	Diff (1)-(4)
Log of real consumption per adult equivalent	10.881	10.947	11.148	10.682	-0.066***	-0.267***	0.200***
Poverty status	0.224	0.231	0.182	0.296	-0.006	0.042***	-0.072***
Poorest 40% of households	0.398	0.138	0.045	0.268	0.260***	0.353***	0.130***
Male	0.472	0.478	0.468	0.491	-0.006	0.004	-0.019
Age category							
Aged 10-14	0.259	0.225	0.224	0.226	0.035***	0.036**	0.033**
Aged 15-24	0.315	0.407	0.428	0.380	-0.092***	-0.113***	-0.064***
Aged 25-34	0.166	0.179	0.174	0.186	-0.012	-0.007	-0.019
Aged 35-49	0.152	0.127	0.117	0.142	0.024***	0.035***	0.01
Aged 50-65	0.072	0.045	0.042	0.049	0.027***	0.030***	0.022**
Aged 66 plus	0.036	0.017	0.016	0.017	0.019***	0.020***	0.018***
Head or spouse	0.368	0.201	0.155	0.263	0.167***	0.214***	0.105***
Child of head	0.291	0.194	0.179	0.215	0.096***	0.112***	0.076***
Male child of head	0.153	0.100	0.088	0.116	0.053***	0.065***	0.036***
Female child of head	0.138	0.094	0.091	0.099	0.044***	0.047***	0.039***
Unmarried	0.622	0.653	0.683	0.612	-0.031**	-0.061***	0.009
Unmarried male	0.291	0.306	0.312	0.297	-0.014	-0.021	-0.005
Unmarried female	0.330	0.347	0.370	0.316	-0.017	-0.040***	0.015
Number of effective years of schooling completed	4.762	5.012	5.356	4.551	-0.250***	-0.594***	0.212*
Level of father's education							
None	0.205	0.068	0.032	0.117	0.137***	0.173***	0.088***
Primary incomplete	0.515	0.710	0.734	0.677	-0.195***	-0.220***	-0.162***
Primary complete	0.113	0.083	0.077	0.092	0.029***	0.036***	0.021*
Secondary incomplete	0.067	0.057	0.072	0.036	0.010	-0.005	0.031***
Secondary complete	0.025	0.026	0.026	0.027	-0.002	-0.001	-0.002
Post-secondary technical	0.008	0.005	0.008	0.000	0.003	0.000	0.008**
University and higher	0.067	0.051	0.050	0.051	0.017***	0.017**	0.016*

Level of mother's education							
None	0.639	0.726	0.711	0.746	-0.087***	-0.072***	-0.107***
Primary incomplete	0.202	0.157	0.142	0.176	0.045***	0.059***	0.025*
Primary complete	0.068	0.046	0.061	0.027	0.021***	0.007	0.041***
Secondary incomplete	0.034	0.025	0.030	0.017	0.010**	0.004	0.017**
Secondary complete	0.007	0.007	0.009	0.004	0.000	-0.002	0.003
Post-secondary technical	0.003	0.004	0.005	0.003	-0.001	-0.002	0.001
University and higher	0.047	0.035	0.041	0.027	0.012**	0.005	0.020**
Individual received loan from any source	0.179	0.117	0.147	0.076	0.063***	0.032***	0.103***
Log Kilometers from Kampala	4.820	4.698	4.220	5.209	0.122***	0.601***	-0.388***
Log Kilometers from regional capital	4.195	3.935	3.443	4.461	0.260***	0.752***	-0.265***
Log WRSI maize	4.388	4.372	4.365	4.380	0.017***	0.023***	0.008*
Log number of fatalities	0.803	1.735	1.973	1.417	-0.932***	-1.170***	-0.614***
Share of one's ethnicity living in urban areas	0.126	0.141	0.161	0.114	-0.014***	-0.034***	0.012***
Age rank (highest value for oldest)	3.722	4.424	5.101	3.516	-0.701***	-1.379***	0.206*

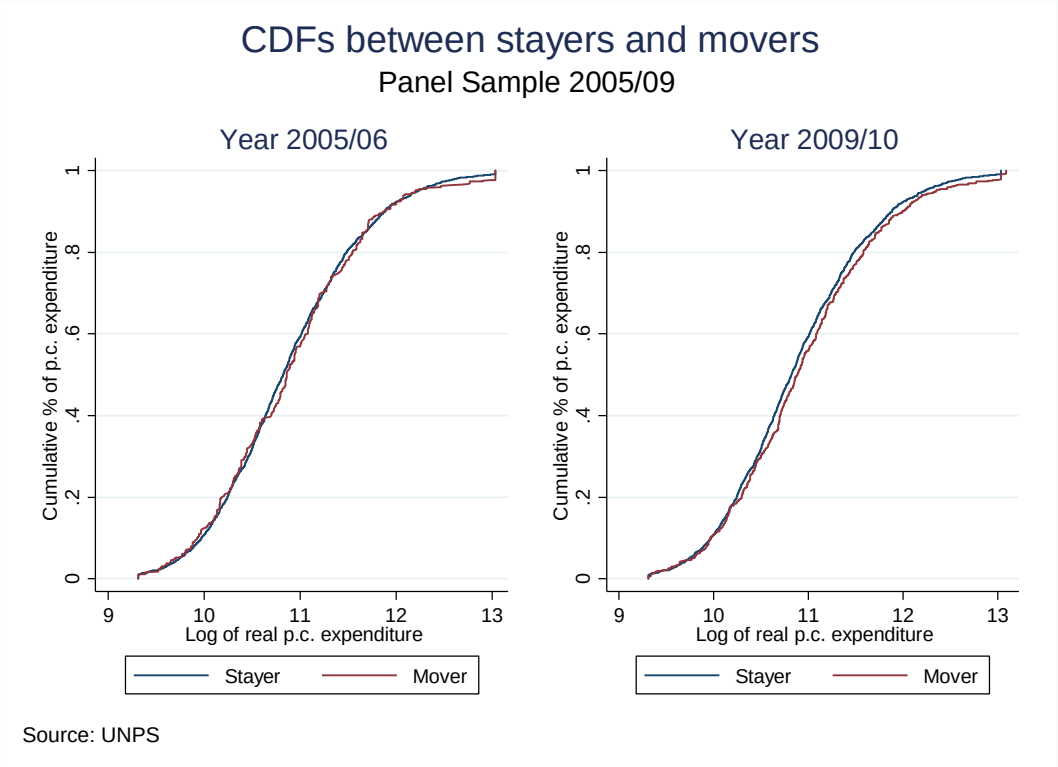
T-test results

*** p<0.01, ** p<0.05, * p<0.1

Source: Authors' calculations with UNPS

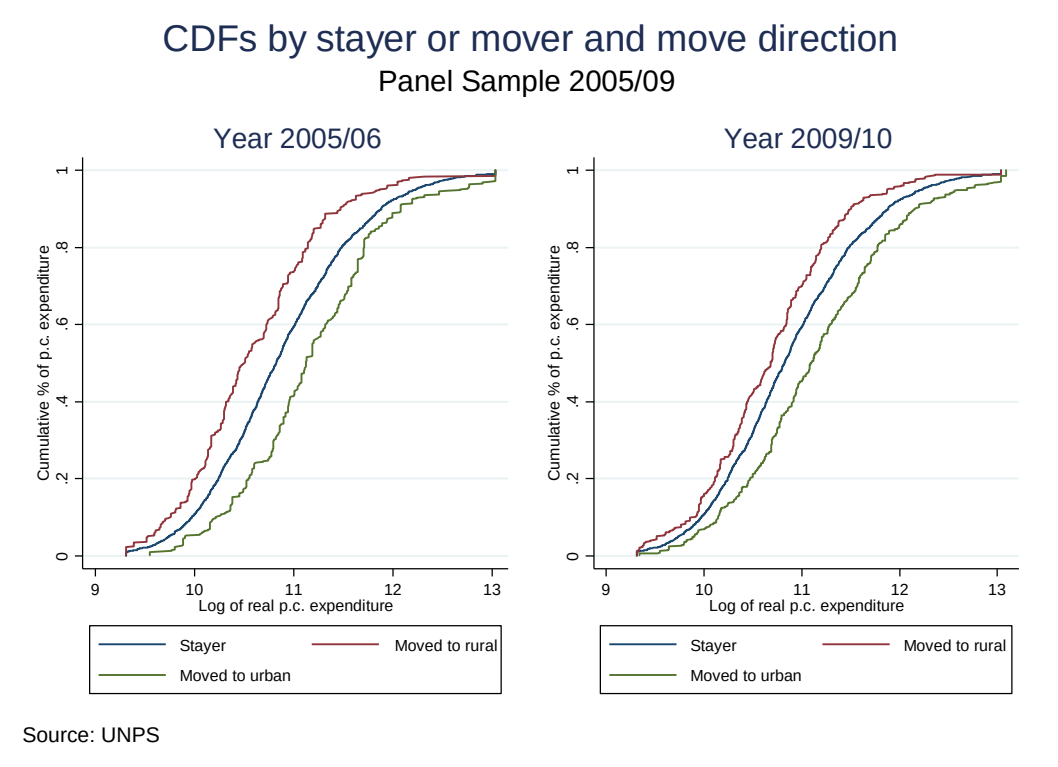
Cumulative distribution functions of consumption are presented for movers versus stayers (Figure 2) and by move direction (Figure 3). Consumption levels of stayers and movers started off with relatively similar distributions in 2005/06. In 2009/10, however, not all movers experience higher consumption levels as compared to stayers. Indeed, the bottom 50% of movers fare the same when compared to stayers in 2009/10 (Figure 2). In fact, movers follow two different welfare paths in 2009/10, one corresponding to moves to rural destinations and the other corresponding to moves to urban destinations. As compared to stayers, movers to rural destinations had a consumption gap in 2005/06, which was almost closed after migration in 2009/10. The consumption distribution of movers to urban destinations dominates that of stayers in 2005/06 and 2009/10 (Figure 3). This descriptive analysis suggests that the welfare impact of out-migration will be strongly positive, regardless of the move direction. Furthermore, it indicates that the welfare impact of migration to urban destinations will be stronger than the welfare impact of migration to rural destinations.

Figure 2



Source: UNPS

Figure 3



Source: UNPS

Drivers and welfare impact of out-migration

Earlier descriptive analysis suggests there are likely poverty differences across time between stayers and movers. To estimate the drivers of moving out – irrespective of the direction – and its welfare impact, we rely on the two-stage regression procedure described previously. Table 7 presents the first stage regression results on the drivers of out-migration, and Table 8 shows the OLS and IV (second stage) regression results on the welfare impact of out-migration.

Results on the drivers of out-migration show that movement out of one's original residence is driven by demographic-specific traits. We observe that, when compared with non-adults, individuals aged between 25 and 49 are more likely to be movers (Table 7), suggesting that migrants selected for the move tend to be of an economically active age. We also observe that individuals selected for out-migration hold a particular position in the household. While being a head or spouse is associated with a lower propensity to migrate by 1.6 percent, being a child of the head increases the propensity to migrate (Table 7). In addition, individual educational attainment influences out-migration. At a 5% level of significance, a one-year increase in schooling leads to 0.1 percent increase in the incidence of out-migration. This suggests that further human capital investments may be needed to facilitate out-migration.

Moving out is also driven by violent conflict shocks and distance to the regional capital. A one log-unit increase in the number of fatalities leads to a 0.8 percent increase in the incidence of out-migration, for young individuals of prime age to migrate. The same effect is observed from a one-log-unit increase in the

distance to the regional capital. Thus, migrants are those experiencing violent conflicts and living further from the regional capital.

The results in Table 8 on the impact of migration over the 2005-2010 period highlight the strongly positive welfare effects from leaving one's original residence. Ignoring the move direction, IV estimations suggest that, at a 1% level of significance, movement out of one's original residence adds 58.2 percentage points to consumption growth (column 2). Out-migration returns are found to be significantly larger when individuals have completed more years of schooling and when they are seniors (50-65 and 66+ age categories).

We assess the validity of the IV estimation in Tables 7 and 8 through a number of checks. First, the excluded instruments are jointly significant in the first stage regression, based on results from the Sanderson-Windmeijer F-test (Table 7). The regressions also do not employ more instruments than needed as we failed to reject the null hypothesis of the Sargan test, according to which the instruments are not correlated with the error process. Furthermore, out-migration proves to be endogenous to consumption growth, in which case the OLS impact estimates in column 1 would be biased and inconsistent, as opposed to the IV impact estimates in column 2 (Table 8).

Table 7. Drivers of out-migration

	Migrated across survey waves (1=mover, 0=stayer)
Baseline variables	First stage
Log WRSI maize x Aged 15-24	-0.031
	(0.032)
Log Kilometers from regional capital x Aged 15-24	0.008*
	(0.004)
Log number of fatalities x Aged 15-24	0.008**
	(0.003)
Share of one's ethnicity living in urban areas x Aged 15-24	0.006
	(0.056)
Head or spouse	-0.016***
	(0.005)
Child of head	0.031***
	(0.006)
Male child of head	-0.012
	(0.008)
Male	-0.006
	(0.004)
Unmarried	0.003
	(0.006)
Unmarried male	0.009
	(0.007)
Age category (reference: aged 10-14)	
Aged 15-24	0.120
	(0.142)
Aged 25-34	0.033***
	(0.007)
Aged 35-49	0.026***
	(0.008)
Aged 50-65	0.013
	(0.008)
Aged 66 plus	-0.001
	(0.009)
Number of effective years of schooling completed	0.001**
	(0.001)
Sanderson-Windmeijer - F test of excluded instruments	6.883
Sanderson-Windmeijer - (p-value)	0.0000
Observations	11,338
Number of households	2,400

Linear probability model; Initial Household Fixed Effects
Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Source: Authors' calculations with UNPS.

Table 8. Impact of out-migration

Variables		(1) OLS-IHHFE	(2) Second stage 2SLS-IHHFE
Migrated across survey waves (1=mover, 0=stayer)		0.194***	0.582***
		(0.058)	(0.142)
Male		0.002	0.003
		(0.003)	(0.004)
Unmarried		0.009	0.001
		(0.005)	(0.007)
Unmarried male		0.000	-0.000
		(0.006)	(0.006)
Age category (reference: aged 10-14)			
	Aged 15-24	0.006	-0.004
		(0.005)	(0.006)
	Aged 25-34	0.004	-0.006
		(0.006)	(0.007)
	Aged 35-49	0.002	-0.001
		(0.006)	(0.006)
	Aged 50-65	0.011*	0.013*
		(0.006)	(0.007)
	Aged 66 plus	0.008	0.015*
		(0.008)	(0.009)
Number of effective years of schooling completed		0.002***	0.001*
		(0.001)	(0.001)
Constant		-0.032***	
		(0.009)	
Cragg-Donald Wald F statistic			7.854
Sargan's statistic			8.431
Sargan p-value			0.208
Endogeneity test of mover (Hausman Chi-square)			6.042
Endogeneity test of mover (Hausman p-value)			0.0140
Observations		11,593	11,338
Number of households		2,602	2,400

Initial Household Fixed Effects

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: Authors' calculations with UNPS.

Drivers and welfare impact of the move to urban or rural destinations

To account for the likely heterogeneity in per capita consumption among movers based on their move direction, further two-stage models are estimated, one for urban migration following Equation 4, and the other for rural migration following Equation 5. The first stage regressions are presented in Table 9, with the drivers of moving to rural destinations (column 1) and those of moving to urban destinations (column 2). The corresponding impacts on consumption growth are presented in Table 10, with the OLS regressions in columns (1) and (3), and the second stage regressions in columns (2) and (4).

Results on the drivers of migration to a rural area (column 1) complement the drivers of out-migration. At a 1% level of significance, for individuals of prime age to migrate, a one log-unit increase in the distance to the regional capital leads to a 0.6 percent increase in the incidence of rural migration (column (1) in Table 9). A one log-unit increase in the number of fatalities leads to a 0.8 percent increase in the incidence of rural migration, for individuals of age to migrate. The above results indicate that remoteness and the intensity of violent conflict prompt a move to rural destinations. In addition, having a dense ethnic migrant network in urban areas deters young adults from migrating to rural destinations. At a 10% level of significance, a 1 percent decrease in one's shared ethnicity in urban areas translates into a 6.7 percent increase in the propensity to migrate to rural areas. (The corresponding point estimate for the move to urban areas, while statistically insignificant, is of a similar magnitude but with the opposite sign.)

One's age also drives one's propensity to migrate to rural areas. Results show that, when compared with non-adults, those aged between 25 and 49 are more likely to be movers to rural destinations (column (1) in Table 9). Individual educational attainment, meanwhile, does not determine rural (or urban) migration decisions.

Results also indicate that individuals selected for rural migration hold particular positions in the household. Being a head or spouse is associated with a 1.1 percent decrease in the propensity to migrate to rural destinations (column (1) in Table 9). In contrast, being a child of head is associated with a 1.2 percent increase in the propensity to migrate to rural destinations for females, and with a 0.6 percent increase in the incidence of rural migration of males (column (1) in Table 9). These effects on male and female children of the head, however, do not mean that females are assigned to rural migration and males to urban migration. As can be found for the drivers of urban migration (column (2) in Table 9), being a child of the head, irrespective of gender, is associated with a 2 percent increase in the propensity to migrate to urban destinations. Females and males are thus equally likely to move to urban destinations.

Rainfall shocks on maize, meanwhile, serve as a strong predictor of urban migration (column (2) in Table 9). A one log-unit decrease in the WRSI (increased rainfall deficit) leads to a 5.2 percent increase in the incidence of out-migration for young adults. Thus, in rain-fed agricultural areas and in the absence of crop insurance, rainfall deficits lead some individuals to escape from rural areas and settle in urban areas. In addition, when compared with non-adults (those aged 10-14), individuals aged 15 to 49 are more likely to move to urban destinations (column (2) in Table 9).

When examining the welfare impact of the move to urban destinations, results indicate that, regardless of the origin, at a 1% level of significance, moving to rural destinations leads to a 56 percentage point increase in per capita consumption growth relative to staying during the 2005-2010 period (column (2) of

Table 10). Meanwhile, the impact estimate of urban migration, at 65 percentage points, is markedly higher (column (4) of Table 10). At a marginal level of significance, the urban impact estimate is stronger for those aged between 50 and 65 years (relative to the reference category).

Overall, the findings suggest that migration generates substantial welfare gains – with even larger gains accrued to those who migrate to urban areas. In terms of drivers, rainfall shocks serve as a push factor for urban migration, while remoteness, violent conflict, and weak urban migrant networks induce individuals to migrate to rural areas.

Table 9. Drivers of migration to urban or rural areas

Baseline variables		(1) Mover to rural (1=mover to rural, 0=stayer) First stage	(2) Mover to urban (1=mover to urban, 0=stayer) First stage
Log WRSI maize x Aged 15-24		0.020	-0.052*
		(0.020)	(0.028)
Log Kilometers from regional capital x Aged 15-24		0.006**	0.002
		(0.003)	(0.004)
Log number of fatalities x Aged 15-24		0.008***	0.002
		(0.003)	(0.003)
Share of one's ethnicity living in urban areas x Aged 15-24		-0.067*	0.068
		(0.037)	(0.049)
Head or spouse		-0.011***	-0.006
		(0.003)	(0.004)
Child of head		0.012***	0.020***
		(0.004)	(0.005)
Male child of head		-0.001	-0.012
		(0.005)	(0.007)
Male		-0.005*	-0.002
		(0.003)	(0.004)
Unmarried		-0.003	0.006
		(0.004)	(0.005)
Unmarried male		0.005	0.004
		(0.004)	(0.006)
Age category (reference: aged 10-14)			
	Aged 15-24	-0.101	0.227*
		(0.087)	(0.123)
	Aged 25-34	0.017***	0.019***
		(0.004)	(0.007)
	Aged 35-49	0.009**	0.018***
		(0.005)	(0.007)
	Aged 50-65	0.005	0.010
		(0.006)	(0.007)
	Aged 66 plus	0.003	-0.003
		(0.006)	(0.007)
Number of effective years of schooling completed		0.001	0.001
		(0.000)	(0.001)
Sanderson-Windmeijer - F test of excluded instruments		5.401	3.335
Sanderson-Windmeijer - (p-value)		0.0000	0.0041
Observations		10,783	10,824
Number of households		2,319	2,290

Linear probability models; Initial Household Fixed Effects
Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Source: Authors' calculations with UNPS.

Table 10. Impact of migration to urban or rural areas

	(1)	(2)	(3)	(4)
		Second stage		Second stage
Variables	OLS-IHHFE	2SLS-IHHFE	OLS-IHHFE	2SLS-IHHFE
Mover to rural (1=mover to rural, 0=stayer)	0.335***	0.560***		
	(0.079)	(0.124)		
Mover to urban (1=mover to urban, 0=stayer)			0.118	0.651***
			(0.080)	(0.233)
Unmarried	0.003	0.002	0.006	-0.002
	(0.002)	(0.003)	(0.005)	(0.007)
Unmarried male	-0.003	-0.004	0.002	0.004
	(0.003)	(0.003)	(0.006)	(0.006)
Age category (reference: aged 10-14)				
Aged 15-24	0.003	0.001	0.003	-0.006
	(0.002)	(0.002)	(0.004)	(0.006)
Aged 25-34	0.001	-0.001	0.003	-0.006
	(0.003)	(0.003)	(0.006)	(0.008)
Aged 35-49	0.000	0.000	0.003	-0.003
	(0.002)	(0.003)	(0.006)	(0.006)
Aged 50-65	-0.000	0.001	0.012**	0.012*
	(0.003)	(0.003)	(0.005)	(0.006)
Aged 66 plus	0.003	0.005	0.005	0.012
	(0.003)	(0.004)	(0.007)	(0.009)
Number of effective years of schooling completed	0.000	0.000	0.001**	0.001
	(0.000)	(0.000)	(0.001)	(0.001)
Constant	-0.018***		-0.018**	
	(0.004)		(0.008)	
Cragg-Donald Wald F statistic		7.573		4.103
Sargan's statistic		3.548		7.022
Sargan p-value		0.738		0.319
Endogeneity test of mover (Hausman Chi-square)		5.373		5.162
Endogeneity test of mover (Hausman p-value)		0.0204		0.0231
Observations	11,034	10,783	11,069	10,824
Number of households	2,523	2,319	2,490	2,290

Initial Household Fixed Effects

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: Authors' calculations with UNPS.

Discussion

Estimation results put forward in this section point to welfare gains of 58 percentage points due to out-migration, gains of 65 percentage points due to migration to urban destinations, and gains of 56 percent due to migration to rural destinations. The results also highlight a number of factors that determine which households would send out migrants, which household member would leave the household, and to which destination the member would migrate.

How do our results on welfare impact and factors for migration align with previous empirical findings? Similar poverty and migration studies demonstrated the positive welfare impact of migration as well as household-specific and individual-specific factors for migration. The findings from Beegle et al. (2011) in Tanzania strongly support our results. They uncovered a 36 percentage-point growth in consumption relative to staying, 18 to 27 percentage-point consumption growth for movers to rural areas, and 66 percentage-point consumption growth for movers to urban areas, which are very close to our impact estimates of 65 percentage points for urban migration. Ignoring the direction of the move, de Brauw et al. (2013) find even larger impacts, with migrants achieving 110 percent higher consumption than non-migrants in Ethiopia.

Similar to other studies, our results also suggest that education matters for out-migration and consumption growth. While the average individual in our sample has completed just 5 years of schooling, we find that an additional year of schooling increases the incidence of out-migration by approximately 0.1 percent. Brockerhoff and Eu (1993) highlight evidence that educated females most likely migrate to cities. In their analysis, Beegle et al. (2011) also highlight the positive influence (with a convex effect) of individual education on migration and consumption. While our results focus primarily on individual educational attainment and do not account for the likely effect of the educational attainment of one's biological parents ,they do not depart from the evidence from numerous poverty studies that a primary level of education adds little to consumption levels (Haughton and Khandker 2009).

Previous studies also examine the role of insurance versus investment as drivers for migration. For Kleemans (2015), migration may evolve as an ex-post risk coping strategy to survive in the face of negative income shocks or as an investment strategy to increase future expected income after facing liquidity constraints. Beegle et al. (2011) find that young people experiencing rainfall shocks migrate and that physical mobility is not associated with financial constraints. Though not testing financial access as an instrument for migration, our results indicate that, for those living far from regional capitals, a less costly move to a rural area is the only viable option.

Previous work further suggests a positive effect of networks on migration, thus supporting our finding that having a thin urban migrant network leads to rural rather than urban migration. Network relationships build upon social connections of kinship, friendship, and shared community origin to reduce the costs and risks associated with the movement, and increase the net expected gains from migration (Massey et al. 1993). Evidence of reliance on networks for lowering migration costs and risks largely exists

in the international migration literature (Ilahi and Jafarey 1999; Massey et al. 1993; McKenzie and Rapoport 2007).

Moreover, our results indicate the importance of positional variables in the household – with heads or spouses constrained from making the move – and the equal propensity of males and females to migrate to urban areas. Contrary to the expectation that males would be more likely to leave their communities for welfare improvement, our results indicate that females also benefit from urban migration opportunities. Brockerhoff and Eu (1993), in their demographic and health studies of eight Sub-Saharan African countries including Uganda, associate rural-urban migration with females in their twenties who reach cities for marriage purposes. However, females may also leave their communities for reasons other than marriage, such as independence from social and family constraints, employment, and education (Chant 1992; Tacoli 1998).

In addition, our findings suggest that rainfall deficits, particularly on maize production, drive migration to urban areas—where welfare gains are highest. In the absence of rainfall shocks, a rural household faces a lower risk of food insecurity and consequentially relies less on migration as a livelihood strategy. After experiencing a rainfall shock, urban migration – and an exit from agriculture – becomes a more salient option for households seeking to escape this covariate risk. Meanwhile, one's distance to urban areas and urban migrant networks matter for making the rural move, suggesting that these factors lead to an inferior choice relative to urban moves. People face difficulties in reaching cities when they live in remote areas, given the long distances and high transportation costs, while those lacking urban ethnic-based networks opt instead to move to rural areas. Finding ways to remove these constraints will enhance urban migration opportunities for rural households, especially for those individuals of an economically active age.

VI. Conclusion

Our findings indicate that migration, particularly to urban destinations, can offer considerable welfare improvements as predicted by the traditional labor migration model. Yet the evidence presented here suggests that push factors such as rainfall deficits for cereal production lead one to undertake urban migration. In contrast, distance to the regional capital and thin urban migrant networks increase initial migration costs, thus restricting migrant candidates to moves to rural destinations. The findings also reveal that an increase in the intensity of conflict forces young adults to move to rural areas. In addition to these migration factors that are external to household control, the findings expose how education leverages higher consumption levels through out-migration, and how female children of the head are as likely to move to urban areas as their male counterparts.

Drawing on these conclusions, the study can propose four key policy implications. First, the welfare impact of migration strongly supports urbanization and pro-rural-urban migration policies for their linkage to poverty reduction in Uganda and similar developing countries. Such policies can transform the lives of rural individuals prone to shocks by offering them migration opportunities to boost their earning potential in urban areas. Second, the development of road infrastructure, while increasing the connectedness of rural areas and developing access to markets, would also likely reduce the financial burdens of migration through a reduction in transport costs, thus increasing the capacity to migrate to urban areas. Addressing this constraint could be of particular benefit to those who live in remote areas that are far from a city or town, as well as those who have a weak urban migrant network. Third, to ensure females take full advantage of urban migration opportunities for their own welfare and to facilitate remittance transfers to their parent households, programs that to delay young women's age at marriage – such as adolescent

empowerment interventions (Bandiera et al. 2014) – should be considered. And finally, the results highlight the importance of investments in the education of rural populations, which would increase human capital and enhance the migration potential for future generations.

VII. Bibliography

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Appendix

Appendix Table 1: Lagged summary statistics of work migrant sending vs. non-sending households (excluding 2011/12 data)

	N	(1) No migrant sent	(2) Sent migrant	(2) - (1) Diff
De facto female-headed household	8,808	0.09	0.09	-0.01
De jure female-headed household	8,808	0.2	0.23	-0.03*
Age of household head	8,787	42.33	50.4	-6.84***
Head: no schooling	8,360	0.18	0.13	0.05***
Head: Primary schooling incomplete	8,360	0.4	0.32	0.04**
Head: Primary schooling complete	8,360	0.14	0.15	0
Head: Secondary schooling incomplete	8,360	0.16	0.21	-0.04***
Head: Secondary schooling complete	8,360	0.05	0.08	-0.01
Head: Post-secondary technical schooling	8,360	0.04	0.09	-0.03***
Head: University and higher	8,360	0.02	0.03	-0.01
# of adult males (15-59) in HH	8,808	1.03	1.49	-0.38***
# of adult females (15-59) in HH	8,808	1.14	1.66	-0.4***
# of adults aged 60+ in HH	8,808	0.21	0.41	-0.18***
Urban household	8,808	0.2	0.22	-0.01
Poverty status	8,675	0.27	0.21	0.04***
Poorest 40% of households	8,808	0.37	0.28	0.07***
Log of avg. monthly real price of maize	8,808	5.82	5.82	0.02**
Log of avg. monthly real price of matoke	8,808	5.66	5.62	0.01
Log of avg. monthly real price of cassava	8,808	5.42	5.41	0.03*
HH shock: agriculture (pests/disease/drought)	8,797	0.36	0.37	0.02
HH shock: death of HH member	8,779	0.07	0.07	-0.01
HH shock: theft or fire	8,782	0.06	0.06	0.02***
Log of # of fatalities near HH	8,292	0.67	0.72	-0.04
Elementary school within one hour of HH	7,191	0.81	0.87	-0.09***
Health center/clinic within one hour of HH	7,541	0.69	0.82	-0.13***
HH has a formal loan of any type	8,669	0.17	0.28	-0.11***
HH member has a savings account with a formal institution	8,642	0.14	0.29	-0.11***
Share of migrants within head's ethnicity	8,054	0.17	0.19	-0.01***
Reliance on networks for insuring shocks	8,639	0.32	0.2	0.08***
Log of HH's distance from Kampala (km)	8,219	4.79	4.57	0.16***

Source: Authors' calculations with UNPS. Significance levels are reported as follows: * p<0.10, ** p<0.05, *** p<0.01.