

Egge, Eva-Maria; Litchfield, Julie A.

Working Paper

Following in their footsteps: An analysis of the impact of successive migration on rural household welfare in Ghana

WIDER Working Paper, No. 2018/22

Provided in Cooperation with:

United Nations University (UNU), World Institute for Development Economics Research (WIDER)

Suggested Citation: Egge, Eva-Maria; Litchfield, Julie A. (2018) : Following in their footsteps: An analysis of the impact of successive migration on rural household welfare in Ghana, WIDER Working Paper, No. 2018/22, ISBN 978-92-9256-464-3, The United Nations University World Institute for Development Economics Research (UNU-WIDER), Helsinki, <https://doi.org/10.35188/UNU-WIDER/2018/464-3>

This Version is available at:

<https://hdl.handle.net/10419/190071>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.



UNITED NATIONS
UNIVERSITY
UNU-WIDER

WIDER Working Paper 2018/22

**Following in their footsteps: an analysis of the
impact of successive migration on rural
household welfare in Ghana**

Eva-Maria Egger¹ and Julie Litchfield²

February 2018

Abstract: The decision to migrate is often influenced by the experience of earlier migrants from one's household. Earlier migrants provide information on likely opportunities and potential risks and can offer support at destination to later migrants. We explore patterns of migration within rural households and the impact that these later migrants have on household welfare outcomes. Specifically, we use a household panel survey collected in 2013 and 2015 in rural areas of Ghana. We exploit the panel nature of the data and a weighting method to overcome sources of bias. Welfare is measured with an asset index of housing quality. We find that more recent or 'new' migrants are more likely to be from a younger generation, they face lower migration costs, and few of them remit. We find no effect of sending a new migrant on the asset index. We conclude that the different nature of migration of new migrants implies neither an economic gain for the household nor a loss. The reason for the former is that the more recent migrants remit less or not at all compared to earlier waves of migrants and the reason for the latter is that migration becomes less costly with prior experience.

Keywords: migration, Ghana, asset index, multiple correspondence analysis, entropy balancing weights

JEL classification: R23, C38, D10

Acknowledgements: The authors would like to especially thank Michael Lipton, Farai Jena and Cecilia Poggi (Department of Economics, Sussex) as well as participants at the UNU-WIDER conference on Migration and Mobility (October 2017) at the University of Ghana, for useful comments and discussions. This paper is an output from a project funded by UK Aid from the UK Department for International Development (DFID) for the benefit of developing countries. The views expressed are not necessarily those of DFID. Data for Ghana was collected by the Centre for Migration Studies (CMS), University of Ghana through funding from the UK's Department for International Development (DFID) and made available by the Migrating out of Poverty Research Consortium, University of Sussex, UK, www.migratingoutofpoverty.dfid.gov.uk. Any errors are ours alone.

This is an updated and revised version of an earlier study published in the working paper series of the Migrating out of Poverty research program consortium as number 51.

¹ International Fund for Agricultural Development (IFAD), Rome, Italy, corresponding author, email: E.Egger@ifad.org. Eva-Maria Egger received financial support in form of a doctoral grant by the Economic and Social Research Council (ESRC) and the research program consortium 'Migrating out of Poverty' (U.K. Department for International Development); ² Department of Economics, University of Sussex, U.K.

This research study is released in connection with the WIDER Development Conference on 'Migration and mobility – new frontiers for research and policy', jointly organized with the African Research Universities Alliance (ARUA), on 5-6 October 2017 in Accra, Ghana.

Copyright © UNU-WIDER 2018

Information and requests: publications@wider.unu.edu

ISSN 1798-7237 ISBN 978-92-9256-464-3

Typescript prepared by Ans Vehmaanperä.

The United Nations University World Institute for Development Economics Research provides economic analysis and policy advice with the aim of promoting sustainable and equitable development. The Institute began operations in 1985 in Helsinki, Finland, as the first research and training centre of the United Nations University. Today it is a unique blend of think tank, research institute, and UN agency—providing a range of services from policy advice to governments as well as freely available original research.

The Institute is funded through income from an endowment fund with additional contributions to its work programme from Finland, Sweden, and the United Kingdom as well as earmarked contributions for specific projects from a variety of donors.

Katajanokanlaituri 6 B, 00160 Helsinki, Finland

The views expressed in this paper are those of the author(s), and do not necessarily reflect the views of the Institute or the United Nations University, nor the programme/project donors.

1 Introduction

Internal migration is a common and sizeable phenomenon in many developing countries. An estimated 740 million people live outside their region of birth (Bell and Muhidin, 2009). Differences in regional economic performance induce people to leave poorer areas and move to those where more and better opportunities are located. In Ghana, around 35 per cent of people in the population Census of 2010 had moved from their place of birth to another location within the country (Ghana Statistical Service, 2013a). Many people move from poorer to richer regions, some move with the whole household, others send a member of the household (Litchfield and Waddington, 2003; Molini et al., 2016).

Internal migration plays an important role in poverty reduction and economic development at the individual, household and macroeconomic level. On the one hand, it contributes to structural change in the country when rural workers move into non-agricultural work in urban areas (Harris and Todaro, 1970). On the other hand, migration of a household member can insure the sending household against income shocks in the origin. Such insurance can prevent households from falling into poverty. Moreover, the income earned by the migrant member can raise consumption levels at home or even pay for investments in profitable technologies (Stark and Bloom, 1985). Additionally, geographic mobility offers young people the possibility to advance in their education and gain new skills if their origins do not provide these opportunities.

Because of its size and relevance for economic development, economists study internal migration, but data limitations and methodological issues remain a challenge. One focus of research is the question whether and how internal migration affects households at origin. This paper contributes to this strand in the literature. We investigate the impact of having a new migrant on the welfare of origin households conditional on their prior migration experience.

The engagement in migration of some village or community members was shown to significantly reduce migration costs for later migrants from that same network. This local migration experience would also increase the probability to be successful at destination in terms of finding a job. Thus, households are more likely to send a migrant if they have access to such a network of migration experience (McKenzie and Rapoport, 2007; Munshi, 2003). Households themselves can gain migration experience through their engagement in migration. Bryan et al. (2014) provide experimental evidence that the idiosyncratic migration experience of a household in contrast to that of social networks significantly predicts the repetition of migration within this household. Migration experience at the household level is hence important for future migration decisions and their impacts on the household.

Furthermore, the focus on new migrants is adequate for a setting in which households have several migrant members who move at different points in time. This is revealed by the data available in this paper. We use primary data from a new two-wave household panel survey conducted in Ghana in 2013 and 2015. The surveys were designed with the goal to collect as much information as possible about migration.

The econometric challenge of the comparison between migrant and non-migrant households is unobserved heterogeneity. There are unobservable factors that determine both, the fact that a household has a migrant and the outcome of interest, for example household income. Any result from a simple comparison of these households with and without migrants would be biased. Comparing households that all have prior migration experience reduces the selection bias to some extent in the analysis of this paper. Gibson et al. (2011) demonstrate experimental evidence for

different stages of selection, first that into migration, then into who moves. We apply entropy balancing weights (Hainmueller, 2012), similar to matching methods, and exploit the panel nature of our data to overcome remaining selection and omitted variable bias. The outcome variable of interest is an asset index constructed using Multiple Correspondence Analysis (MCA).

Because there is little existing evidence on the consequences of idiosyncratic migration experience of households, we first describe migrants and their households in our new data to explore the dynamic patterns of migration. A comparison of the new migrants to those migrants who left the household before, documents that new migrants are from a younger generation within households, such as children or grandchildren of the head. Their migration costs are lower and might be related to family networks and the households' prior engagement in migration. From these observations we derive hypotheses for the impact assessment. Then we estimate how the asset welfare of households with a new migrant changes compared to those without, conditional on the fact that all households have previously had a migrant. We analyse whether there are heterogeneous effects by gender of the migrant, by type of migration (seasonal or permanent), reason for migration (family or work), and by destination (within or across regional border).

We find no effect of sending a new migrant on the change in the asset index of origin households compared to those households who do not engage further in migration in the same period. This result is robust to a sensitivity analysis. Our interpretation is that the returns to migration might not show after the short period of our study. Households in our sample use their savings to finance migration. They hence do not experience a drop in their asset index. However, they also do not experience an increase in their asset index since the new migrant left. This could be, on the one hand, due to their use of savings to cover migration costs instead of investing into more assets and, on the other hand, because new migrants send only rarely and low remittances. We further suggest that due to prior engagement in migration our sample of households does not experience an initial decline in welfare. This could be caused by the migration costs or the loss in labour due to a member leaving (Taylor and Lopez-Feldman, 2010). We however document that migration costs for new migrants are smaller than for prior migration, which indicates that migration experience at the household level reduces the costs of migration. In addition, prior to their move new migrants are either in school or doing unpaid work. It is thus less likely that their migration implies a loss in labour income for the household.

This study builds on earlier work where we employed propensity score matching at baseline to estimate the welfare effect of migration (Egger and Litchfield, 2017). In contrast to the matching approach, entropy balancing weights allow us to further control for time-varying characteristics. In addition, we previously adopted Factor Analysis to construct the asset index, while MCA fits the data better. Extending from that previous work, we provide a more comprehensive discussion of the sensitivity of results and explore possible channels of the results in the data.

The paper is structured as follows. In the next section, we discuss the literature on impacts of migration on households left behind with respect to methodological challenges, knowledge gaps and evidence for our context. This is followed by the analytical framework for this study in section 3. Then we present the data used for the analysis (section 4) followed by a description of the migrants, migrant households and their prior migration experience (section 5). In section 6, we explain the methodology to estimate the impact of sending a new migrant on the welfare of origin households. In section 7, we provide results and robustness checks. Section 8 concludes.

2 Literature review

The research interest of this paper is the short-term relationship between having a new migrant and the welfare of origin households in rural Ghana. Many studies explored the more general question looking at the impact of having a migrant or not on some measure of well-being of the origin household. There exists also research that examines the effect of migration on the migrant's own welfare, e.g. Beegle et al. (2008), but this is not the focus of this paper.

Theoretical models such as from the New Economics of Labour Migration (NELM, Stark and Bloom, 1985) cannot predict the direction of the impact of migration on origin households. The reason for this is that the impact depends on counteracting factors. For example, De Brauw and Harigaya (2007) model the impact of migration on consumption growth. It depends at the same time on the loss of farm production incurred by migration and the increase in consumption due to remittance receipt (De Brauw and Harigaya, 2007, p.436) aside from the costs of moving.

Antman (2012) reviews the research that examines the impact of migration on the left behind family members and Mendola (2012) reviews studies looking at rural out-migration and its impacts on sending households. Both summarize mixed results from the literature. The following examples illustrate the inconclusive findings.

Empirical evidence from China by De Brauw and Giles (2012) documents an increase in consumption growth as well as 'increased accumulation of housing welfare and consumer durables' (p.3). Quisumbing and McNiven (2010) consider the impact of migration and remittances on assets, consumption and credit constraints in the rural Philippines. They find that a larger number of migrant children reduces the values of non-land assets and total expenditures per adult equivalent in the origin households. However, remittances have a positive impact on housing, consumer durables, non-land assets, total (per adult equivalent) and educational expenditures. They find no effect on status of credit constraint. Mendola (2008) finds an increase in investments in agricultural production among the left behind households with international migrants in Bangladesh, but she does not find an effect for internal migration. Taylor and López-Feldman (2010) provide evidence of a positive effect of migration to the U.S. on land productivity of migrant-sending families in Mexico. They also document an increase in per-capita income via remittances. Damon (2010) finds only weak increases in asset accumulation in El Salvador, he finds no impact of migration and remittances on investments in agricultural production.

What gives rise to these mixed results? One explanation is that the counteracting factors of costs and rewards to migration materialize at different speeds (Taylor and López-Feldman, 2010). The loss in labour is felt immediately as are the costs of paying for the migration of a household member. The returns to migration in form of remittances contribute to higher consumption levels. They delay however until the migrant arrived at the destination, found a job and earned enough income to send some of it back home. It might take even longer for remittances to accumulate enough to invest in productive assets. Other aspects that contribute to the mixed results are the different data, definitions for migration and methodologies used. Migrants, or migrant households, are not a random sample of the population, but observable and unobservable factors determine their participation in migration. These factors can affect the outcomes of interest at the same time. In addition, the outcome itself can affect the migration decision. This is especially an issue in cross-sectional data.

Only few studies consider migration experience at the household level. De Brauw and Harigaya (2007) and De Brauw (2010) provide evidence about the impact of seasonal migration on household welfare or agricultural production in Viet Nam. While seasonal migration is most likely

a repeated event, the authors do not specifically account for the repetition and potential learning process of the household. Bryan et al. (2014) conduct a randomized control trial in a region in Bangladesh that is seasonally affected by famine to understand underused seasonal migration. Their intervention was a cash transfer to vulnerable households conditioned to finance seasonal migration of one household member. The results show significant improvements of consumption levels for the treated households. According to the authors' model, migration results in success or failure in terms of finding a job at destination and sending remittances. Households learn from this experience and it predicts their future engagement in migration. Further evidence for the role of migration experience within the family is provided by Giulietti et al. (2014). The authors develop a model that differentiates between 'weak' and 'strong' network ties and their role for migration decisions. Their findings suggest that networks at community level (weak ties) and prior migration of a family member (strong ties) act complementary, but weak ties have a higher impact on the migration decision. No further analysis is conducted to investigate how such different networks might influence migration and household outcomes.

Ghana is a middle-income country that has been able to improve living standards remarkably in the past decade. Despite these improvements, there remain challenges and small-scale agriculture is still the predominant income source in most regions. This gives rise to internal migration. Based on 2000 Census data, Castaldo et al. (2012) map poverty and migration rates at district level and find that most people move out of the poor and into the richer regions of the country. Many researchers have studied the impacts of migration in Ghana with mixed results due to the different data sources used and different methodologies applied (Ackah and Medvedev, 2010; Adams, 2006; Adams et al., 2008; Adams and Cuecuecha, 2013; Litchfield and Waddington, 2003; Mahé and Naudé, 2016; Molini et al., 2016).

This study contributes to the understanding of internal migration in Ghana and its consequences for origin households by using novel data. We utilize its rich questionnaire to document the diverse patterns of migration. We exploit the panel nature of the data and apply a new method from the evaluation literature to reduce concerns of bias. We condition the analysis on prior migration experience. Thus, we contribute to the literature aiming to understand whether households learn from migration and what the implications are for future migration at household level.

3 Analytical framework

This paper investigates whether having a new migrant is related to a change in the welfare of the migrant's household at origin conditional on migration experience. The analysis is set in two periods, baseline and follow-up. All households have at least one member who is a migrant in the baseline period. Thus, they have previously engaged in migration, which we define as 'migration experience'. A migrant is defined in the surveys as a member of the household who is currently absent, left at least three months ago, but not more than five years.

A new migrant is defined as a household member who is present in the household in the baseline period and who then moves at least to another community and is still away in the follow-up period.¹ We look at new migrants, because it appears to be common for households to have more than one migrant and to see them move at different times. Thus, we are not interested in just the

¹ It is possible that the new migrant had migrated in the past. In such a case, not only the household as a whole would have migration experience but also the individual migrant. The response rate to the question asking how many times a migrant moved before is unfortunately very low so that we cannot control for this in the analysis.

number of migrants, but in the dynamic aspect of another member migrating. Furthermore, it removes some of the selection bias of households into migration. To give an example, imagine a household as depicted in the following table:

Table 1: Example household with baseline and new migrant

Household member	Migrant in baseline	Migrant in follow-up
A	1	1
B	0	0
C	0	0
D	1	0
E	0	1
Total	2	2

Source: Authors' compilation.

This household has five members. At baseline, member A and member D are away as migrants. In the follow-up period, member A is still away as a migrant, while member D has returned to the household. Now member E is away as a migrant. If we were to compare only the total number of migrants away, we would see no difference between these two periods for this household. However, member D might have returned with money for the household and will now contribute again to the household production (farm or business), and he or she potentially returned with new skills that could improve the returns to her or his labour. At the same time, for member E to migrate, the household had to incur some costs, maybe by selling assets or using savings. These factors have different impacts on the household welfare, so that we focus on new migrants instead of the total number of migrants. Thus, this example household would be defined as a household with migration experience and a new migrant. Member E would be this new migrant.

Different aspects determine the impact of having a new migrant. Firstly, migration is costly and can initially lead to a decline in welfare due to the costs incurred as well as the loss in labour. Secondly, migration is beneficial when migrants send money back to their origin household and thus create another source of income. Thirdly, migration can be beneficial for the migrant him or herself directly. There might be more and better opportunities to earn an income or pursue further education at destination than at origin. Moreover, the household has one member less to care for and it might derive utility from the fact that the migrant can find a better livelihood somewhere else.

However, it is not clear in which direction the effect should work and which factor dominates. The afore-mentioned factors work in different directions. Additionally, in our specific case households have migration experience at baseline before they have a new migrant, which can influence the effect. While sending a new migrant can incur costs, these might be lower conditional on prior migration experience of the household.

Following this discussion, we look at the impact of sending a new migrant conditional on migration experience. The sample is therefore first restricted only to households with migration experience at baseline. Then, households are assigned to a group called 'treated' and another one named 'control'. Households are in the treated group if they have at least one new migrant between the two periods. The remaining households without a new migrant between the two periods are in the

control group.² This definition implies that households can have more than one new migrant and they can have several baseline migrants. Our sample is restricted to those households whose new migrants were present members of the household in the baseline period.³ Obviously, these definitions restrict the sample to a smaller set of observations than the original full survey.

4 Data

4.1 Data source and sample

The data used for this analysis is a household survey collected in April/May 2013 and again at the same households in April/May 2015. In this way, the households are interviewed during the same season to avoid issues of seasonality between survey waves. We call this data set MooP Ghana panel study from here on.

In the first wave, around 1,400 households were surveyed, and in the second wave the team was able to follow up with around 1,100 of them. The households are not nationally or regionally representative, but they were specifically chosen to oversample migrant sending households. While migration is a common phenomenon, it remains difficult to get a feasible sample in most nationally representative surveys.

The survey was conducted in five regions, the Northern region, the Upper East, Upper West, Brong Ahafo, and Volta region. These regions are major source areas for internal migration based on the information in the 2010 Ghana Population and Housing Census (Ghana Statistical Service, 2013). The questionnaire was directed at the household head and asked about the demographics of each household member, their education and employment status, as well as their migration history. The questions about migration are either about current migrants or in an extra section directed towards returned migrants. These sections cover, for example, information on destination, reason for migrating, financing of the move, remittance sending, and occupation at destination.

In the questionnaire, migrants are members who are currently not living in the household and who have been away for at least three months, but less than ten (in 2013) or five years (in 2015). 60 per cent of households in the treatment group for this analysis have only one new migrant, 25 per cent have two, and the remaining 15 per cent have three or more new migrants in the study period.

After cleaning the data and making sure that the main variables of interest are available for all households in both survey waves, we are left with a balanced panel of 960 household-year observations. 131 migrant households are in the treated group, and 349 in the control group. The

² We could include households that had a return migrant at baseline, but no current migrant. They also have migration experience. However, there are no such households in our data.

³ A special case are households that grew overall, which means that they had more members in the follow-up period than in the baseline due to new household formation. This can for example happen, when the son of the household head marries and his new wife and maybe a relative of hers join the household. If any of the newly joined household members then is a migrant in the follow-up period, we drop this household from the analysis. These households might represent a different form of household formation.

majority of households with a new migrant are located in Brong Ahafo and in the Volta region and the majority of the comparison group live in the Volta and the Northern region (Table 2).⁴

Table 2: Sample of treatment and control households across regions in 2013

<i>Region</i>	Control		Treatment		Total	
	N	%	N	%	N	%
Brong Ahafo	61	17.5	40	30.5	101	21
Northern	93	26.6	19	14.5	112	23.3
Upper East	54	15.5	25	19.1	79	16.5
Upper West	43	12.3	18	13.7	61	12.7
Volta	98	28.1	29	22.1	127	26.5
Total	349	100	131	100	480	100

Source: Authors' calculations based on MooP Ghana panel study.

4.2 Migrants and households in the sample

We compare individuals who were migrants in the baseline (2013) and those who moved as new migrants between baseline and follow-up survey (2015). This comparison helps to document how new migrants differ from previous migrants within households with migration experience. In our sample, we have 951 migrants in 2013, and 215 new ones in the follow-up survey. The response rates to the questions about migrants vary. We hence always report the number of responses for each question.

Table 3 provides an overview of the basic demographic characteristics of the migrants by migrant status and gender. Of the 2013 migrants, 38 per cent are female, in 2015 the share of women increased to 50 per cent. New migrants are on average younger and relatively more of them are single. They are from a younger generation within the household, often sons or daughters of the household head or even from the third generation. Relatively more of the new migrants have no or only primary education compared to baseline migrants.

⁴ The different shares of treated and control households across regions will be accounted for in the empirical strategy using a re-weighting method.

Table 3: Demographic information of migrants, by migrant status and gender

	Baseline (2013)		New (2015)	
	Male	Female	Male	Female
<i>Observations (N)</i>	592	359	107	108
<i>Age (in years)</i>	32.4	30.7	25.6	26.8
<i>Marital status</i>				
<i>N</i>	543	330	95	92
Single	44.6	42.7	68.4	47.8
Married/living with partner	54	50.6	30.5	48.9
Separated/Divorced/Widowed	1.5	6.7	1.1	3.3
<i>Relation to head</i>				
<i>N</i>	592	359	107	108
Head	8.3	1.9	3.7	1.9
Spouse / partner	3.4	11.4	2.8	3.7
Child/adopted child	52.4	49	49.5	51.9
Grandchild	4.7	6.7	13.1	12
Niece/nephew	5.6	7	14	13.9
Parent	5.4	2.2	0.9	2.8
Sibling	17.2	12.5	10.3	5.6
Son/daughter-in-law	0.2	2.2	1.9	0
Sibling-in-law	1.2	3.1	0.9	1.9
Parent-in-law	0	2.2	0	1.9
Grandparent	0.2	0.6	0	0
Other relatives	1.2	1.1	1.9	2.8
Not related	0.3	0	0.9	1.9
<i>Education</i>				
<i>N</i>	520	296	97	89
None	14	18.6	23.7	31.5
Primary	16.7	18.6	22.7	15.7
Middle/Junior	31	30.4	27.8	22.5
High/Senior	21.5	19.3	15.5	16.9
College/Technical	16.7	13.2	10.3	13.5
<i>Occupation prior to migration</i>				
<i>N</i>	436	232	70	68
In school / education	16.7	20.3	32.9	36.8
Paid employee	8.9	4.7	10	5.9
Paid work for self	35.1	27.6	24.3	17.6
Unemployed, looking for job	9.9	7.8	8.6	8.8
Doing unpaid work	24.1	30.2	21.4	27.9
Retired	0.5	0		
Apprenticeship	2.3	5.6	1.4	1.5
Others	2.5	3.9	1.4	1.5

Source: Authors' calculations based on MooP Ghana panel study.

Turning to households, we observe in table 4 that there are some differences between households with a new migrant and the control group when we compare their characteristics at baseline. They differ in household size, ethnicity and livelihood. Households with new migrants are relatively larger and most live from family farm income. Our sample reflects households in a setting where family farms or businesses are common, as is migration. Migration is mostly long-term and not seasonal, even though repeated migration is not unusual. Households with new migrants have relatively fewer seasonal migrants, more female migrants, more returned migrants and more migrants with a job at destination compared to the control households.

Table 4: Household characteristics at baseline, by group

	Households without new migrants (Control)	Households with new migrants (Treatment)
N	349	131
Household size (excluding currently absent migrants)	5.6	7.2
Dependency ratio	0.60	0.61
Female-to-male ratio	0.50	0.48
Female head	0.26	0.29
Age of head in years	53.3	54.8
Marital status		
Single	0.06	0.05
Married/ living with partner	0.77	0.73
Separated/ Divorced/ Widowed	0.17	0.22
Ethnicity of head		
Akan	0.13	0.20
Ewe	0.24	0.19
Mole Dagbani	0.29	0.24
Others	0.34	0.37
Education of head		
None	0.41	0.41
Primary	0.09	0.11
Middle/Junior	0.25	0.32
High/Senior	0.12	0.07
College/Technical	0.12	0.08
Highest level of education in household		
None	0.05	0.05
Primary	0.11	0.08
Middle/Junior	0.23	0.23
High/Senior	0.30	0.31
College/Technical	0.31	0.34
Main occupation of head		
employee	0.16	0.15
self-employed	0.52	0.52
unpaid/unemployed	0.23	0.25
inactive etc	0.09	0.08
Main income source		
Public sector	0.12	0.08
Private sector	0.04	0.05
Own business	0.28	0.26
Own farm	0.42	0.51
Private transfers	0.11	0.07
Others	0.03	0.03
Migration experience		
Household has returnee	0.17	0.24
Number of current migrants	1.9	2.1
Number of prior migration spells of current migrants	1.3	0.9
Share of seasonal migrants	0.16	0.09
Share of female migrants	0.35	0.41
Share of migrants with job	0.60	0.66

Source: Authors' calculations based on MooP Ghana panel study.

5 Descriptive statistics

The rich information about migration in this survey allows us to draw a detailed picture of migration in these areas of Ghana. We explore the differences between baseline migrants and new migrants concerning migration networks, financing and occupations before and after migration

and we look at the investment behaviour of households in the study period. From these descriptions, we can then move on to the analysis of the welfare impact of having a new migrant in section 6.

We saw before that households with new migrants appear to be successful in terms of the share of baseline migrants that have a job at destination and they are more likely to have a return migrant who potentially transmits important information for future migration. Further details about the migration network and financing are discovered in the data.

Table 5: Migration networks

	Baseline (2013)		New (2015)	
	Male	Female	Male	Female
<i>Contact at destination</i>				
<i>N</i>	481	259	87	83
Yes	54.3	69.1	64.4	74.7
<i>Type of contact</i>				
<i>N</i>	-	-	56	61
Father			10.7	6.6
Mother			7.1	9.8
Siblings			17.9	14.8
Relatives			55.4	55.7
Recruitment agent			5.4	3.3
Other specified			3.6	9.8
<i>Job fixed up prior to moving</i>				
<i>N</i>	479	256	85	71
Yes	20.3	19.9	29.4	8.5

Source: Authors' calculations based on MooP Ghana panel study.

Contacts at the destination can provide an important support for migrants as we document in table 5. In our sample, women rely on networks relatively more than men. For new migrants, we also know which contacts the migrants had at destination. Around 55 per cent of times, the migrant had a relative at destination, and 18 per cent of men and 17 per cent of women had their parent at destination. Earlier we learned that most of these new migrants are second or third generation within the household and often not direct descendants of the household head. It is therefore possible to imagine that nieces and nephews or grandchildren follow their parent who moved in the past. Finally, we also observe whether migrants already had a job agreed before their move. This is less common, especially among female new migrants. In contrast, almost 30 per cent of new migrant men state to have a job waiting for them at destination. At baseline, fewer migrants had a job fixed up prior to their move irrespective of their gender.

Table 6 documents the migration costs and modes of financing. In terms of costs, female migrants pay on average less than male migrants do for their move, 212 Ghanaian Cedi (GHS) at baseline and 112 for new migrants compared to 220 and 137 respectively for men. It is worth noting that new migrants pay on average less than baseline migrants do. Previously, we learned that relatively more of the new migrants have a contact at their destination and their household has prior engagement in migration. These observations suggest that costs can be reduced through migration experience.

Table 6: Migration costs and means of financing

	Baseline (2013)		New (2015)	
	Male	Female	Male	Female
<i>Migration costs</i>				
<i>N</i>	220	111	65	58
in GHS of 2015	222.5	212.3	137.1	111.6
<i>Financing of migration</i>				
<i>N</i>	371	173	79	79
Savings	72	67.6	41.8	38
Formal loan	1.1	1.7	0	0
Loan from family	7	6.9	6.3	5.1
Borrowing from money lender	0.8	0.6	2.5	0
Advance from recruitment agent	1.6	2.3	0	1.3
Sale of assets	12.7	11	10.1	5.1
Gov't schemes	1.6	0	0	0
Scholarship	0.3	0.6	0	0
Remittances from other migrants in the HH	3	9.2	6.3	8.9
Others	0	0	32.9	41.8

Source: Authors' calculations based on MooP Ghana panel study.

The most common way to finance migration in 2013 were savings (70 per cent) indicating that migration is an investment under credit constraints. If loans are taken, then only from family. In no or very few cases, formal sources for credit are used and only in very few cases migrants rely on a moneylender or recruitment agent. Around 12 per cent of migration was financed by selling assets. New migrants in 2015 also rely on savings, but less so. Selling of assets is less likely to be used to finance the migration of a new female migrant at only 5 per cent. A third of new migrant men and 42 per cent of new migrant women state 'others' as source of financing. The specified sources among this category are mainly money from a parent and in some cases from the migrant her- or himself. We consider this type of money as individual savings. Another source of financing are private transfers to the household from other migrants, remittances, but they seem less important. Relatively more migrant women finance their move through remittances compared to men.

The average costs of migration for baseline migrants in 2013 was above 200 Ghanaian Cedis (in 2015 prices) compared to on average 120 Ghanaian Cedis for new migrants by 2015 (see table 6). This documents that costs for new migrants are relatively lower than for previous migrants. Using the information on previous migration we find that migrants who move the first time – independent of whether they are new or baseline migrants – pay on average more than those who moved the second time or more often (see table 7).

Table 7: Migration costs by number of times migrant moved before

	Baseline (2013)		New (2015)	
	in GHS of 2015	<i>N</i>	in GHS of 2015	<i>N</i>
First time	331	137	160	74
Moved at least once before	142	132	78	41

Source: Authors' calculations based on MooP Ghana panel study.

Despite lower costs of migration, the new migrants moved relatively more often to another region in Ghana than to remain in their own district or region which normally is associated with higher moving costs. Female migrants on average stayed closer to their origin than men. This difference could be due to those women who migrate to get married which is often tied to ethnic and family networks that might be closer to the origin community.

Table 8: Migration experience: repetition, seasonality, destination and occupation

	Baseline (2013)		New (2015)	
	Male	Female	Male	Female
<i>Repeated migration</i>				
<i>N</i>	389	203	84	80
First time migrants	49.4	59.6	70	65
<i>Seasonal migration</i>				
<i>N</i>	474	259	86	84
Seasonal (in contrast to permanent)	15.2	16.6	16.3	9.5
<i>Destination</i>				
<i>N</i>	-	-	86	83
Same district			10.5	18.1
Other district, same region			29.1	34.9
Other region			60.5	47
<i>Activity prior to migration</i>				
<i>N</i>	241	97	42	34
Farming	43.2	34	42.9	26.5
Trading	7.5	35.1	7.1	14.7
Self-employment	10	17.5	2.4	8.8
Teaching	9.1	5.2	7.1	14.7
Others	30.1	8.2	40.5	35.3
<i>Occupation at destination</i>				
<i>N</i>	353	182	54	51
Farming	19.8	12.1	14.8	21.6
Trading	15.9	39.6	18.5	21.6
Self-employment	16.1	26.4	1.9	9.8
Teaching	7.9	8.2	9.3	7.8
Others	40.1	13.4	55.7	39.3

Source: Authors' calculations based on MooP Ghana panel study.

At destination, the patterns of occupation change compared to what migrants did prior to their move. Self-employment is much less common among new migrants than baseline migrants. Between 12 and 22 per cent of migrants in both years work in farming at destination. This suggests that geographical mobility implies also some occupational mobility. Trading is the most common occupation for baseline migrant women at their origin as well as their destination. For female new migrants, trading is an important activity, but services (in 'Others') is the most important sector.

Remittance sending behaviour is different between baseline and new migrants (see table 9). In the baseline group, relatively more men remit money to their families. Among new migrants fewer remit. Baseline migrant men also remit larger amounts than their female counterparts, but they all remit on average at least GHS 100 more than new migrants. When asked how frequently they remit, new migrants remit relatively less frequent, half of them only on special occasions or in emergencies, whereas baseline migrants tend to remit mostly every couple of months or even monthly. New migrants are also less likely to remit goods to their origin household. Among baseline migrants, half of the women send goods back home and even 44 per cent of men do so.

Table 9: Remittances

	Baseline (2013)		New (2015)	
	Male	Female	Male	Female
<i>Cash remittances</i>				
<i>N</i>	448	242	74	70
Yes	63.8	53.7	40.5	38.6
<i>Amount</i>				
<i>N</i>	260	112	29	24
in GHS of 2015	788.7	655.1	607.9	515.2
<i>Frequency of remitting</i>				
<i>N</i>	267	120	29	26
Weekly	1.1	1.7	0	3.8
Fortnightly	1.1	0	0	3.8
Monthly	24.3	19.2	17.2	11.5
Every couple of month	43.1	40.8	13.8	15.4
Every six months	5.2	6.7	13.8	3.8
Every year	6.4	9.2	3.4	11.5
Only on special occasions or emergencies	18.7	22.5	51.7	50
<i>Remittance of goods</i>				
<i>N</i>	427	228	74	71
Yes	44	49.6	28.4	26.8

Source: Authors' calculations based on MooP Ghana panel study.

From these findings we cannot clearly predict the relationship of migration and household welfare, nor can we hypothesize its direction. In some cases, new migrants might be sent to diversify income sources and it is seen as an investment expecting returns to the household in the form of remittances. In this case, we would expect to see a negative impact of the initial investment costs due to our short panel period as remittances usually delay to arrive and materialize in origin households (Taylor and López-Feldman, 2010). In other cases, it could be possible that migrants are already successful at their destination and are sending remittances that improve the household welfare.

Other migrants moved with the financial support from their families to pursue more education or to find new work opportunities in other locations. This could be in line with human capital models of migration (Sjaastad, 1962). In these cases, it would be possible to find a negative effect on welfare of origin households due to the incurred migration costs and the loss in labour, but it is also possible that due to prior migration experience there is no impact on the origin households. This could even imply a positive impact as fewer members in the household leave more financial resources available for those who stay.

6 Methodology

Theoretically, there are no clear answers to the question whether migration has a positive or negative effect on the welfare of left-behind households. The New Economics of Labour literature (Stark and Bloom, 1985; Taylor, 1999) suggests that the migration decision is part of the overall household strategy in a context of market imperfections, but it cannot provide clear predictions for the impact of this decision (Mendola, 2012). As documented in the descriptive part, migrants move for different reasons, which might imply different costs and different remittance sending behaviour. Additionally, prior experience with migration at the household level is also expected to affect the costs and migrants' remittance behaviour. It remains an empirical question to study how having a new migrant relates to the welfare of origin households conditional on prior migration experience.

6.1 Empirical strategy

We estimate the impact of having a new migrant on household welfare in the following specification:

$$y_{it} = \beta_1 2015_t + \beta_2 \text{NewMig} * 2015_{it} + \beta_3 X_{it} + \beta_4 \text{LM}_{ct} + H_i + \varepsilon_{it} \quad (1)$$

Our interest is to see how the welfare of households changes when they have a new migrant. With two time periods, we regress the outcome variable y_{it} for household i on the treatment status of a household, NewMig_i , interacted with a dummy indicating the second survey year, 2015_t . NewMig_i is a dummy indicating whether the household has a new migrant or not. We also control for the general change of welfare over time by including the dummy for the second survey year separately. We include household fixed effects, γ_i , that automatically discard any unobservable characteristics of the households that do not vary between the survey waves.

The parameter of interest is β_2 , the coefficient of the interaction. It measures the effect of having a new migrant between the two survey waves on the welfare of the origin household compared to those households that did not see another member migrate.

The time-varying household characteristics, X_{it} , are the dependency ratio, whether the household has a returned migrant and the employment status of the household head (unemployed/unpaid work, self-employed, employed or inactive). These can all affect household welfare and they can change within the period under investigation. If a household has another child or if one of the older members becomes too old to work, the welfare might decline, as per capita income declines. Similarly, if a household head becomes unemployed this affects household welfare negatively. Finally, a migrant who returns to the origin household can, on the one hand, bring home money and invest it in assets to increase welfare or, on the other hand, the returnee might have failed at destination and now presents an additional burden to the household.

The local labour market variable, LM_{ct} , is the employment rate in a community c . It is measured as the share of individuals who work as wage employees relative to the local labour force. This is included because a household seeking to diversify its income sources will consider local opportunities, where household members could earn a wage.⁵

We estimate the fixed-effects model in a weighted least squares regressions applying entropy balancing weights. These weights are used to make the control group look comparable to the treated households in terms of household characteristics at baseline, in 2013. This reduces the selection bias that can challenge the analysis of migration impacts.

6.2 Dependent variable: asset index

The outcome variable is an asset index. Starting from Sahn and Stifel (2000) researchers used the rich information on assets available in many developing country household data sets to construct an index as welfare measure. The main argument for the use of the asset information instead of conventional measures such as consumption or income is that the latter are much more volatile

⁵ This measure is obtained using all individuals in our data in each community. Based on their main activity we define those who are employed and we sum all who are either employed, unemployed, doing unpaid work or self-employed. This captures how common paid employment is in a community and thus reflects the local opportunities for wage work outside the family farm or business.

and more difficult to measure. For a long-term assessment of the economic status of households, assets have been proven to be more stable and more reliable measures. It is important to note that a welfare index is a relative, not an absolute measure. It is very useful for comparisons of welfare between groups and/or over time. Filmer and Pritchett (2001), McKenzie (2005) and Booysen et al. (2008) all used asset indices to compare poverty reductions in various countries and the use of such welfare indices has been increasing since the concept of multi-dimensional poverty was introduced (for a discussion see Ravallion, 2011).

An asset index is a composite measure using information about asset ownership and/or other welfare indicators in survey data. The researcher is interested in one continuous measure that captures the welfare of a household. In its simplest format, we can think of an asset index as the sum of its weighted components:

$$A_i = p_1 a_{1,i} + p_2 a_{2,i} + p_k a_{k,i} \quad (2)$$

The asset index of household i is the sum of each of the individual asset indicator dummies, a_k , weighted by an asset specific weight, p_k . Each indicator is equal to 1 if the household owns this specific asset, 0 otherwise. There are different possibilities to assign weights. The simplest, but most arbitrary, is to assign equal weights for each indicator. Ideally, one would use the price of each asset as weight. That is most times impossible due to lack of data. Alternatively, we apply a statistical method used in the literature to retrieve the indicator weights, Multiple Correspondence Analysis (MCA). This method is non-parametric and least restrictive for data with many indicator variables.

We use assets that are comparable to those found in the most commonly used household surveys in developing countries, the Demographic and Health Surveys (DHS). These are indicators of housing quality. They comprise the number of rooms, dwelling ownership, the presence of a bathroom and a toilet, main source of drinking water, and the floor and wall material.

In table 10, we tabulate the ownership of each of these indicators by year and treatment status and describe the major changes observed.

Table 10: Asset ownership by group and year

	Control		Treatment	
	2013	2015	2013	2015
<i>N</i>	<i>349</i>		<i>131</i>	
<i>Number of rooms</i>				
1	0.10	0.08	0.04	0.07
2	0.17	0.15	0.15	0.15
3	0.22	0.20	0.21	0.24
4	0.15	0.19	0.18	0.15
5 or more	0.35	0.37	0.42	0.37
<i>Dwelling ownership</i>				
Owned	0.83	0.85	0.89	0.90
Rented	0.17	0.09	0.11	0.05
Other	0.00	0.05	0.00	0.05
Bathroom	0.96	0.93	0.95	0.98
Toilet	0.37	0.36	0.41	0.42
<i>Main source of drinking water</i>				
Pipe borne water inside	0.12	0.18	0.11	0.16
Pipe borne water outside	0.29	0.30	0.21	0.18
Borehole	0.32	0.30	0.34	0.35
Dug well	0.13	0.09	0.13	0.14
Tanker service	0.00	0.01	0.00	0.00
Stream/river/lake	0.09	0.09	0.15	0.12
Rain water	0.01	0.00	0.01	0.01
Bottled or sachet water	0.05	0.01	0.05	0.04
Other	0.00	0.01	0.00	0.00
<i>Floor material</i>				
Mud	0.20	0.19	0.28	0.16
Raw wood, boards	0.00	0.01	0.00	0.00
Cement/concrete	0.77	0.77	0.69	0.80
Burnt brick	0.01	0.00	0.02	0.01
Terrazo	0.00	0.01	0.00	0.02
Floor tile	0.00	0.01	0.01	0.02
Polished wood	0.01	0.00	0.01	0.00
<i>Wall material</i>				
Bamboo or other organic materials	0.04	0.04	0.05	0.05
Cloth, cardboard, cans	0.01	0.00	0.00	0.00
Zinc	0.05	0.11	0.02	0.16
Raw wood	0.00	0.00	0.00	0.00
Mud, adobe, cane wall	0.36	0.35	0.40	0.32
Block, bricks, stone, prefabricated material, polished wood	0.50	0.49	0.50	0.46
Other	0.03	0.01	0.03	0.01

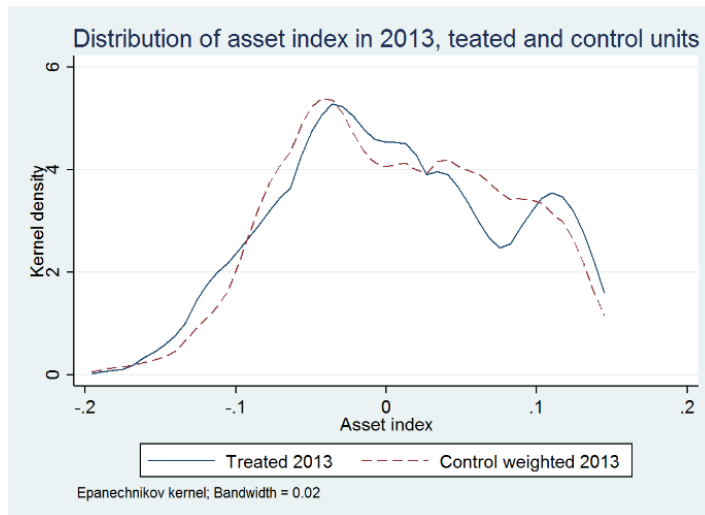
Source: Authors' calculations based on MooP Ghana panel study.

The ownership status and presence of a bathroom or toilet are relatively stable. There are some larger changes between years for floor and wall material and smaller changes for the number of rooms and the source of drinking water. These changes also differ between treatment and control

group which is important for our identification strategy. If all changes would go in the same direction we would not be able to identify an effect of having a new migrant on the change in the index. The results of the MCA can be found in the appendix A (Figures A1 and A2).

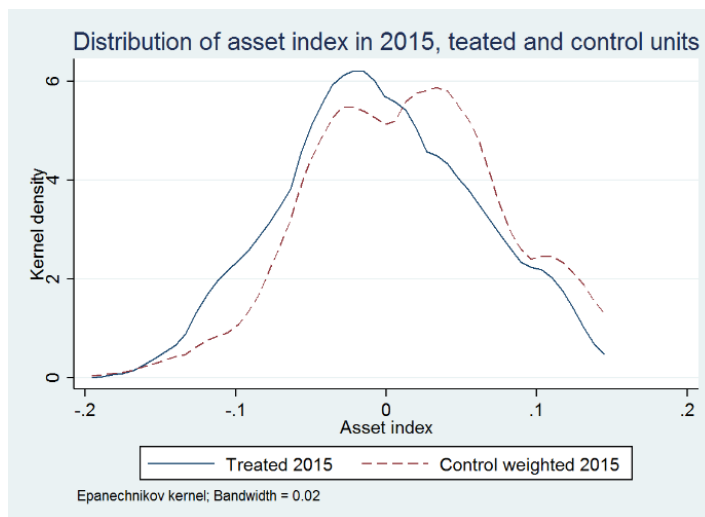
Figure 1 presents the asset index in 2013 of households with a new migrant and of those without, figure 2 depicts the same for 2015.

Figure 1: Asset index of treated and control households in 2013



Source: Authors' calculations based on MooP Ghana panel study.

Figure 2: Asset index of treated and control households in 2015



Source: Authors' calculations based on MooP Ghana panel study.

These figures illustrate that the distribution of the asset index overlap in 2013, but they shift apart in 2015. It seems that households without a new migrant have a higher distribution of the index. Note that the distribution for control households are weighted to make households comparable applying a method, which is described in detail in the next section. This explains the overlap in the baseline year (Figure 1).

6.3 Identification strategy

Several issues challenge the empirical identification of the impact of migration on households left behind.

Firstly, we can think of factors that simultaneously affect both the migration decision and the outcome. For example, risk aversion of a household might prevent it from engaging in migration or in more profitable but riskier technologies in their farm or business. Hence, such households would be less likely to have a new migrant and would remain at a lower welfare level. Such omitted variables would bias the coefficient of interest. In the given example, we would overestimate a negative effect of having a new migrant. We cannot foresee the direction of the effect, but it would be biased upwards. By modelling a fixed-effect model, we capture any unobservable time-invariant factors at the household level.

Secondly, the migration decision could be influenced by the outcome variable. This is especially a problem with cross-sectional data (Antman, 2012). The change in asset ownership in the period preceding our baseline could affect the treatment status of households. We cannot exploit previous data to control for this, but by balancing households on baseline characteristics, we only compare those that look similar and thus capture any effect the prior welfare change had on households.

We apply a weighting method that makes the comparison group look like the treated group in terms of observable characteristics at baseline. This approach assumes selection on observables. It means that conditional on observable characteristics, having a new migrant is as good as random (Wooldridge, 2010). This balance is achieved for observable characteristics that are expected to influence the likelihood to be a treated household and the outcome variable (Imbens, 2015). Once these observables are balanced, the selection bias is reduced (Heckman et al., 1998).

Entropy balancing weights

The weighting method applied for this research aims to achieve balance between treated and comparison households. It is called entropy balancing developed by Hainmueller (2012). This approach defines weights for each observation that ensure a predefined balance of covariates. The balance can be defined in terms of the first, second and even higher order moments of the covariates. The main advantages of this method are that balance checks become redundant, the majority of observations are retained, the computation of the weights is fast, and the method can be combined with many other matching and regression methods, similarly to inverse probability weighting methods and regression adjustment procedures (Imbens, 2015).

Entropy weights, w , minimize the entropy distance metric, which is defined as:

$$\min_{w_i} H(w) = \sum_{i|D=0} w_i \log\left(\frac{w_i}{q_i}\right) \quad (3)$$

and which is subject to balance (Equation 4), and normalizing constraints (Equations 5 and 6 respectively):

$$\sum_{i|D=0} w_i c_{ri}(X_i) = m_r \quad \text{with} \quad r \in 1, \dots, R \quad \text{and} \quad (4)$$

$$\sum_{i|D=0} w_i = 1 \quad \text{and} \quad (5)$$

$$w_i \geq 0 \quad \text{for all} \quad i \quad \text{such that} \quad D = 0 \quad (6)$$

q_i is a base weight defined as 1 over the number of control units. $c_{ri}(X_i)$ are ‘a set of R balance constraints [that are] imposed on the covariate moments of the reweighted control group’ (Hainmueller and Xu, 2013, p. 4). Finally, it computes a set of weights that minimize the first equation (3) subject to the balance constraint, the normalization constraint, and the non-negativity constraint.⁶

Once the weights have been computed, they are applied to estimate equation 1 with weighted least squares (WLS). This approach works like any Regression Adjustment method (Wooldridge, 2010).

Variables to balance

We include all variables that we consider substantive for having a new migrant or for the outcome. We also include squared terms of continuous variables (Imbens and Rubin, 2015; Smith and Todd, 2005). Region dummies should capture any such factors that relate to migrant networks, regional development and economic opportunities. Most importantly, we control for the household size and dependency ratio of elderly and children to adult members to capture the household structure. These variables are important for the household decision about migration as well as the household’s welfare. Another important characteristic is the main household income source, that is whether the household earns its living from agriculture, employment, its own business, public or private transfers. We also control for the employment status of the household head (employed, self-employed, unemployed or inactive) to capture economic activity. As a measure for human capital in the household, we include the highest level of education of adult members in the household. Many studies show that education is an important predictor for households’ welfare. It is also related to migration decisions as higher educated people have higher expected incomes at home as well as at possible destinations (Sjaastad, 1962). We include a dummy for female household heads, shown to be a strong predictor for household welfare in the rural context as well as reflecting a households’ options for migration decisions (Adams and Cuecuecha, 2013). In addition, age and marital status of the household head are added to control for the life-cycle of a household (Lipton, 1980). Ethnicity was found to be an important factor in creating and maintaining migrant networks in Ghana (Awumbila et al., 2016). Such networks are important determinants for migration decisions as they reduce the risk and costs associated with migration (Carrington et al., 1996), which is why we include the ethnicity of the household head. We also include our measure of community employment rate. We choose this measure, because if a household seeks to diversify its income sources, it will also consider other opportunities in the community where household members could earn a wage (Bazzi, 2017).

Economic welfare is an important predictor for migration decisions and it is our outcome variable. In a credit constraint context, only households at a certain level of wealth are able to afford migration (McKenzie and Rapoport, 2007). Thus, only households with a similar level and distribution of welfare should be compared. While we do not have information on economic

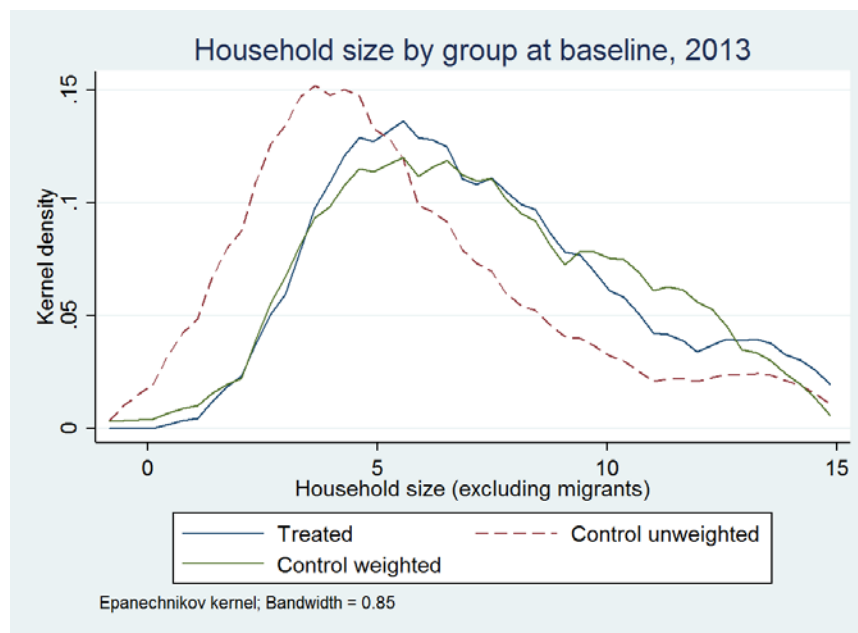
⁶ The procedure is easily implemented in Stata using the command *ebalance*. The command first defines the first moment of the covariates using only the treated units. Then the control units are re-weighted so that their mean is equal to that of the treated units for the chosen covariates complying with the normalizing constraints. The same procedure applies to higher moments. It is important to note that one has to consider the sample at hand when using this method. Entropy balancing is a useful method only if the treated and control units do not look radically different and there can only be as many balance conditions as control observations. Like in other matching methods this implies the assumption of common support. Observations that make it impossible to achieve the balance defined by the researcher are dropped and weights are only computed for the remaining observations. In our case, we drop 91 observations, 22 treated and 69 control households. Around a third of these are dropped due to missing values for some of the covariates that we required to be balanced. Others had extreme values for some covariates, e.g. a dependency ratio of 5.

welfare pre-dating our baseline as suggested by Smith and Todd (2005), we include a rich set of asset indicators and information on asset purchases. Asset indicators are those that are used to construct the asset index. Asset purchase is a dummy that is equal to 1 if a household has purchased a specific asset within the past five years before the baseline survey, 0 otherwise.⁷ In this way, we can capture a certain level of wealth and investment behaviour of the household that pre-dates the baseline

Balance statistics for treatment and control group

Here we present an overview of the balanced characteristics of treated and control households. The summary statistics provide evidence that the balance is achieved using the entropy weights. Figure 3 plots the kernel density of household size in 2013 for treatment and control group. The latter is represented once without applying the entropy balancing weights, and then with weighting.

Figure 3: Kernel density of household size in 2013, by treatment groups



Source: Authors' calculations based on MooP Ghana panel study.

Without the weights, the dashed line shows a very different distribution. Control households are on average smaller than treatment households so that sending a new migrant is much more likely if there are more members that could make this choice. Thus, it is important to make households more comparable concerning this variable. The overlap between the treated distribution and the weighted control distribution confirm that the balance is achieved using the entropy weights.

In the appendix table A1, we show the mean and variance of the variables that were included in the construction of the entropy balancing weights with the weights applied to the control group. Using the weights leads to identical means of all variables and the variance is in some cases only slightly different. The entropy balancing weights construct a comparable sample of households to reduce the selection bias.

⁷ These assets are electric household goods, white household goods, livestock, generator, car, computer, electronic appliances, other investments, agricultural land, agricultural machinery, non-agricultural land, new house.

Even though we are not able to include the change in the outcome variable for the years before our analysis, we included information on the asset purchases within the two years prior to the baseline survey. Households purchased larger assets within a two-year period preceding our survey. It is therefore plausible to expect also further changes in assets.

7 Results

7.1 Main results

How does having a new migrant affect the asset welfare of households left behind conditional on prior migration experience? To answer this question, we estimate weighted least squares regressions applying the entropy balancing weights. Table 11 presents the results. The coefficient of interest is the dummy variable of having a new migrant interacted with the second survey wave indicator, 2015. This estimates the average effect on the change in the asset index for households with a new migrant between baseline and the follow-up survey compared to households without a new migrant.

Table 11: Effect of having a new migrant on asset index, weighted least squares

	Wealth index		
	(1)	(2)	(3)
New Migrant * 2015	-0.011 (0.007)	-0.017 (0.011)	-0.016 (0.011)
2015 (=1)	0.001 (0.005)	0.007 (0.009)	0.012 (0.009)
Household has return migrant (=1)			-0.015* (0.008)
Dependency ratio			0.002 (0.004)
<i>Occupation of household head (base = inactive/others)</i>			
Employee			0.014 (0.015)
Self-employed			-0.001 (0.016)
Unpaid work / unemployed			-0.003 (0.018)
Local employment rate			0.138 (0.104)
Entropy balancing weights	No	Yes	Yes
Household fixed effects	Yes	Yes	Yes
Observations	960	960	960
Adjusted R-squared	0.584	0.522	0.528
Number of clusters	93	93	93

Notes: * p<.10, ** p<.05, *** p<.01; S.E. clustered at community level

Source: Authors' calculations based on MooP Ghana panel study.

In column 1, we show results without applying entropy balancing weights suggesting that they might be biased due to selection. The effect of migration on household welfare could be driven by the fact that only households who are less likely to improve their welfare due to household characteristics sent a new migrant because of these same characteristics. We then apply balancing weights to the regression in column 2. The coefficient becomes larger but remains insignificant.

In column 3, time-varying household and local labour market characteristics are included that we consider relevant for the welfare of households. Of all control variables, only that indicating whether a household had a return migrant or not is significant.⁸ Households are on average slightly worse off if they had a migrant return to their home. The inclusion of time-varying covariates improves the precision of the estimates minimally, as indicated by a higher adjusted R-squared statistic. The coefficient of interest becomes minimally smaller. On average and everything else constant, sending a new migrant does not change the asset index of households significantly compared to those who do not send another migrant.

We now look further into the role of migrant characteristics. Table 12 lists the coefficients of the main estimation, each time interacting the treatment dummy with a migrant feature. These characteristics are whether the new migrant is female or whether they moved within the same region and those moving to another region.

Table 12: Interaction of treatment with the characteristics of new migrants

<i>Migrant characteristics:</i>	Dependent variable: Wealth index	
	Female migrant	Moved within region
New Migrant *X* 2015	-0.009 (0.011)	-0.013 (0.021)
New Migrant * 2015	-0.010 (0.014)	-0.005 (0.022)
Entropy balancing weights	Yes	Yes
Other controls	Yes	Yes
Household fixed effects	Yes	Yes
Observations	960	960
Adjusted R-squared	0.528	0.528
Number of clusters	93	93

Notes: * p<.10, ** p<.05, *** p<.01; S.E. clustered at community level; Other controls include whether the household has a returned migrant, occupation of the household head, dependency ratio and community employment rate.

Source: Authors' calculations based on MooP Ghana panel study.

None of these interactions shows a significant effect on the asset index. There are three possible explanations for the fact that we do not find an impact of having a new migrant on households' asset index. One refers to the outcome variable used, one to the role of migration experience and the third one to the sample investigated.

First, considering that asset indices are less volatile than for example consumption measures, it might be due to their stable nature that we do not find a significant effect in the short period of two years. We emphasize that the estimated effect is that of households sending a new migrant compared to those who do not. Hence, even a zero effect does not imply that there was no change in the asset index, but it means that the index of treated households changed in the same direction and magnitude as that of the control group. The distributional graphs of the welfare index (figure 1 and 2 in section 6.2) indicated some changes in the welfare of households. It appears, however, not to be significantly different between the groups once we control for observable and unobservable household characteristics. Booysen et al. (2008) also point out that because assets are more durable than other consumption goods, they tend to show an increase in asset wealth

⁸ There might arise the concern that the measure of local employment is not well defined. When we drop this variable from the estimation, results remain unchanged (see appendix table A2).

more than a reduction of the same. As our coefficients are negative, it is possible that we cannot find a significant effect due to this issue.

The only possibility for households to increase their asset index would have been through investments in their housing. Despite many missing values we regress the likelihood to invest in better housing on the indicator for having a new migrant (table 13). The results confirm this hypothesis. Households with a new migrant are significantly less likely to have invested in the refurbishment of their house between survey waves. There is no significant impact on investments in land or other assets, which could be due to a very low number of observations. Repeated migration is financed mostly through savings so that they cannot be used for housing investments.

Table 13: Effect of having a new migrant on likelihood to invest

	Refurbishment of house	Improvement to agricultural land	Development of non-agricultural land	Others
New Migrant * 2015	-0.2972** (0.153)	0.1310 (0.118)	0.3897 (6.386)	0.1298 (0.260)
2015 (=1)	0.1685* (0.101)	-0.1174 (0.102)	-0.3635 (5.957)	0.0274 (0.051)
Other controls	Yes	Yes	Yes	Yes
Household fixed effects	Yes	Yes	Yes	Yes
<i>Observations</i>	158	108	54	60
Pseudo R-squared	0.186	0.373	0.548	0.519
Log likelihood	-26.4	-13.7	-2.33	-4.86

Notes: Significance levels * 10% ** 5% *** 1%. Fixed-effects estimator. S.E. clustered at community level. Other controls include whether the household has a returned migrant, employment status of the household head, dependency ratio and community employment rate.

Source: Authors' calculations based on MooP Ghana panel study.

Secondly, we suggest that migration of a new migrant might be less costly than first-time migration. If we consider migration as an investment, then we would expect an initial decline in welfare and in the longer run an increase as suggested by Taylor and Lopez-Feldman (2010). We do not observe that households with a new migrant experience a decline in welfare that could have been caused by the cost of migration and the loss of a working household member. In the descriptive statistics, we saw that costs for new migrants are relatively lower than for previous migrants. Similar to the reduction of migration costs with the growth of social migrant networks, the migration experience at the household level itself can reduce costs of migration (Bryan et al., 2014). This could be happening through similar channels, such as information transfer and family connections at the destination to find a job.

Another reason for not finding an effect might be that we are looking at the wrong sample. Some of the new migrants move for family reasons, such as marriage or joining other family members, while the majority moves for work. These reasons can have quite different implications for household welfare. We therefore estimate the effect of a new migrant including the interaction of the treatment with an indicator for those households whose new migrant moves for family reasons. Table 14 shows the results. They do not neither change for the main estimate⁹, nor when we look

⁹ We also conduct a Chow test of stable coefficients across the sub-samples of family reason and work reason. We cannot reject the hypothesis that the sample should remain pooled and we should not separately estimate the effect. The test statistic of a Chow-test for coefficient stability across sub-samples is 1.1 and cannot be rejected. This tests

at specific characteristics of the migrant, for example gender. All we observe is that the coefficient of the interaction that indicates households with a new migrant moving for family reasons is positive, while the overall treatment effect is negative. Both are however always insignificant.

Table 14: Welfare effect of having a new migrant by reason for migration, weighted least squares

<i>Migrant characteristics:</i>	<i>Dependent variable: Asset index</i>			
		Female migrant	Seasonal migrant	Moved within region
	All			
New Migrant *X* 2015		-0.011 (0.012)	0.011 (0.013)	-0.014 (0.021)
New Migrant * 2015	-0.019 (0.012)	-0.012 (0.014)	-0.020 (0.012)	-0.006 (0.023)
New Migrant moves for family reason * 2015	0.011 (0.017)	0.015 (0.019)	0.013 (0.018)	0.014 (0.018)
Entropy balancing weights	Yes	Yes	Yes	Yes
Other controls	Yes	Yes	Yes	Yes
Household fixed effects	Yes	Yes	Yes	Yes
Observations	960	960	960	960
Adjusted R-squared	0.521	0.528	0.528	0.528
Number of clusters	93	93	93	93

Notes: * p<.10, ** p<.05, *** p<.01; S.E. clustered at community level; Other controls include whether the household has a returned migrant, occupation of the household head, dependency ratio and community employment rate.

Source: Authors' calculations based on MooP Ghana panel study.

7.2 Sensitivity analysis

One concern is measurement error in the asset index. The measurement error could be even larger as it is a linear variable constructed from individual factor variables. In consequence, the estimates are still unbiased and consistent, but less precise which could explain the insignificant results (Wooldridge, 2010). We would be concerned if there was a reason to think that measurement error in the index was systematically related to the independent variables in our model.

We therefore estimate the main regression and exclude each time one component of the index to see how sensitive the results are to this. We find stable results across index compositions presented in table 15.

whether all coefficients of the sub-sample with family migrants are equal to zero and should thus not be treated separately from the pooled sample.

Table 15: Sensitivity of results of impact of having a new migrant on asset index using different ways to construct index, weighted least squares

<i>Dependent variable: Asset index</i>							
	Number of rooms	Exclude specific item from asset index construction: Dwelling ownership	Bathroom	Toilet	Drinking water	Floor material	Wall material
New Migrant * 2015	0.019 (0.014)	-0.017 (0.012)	-0.017 (0.012)	-0.015 (0.011)	-0.020 (0.015)	-0.013 (0.009)	-0.009 (0.008)
Household fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Entropy balancing weights	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Other controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	960	960	960	960	960	960	960
Adjusted R-squared	0.515	0.473	0.524	0.47	0.462	0.544	0.485
Number of clusters	93	93	93	93	93	93	93

Notes: * p<.10, ** p<.05, *** p<.01; S.E. clustered at community level; Other controls include whether the household has a returned migrant, occupation of the household head, dependency ratio and community employment rate.

Source: Authors' calculations based on MooP Ghana panel study.

The comparison of asset indices for the same household over time yields two potential problems. The first is that the coordinates used as weights should be consistent over time to make the index comparable between periods. The coordinates are retrieved from the data and result from the cross-sectional variation of assets across households. If we now pooled the two survey waves to compute the coordinates, this variation would be different than that of one cross-section and some of the variation would only reflect variation over time. Therefore, we will rely only on the data of the base year 2013 to retrieve the coordinates as in Booysen et al. (2008). Then we use these to compute the index in both years. In the appendix table A3, we also present the main results using the pooled sample to compute the asset index. The results do not change.

The second issue is that prices for assets might change over time and in response to this the demand for assets and the distribution of assets across households might change.¹⁰ There is, though, no reason to think that households with a new migrant would react differently than control households to price changes in their asset purchase behaviour.

7.2 Community shocks

One major concern challenging our identification strategy is that of unobserved shocks experienced by the households between the two survey waves. A shock could reduce household welfare and at the same time motivate people to leave their home or deter migration, as savings would be used to cover the damages of the shock instead of financing migration. This could affect whether we observe an impact of having a new migrant on welfare of households left behind.

In 2015, the enumerators interviewed village elders to collect information about the communities. These surveys included questions about shocks experienced by the village, and how many people were affected by it. The questions were asked open ended, so that the respondent could name any type of shock that s/he considered relevant. The most commonly named shocks are droughts,

¹⁰ While there has been high inflation in Ghana between 2013 and 2015 there is no data on the price changes for each individual asset (Ghana Statistical Service, 2015a,b). Moreover, it is difficult to measure the market price of a mud wall or a brick wall, as we would need to decide whether to measure only the material or also the service to build the wall.

flooding or crop infestation by insects. We identified the communities where at least 50 per cent of inhabitants were affected by such a shock.

In table 16, we present the results of the main specification, only that we include a dummy variable indicating a major shock at the community level and interact this with the treatment indicator. This interaction captures the impact of households that experienced a shock and have a new migrant in 2015.

The impact of having a new migrant on the asset index remains insignificant. Neither the coefficient of the shock variable nor its interaction with the treatment are significant. We note that there are fewer observations in these regressions due to missing values for the shock variables in six communities. We ran the main regression including a dummy for these communities. The dummy is positive and significant. On average, households in those communities for which we do not have any information about shocks, experience an increase in their asset index (see appendix table A4). We suggest that their missing information concerning shocks actually means that they did not experience any shock, which could explain their higher asset index. If we include them in the estimation replacing their missing value of the shock with a zero, the main results are still insignificant.

Table 16: Effect of new migrant on household welfare controlling for major shocks in community

	Wealth index
New Migrant*2015	-0.021 (0.018)
New Migrant *Shock* 2015	0.015 (0.023)
Shock	-0.018 (0.017)
Entropy balancing weights	Yes
Other controls	Yes
Household fixed effects	Yes
Observations	902
Adjusted R-squared	0.521
Number of clusters	87

Notes: * p<.10, ** p<.05, *** p<.01; S.E. clustered at community level; Other controls include whether the household has a returned migrant, occupation of the household head, dependency ratio and community employment rate.

Source: Authors' calculations based on MooP Ghana panel study.

After this test, one could still argue that an unobserved idiosyncratic shock at the household level interferes with our results. For example, a household would normally have experienced an increase in its asset index, but due to a negative shock interfered with this trajectory, for example a household member falling sick and not being able to earn income. Instead of investing in better walls or expanding the rooms of the house, the money is used to send another member as new migrant to find an income somewhere else or to pay for the medical bills. Only in very few cases (3 per cent) a new migrant had moved due to negative events, such as declining yields in agriculture, a family dispute, a flood or for medical treatment. Aside from lack of evidence that the reason of migration is an idiosyncratic shock, new migrants barely send remittances. If they had been sent to support the household through a crisis, one would expect regular remittances and higher amounts.

8 Conclusion

This paper documents the dynamic nature within households of internal migration in rural Ghana. Using a new dataset from 2013 and 2015, we show that many households with migrants at the baseline send a new migrant by 2015. Looking more closely at these migrants and their households, we provide an insight into the nature of such repeated migration. Within the same household, migrants move for different reasons, at different times and their connection with the origin household differs as well.

This motivates the question how households with prior migration experience are affected if they have a new migrant. There are hypotheses for positive, negative or no effect due to the variety of factors involved and their counteracting impacts.

We find that having a new migrant does not have an impact on the welfare measured with the asset index of origin households compared to those without a new migrant. We suggest that this is partially due to the stable nature of such an index over the short period of our analysis. In order to identify an impact, the households in our sample would have needed to invest in their housing to different amounts between treated and control group. However, their investment priorities might lie somewhere else, for example in their farm or business. Unfortunately, the questions about other forms of investment were not consistent between the two survey waves and those that were, had very low response rates so that we cannot provide an answer to this hypothesis.

Another insight we gain is that new migrants pay relatively less for their migration than baseline migrants. This indicates that migration becomes cheaper with the migration experience of the household so that a negative effect of migration incurred by moving costs might not materialize in this case. Furthermore, we observed that new migrants are in many aspects different from baseline migrants. Among the differences are for example the fact that new migrants are from a younger generation, coming straight from school and often not sending any remittances or only for special occasions. This also supports the zero effect we find for the asset index. Households with prior migration experience might not send a new migrant in expectation of future remittances and income diversification. Instead, the new migrants might move primarily to improve their own situation.

These unanswered hypotheses point at the limitations of this study. The effect we estimate is that of only two years or less since a new migrant left the household. The comparison of studies using longitudinal data from longer periods with those of short periods indicates that the positive returns to migration might only present itself after a certain period (Davis et al., 2010; Taylor and Lopez-Feldman, 2010). More data collection is required to confirm our results over the longer run.

References

- Ackah, C., and D. Medvedev (2010). 'Internal Migration in Ghana: Determinants and Welfare Impacts'. Policy Research Working Paper 5273. Washington, DC: World Bank.
- Adams, R. H. (2006). 'Remittances and Poverty in Ghana'. Policy Research Working Paper 3838. Washington, DC: World Bank.
- Adams, R. H., and A. Cuecuecha (2013). 'The Impact of Remittances on Investment and Poverty in Ghana'. *World Development*, 50: 24–40.
- Adams, R. H., A. Cuecuecha, and J. Page (2008). 'Remittances, consumption and investment in Ghana'. Policy Research Working Paper Series 4515. Washington, DC: World Bank.
- Antman, F. (2012). 'The impact of migration on family left behind'. Discussion Paper 6374, Bonn: IZA.
- Awumbila, M., L. Boakye-Yiadom, E.-M. Egger, J. Litchfield, J. Teye, and C. Yeboah (2016). 'Gains and Losses from Internal Migration: Evidence from Migrant-Sending Households in Ghana'. Working Paper 44. Falmer: Migrating out of Poverty Research Program Consortium, University of Sussex.
- Bazzi, S. (2017). 'Wealth Heterogeneity and the Income Elasticity of Migration'. *American Economic Journal: Applied Economics*, 9(2): 219–55.
- Beegle, K., J. De Weerd, and S. Dercon (2008). 'Migration and Economic Mobility in Tanzania Evidence from a Tracking Survey'. Policy Research Working Paper 4798. Washington, DC: World Bank.
- Bell, M., and S. Muhidin (2009). 'Cross-National Comparisons of Internal Migration'. Human Development Reports Research Paper. New York City: United Nations.
- Booyesen, F., S. van der Berg, R. Burger, M. Maltitz, and G. du Rand (2008). 'Using an Asset Index to Assess Trends in Poverty in Seven Sub-Saharan African Countries'. *World Development*, 36(6): 1113–30.
- Bryan, G., S. Chowdhury, and A. M. Mobarak (2014). 'Underinvestment in a Profitable Technology: The Case of Seasonal Migration in Bangladesh'. *Econometrica*, 82(5): 1671–1748.
- Carrington, W. J., E. Detragiache, and T. Vishwanath (1996). 'Migration with Endogenous Moving Costs'. *American Economic Review*, 86(4): 909–30.
- Castaldo, A., P. Deshingkar, and A. McKay (2012). 'Internal Migration, Remittances and Poverty: Evidence from Ghana and India'. Working Paper 7. University of Sussex: Migrating out of Poverty Research Program Consortium.
- Damon, A. L. (2010). 'Agricultural Land Use and Asset Accumulation in Migrant Households: the Case of El Salvador'. *Journal of Development Studies*, 46(1): 162–89.
- Davis, B., G. Carletto, and P. Winters (2010). 'Migration, Transfers and Economic Decision Making among Agricultural Households: an Introduction'. *Journal of Development Studies*, 46(1): 1–13.
- De Brauw, A. (2010). 'Seasonal Migration and Agricultural Production in Vietnam Seasonal Migration and Agricultural Production in Vietnam'. *Journal of Development Studies*, 46(1): 114–39.
- De Brauw, A., and J. Giles (2012). 'Migrant Labor Markets and the Welfare of Rural Households in the Developing World: Evidence from China'. Discussion Paper 6765. Bonn: IZA.

- De Brauw, A., and T. Harigaya (2007). 'Seasonal Migration and Improving Living Standards in Vietnam'. *American Journal of Agricultural Economics*, 89(2): 430–47.
- Egger, E.-M., and J. Litchfield (2017). 'Following in their footsteps: an analysis of the impact of successive migration on rural household welfare in Ghana'. Working paper 51. Falmer: Migrating out of Poverty Research Program Consortium, University of Sussex.
- Filmer, D., and L. H. Pritchett (2001). 'Estimating Wealth Effects Without Expenditure Data — or Tears: An Application to Educational Enrollments in States of India'. *Demography*, 38(1): 115–32.
- Ghana Statistical Service. (2013). 2010 Population and Housing Census. National Analytical Report. Accra.
- Ghana Statistical Service (2015a). Consumer Price Index (CPI) April 2015. Technical report. Accra: Ghana Statistical Service.
- Ghana Statistical Service (2015b). Consumer Price Index (CPI) May 2015. Technical report, Accra: Ghana Statistical Service.
- Gibson, J., D. McKenzie, and S. Stillman (2011). 'The Impacts of International Migration on Remaining Household Members: Omnibus Results from a Migration Lottery Program'. *Review of Economics and Statistics*, 93(4): 1297–1318.
- Giulietti, C., J. Wahba, J., and Y. Zenou (2014). 'Strong versus Weak Ties in Migration'. Discussion Paper 8089. Bonn: IZA.
- Hainmueller, J. (2012). 'Entropy Balancing for Causal Effects: A Multivariate Reweighting Method to Produce Balanced Samples in Observational Studies'. *Political Analysis*, 20: 25–46.
- Hainmueller, J., and Y. Xu, (2013). 'ebalance: A Stata Package for Entropy Balancing'. *Journal of Statistical Software*, 54(7).
- Harris, J. R., and M. P. Todaro (1970). 'Migration, Unemployment and Development: A Two-Sector Analysis'. *American Economic Review*, 60: 126–42.
- Heckman, J. J., H. Ichimura, and P. Todd (1998). 'Matching As An Econometric Evaluation Estimator'. *Review of Economic Studies*, 65: 261–94.
- Imbens, G. W. (2015). 'Matching Methods in Practice: Three Examples'. *Journal of Human Resources*, 50(2): 373–419.
- Imbens, G. W., and D. B. Rubin (2015). *Causal Inference for Statistics, Social, and Biomedical Sciences - An Introduction*. New York, NY: Cambridge University Press.
- Lipton, M. (1980). 'Migration from Rural Areas of Poor Countries: The Impact on Rural Productivity and Income Distribution'. *World Development*, 8: 1–24.
- Litchfield, J., and H. Waddington (2003). 'Migration and Poverty in Ghana: Evidence from the Ghana Living Standards Survey'. Sussex Migration Working Paper 10. Falmer.
- Mahé, C., and W. Naudé (2016). 'Migration, occupation and education: Evidence from Ghana'. Working Paper 2016-018. Maastricht: UNU-MERIT.
- McKenzie, D. J. (2005). 'Measuring inequality with asset indicators'. *Journal of Population Economics*, 18(2): 229–260.
- McKenzie, D., and H. Rapoport (2007). 'Network effects and the dynamics of migration and inequality: Theory and evidence from Mexico'. *Journal of Development Economics*, 84: 1–24.
- Mendola, M. (2008). 'Migration and technological change in rural households: Complements or substitutes?' *Journal of Development Economics*, 85: 150–275.

- Mendola, M. (2012). 'Rural Out-Migration and Economic Development at Origin: A Review of the Evidence'. *Journal of International Development*, 24: 102–22.
- Molini, V., D. Pavelesku, and M. Ranzani (2016). 'Should I Stay or Should I Go? Internal Migration and Household Welfare in Ghana'. Policy Research Working Paper 7752. Washington, DC: World Bank.
- Munshi, K. (2003). 'Networks in the Modern Economy: Mexican Migrants in the U. S. Labor Market'. *The Quarterly Journal of Economics*, May: 549–99.
- Quisumbing, A., and S. McNiven (2010). 'Moving Forward, Looking Back: the Impact of Migration and Remittances on Assets, Consumption, and Credit Constraints in the Rural Philippines'. *Journal of Development Studies*, 46(1): 91–113.
- Ravallion, M. (2011). 'On Multidimensional Indices of Poverty'. Policy Research Working Paper 5580. Washington, DC: World Bank.
- Sahn, D., and D. Stifel (2000). 'Poverty comparison over time and across countries'. *World Development*, 28(12): 2123–2155.
- Sjaastad, L. A. (1962). 'The Costs and Returns of Human Migration'. *The Journal of Political Economy*, 70(2): 80–93.
- Smith, J., and P. Todd (2005). 'Does matching overcome LaLonde's critique of nonexperimental estimators?' *Journal of Econometrics*, 125: 305–53.
- Stark, O., and D. E. Bloom (1985a). 'The New Economics of Labor Migration'. *American Economic Review*, 75(2): 173–178.
- Taylor, J. E. (1999). 'The new economics of labour migration and the role of remittances in the migration process'. *International Migration*, 37(1): 63–88.
- Taylor, J. E., c (2010). 'Does Migration Make Rural Households More Productive? Evidence from Mexico'. *Journal of Development Studies*, 64(1): 68–90.
- Wooldridge, J. M. (2010). *Econometric analysis of cross section and panel data* (2nd ed.). Cambridge, MA; London: The MIT Press.

Appendix

Figure A1: Principle inertia across dimensions of MCA

Multiple/Joint correspondence analysis Number of obs = 593
 Total inertia = .01661842
 Method: Burt/adjusted inertias Number of axes = 2

Dimension	principal inertia	percent	cumul percent
dim 1	.0051666	31.09	31.09
dim 2	.0021568	12.98	44.07
dim 3	.0009358	5.63	49.70
dim 4	.0005249	3.16	52.86
dim 5	.000335	2.02	54.87
dim 6	.0002993	1.80	56.67
dim 7	.000156	0.94	57.61
dim 8	.0001396	0.84	58.45
dim 9	.0000911	0.55	59.00
dim 10	.0000541	0.33	59.33
dim 11	.0000215	0.13	59.46
dim 12	4.02e-06	0.02	59.48
dim 13	1.95e-06	0.01	59.49
dim 14	5.68e-07	0.00	59.50
Total	.0166184	100.00	

Source: Authors' calculations based on MooP Ghana panel study.

Figure A2: Category coordinates from MCA

Categories		mass	overall quality	%inert	dimension_1		
					coord	sqcorr	contrib
roomn1	0	0.032	0.562	0.002	0.016	0.280	0.002
	1	0.003	0.562	0.020	-0.183	0.280	0.018
roomn2	0	0.029	0.018	0.003	0.000	0.000	0.000
	1	0.005	0.018	0.016	-0.002	0.000	0.000
roomn3	0	0.027	0.022	0.006	-0.008	0.016	0.000
	1	0.007	0.022	0.021	0.028	0.016	0.001
roomn4	0	0.029	0.023	0.003	0.004	0.007	0.000
	1	0.006	0.023	0.017	-0.019	0.007	0.000
roomn5	0	0.022	0.128	0.015	-0.021	0.036	0.002
	1	0.013	0.128	0.025	0.034	0.036	0.003
q95_1	0	0.005	0.611	0.079	-0.235	0.222	0.056
	1	0.029	0.611	0.014	0.043	0.222	0.010
q95_2	0	0.029	0.611	0.014	0.043	0.222	0.010
	1	0.005	0.611	0.079	-0.235	0.222	0.056
q97a_1	0	0.001	0.011	0.004	0.004	0.000	0.000
	1	0.033	0.011	0.000	-0.000	0.000	0.000
q97b_1	0	0.022	0.742	0.014	0.088	0.736	0.033
	1	0.013	0.742	0.024	-0.153	0.736	0.057
q98_1	0	0.031	0.623	0.004	0.038	0.608	0.008
	1	0.004	0.623	0.033	-0.292	0.608	0.065
q98_2	0	0.025	0.037	0.009	0.006	0.007	0.000
	1	0.009	0.037	0.025	-0.018	0.007	0.001
q98_3	0	0.023	0.143	0.013	-0.035	0.128	0.005
	1	0.012	0.143	0.024	0.066	0.128	0.010
q98_4	0	0.031	0.121	0.002	-0.011	0.115	0.001
	1	0.004	0.121	0.017	0.091	0.115	0.006
q98_5	0	0.034	0.308	0.000	0.001	0.300	0.000
	1	0.000	0.308	0.002	-0.289	0.300	0.002
q98_6	0	0.031	0.108	0.002	-0.011	0.108	0.001
	1	0.004	0.108	0.017	0.090	0.108	0.006

q98_7	0	0.034	0.143	0.000	0.001	0.122	0.000
	1	0.000	0.143	0.003	-0.135	0.122	0.001
q98_8	0	0.033	0.088	0.001	0.002	0.018	0.000
	1	0.002	0.088	0.011	-0.048	0.018	0.001
q99_1	0	0.027	0.630	0.021	-0.082	0.515	0.035
	1	0.008	0.630	0.071	0.277	0.515	0.117
q99_2	0	0.034	0.192	0.000	-0.000	0.035	0.000
	1	0.000	0.192	0.004	0.138	0.035	0.000
q99_3	0	0.009	0.632	0.072	0.252	0.492	0.113
	1	0.025	0.632	0.026	-0.092	0.492	0.041
q99_4	0	0.034	0.319	0.000	0.001	0.005	0.000
	1	0.000	0.319	0.012	-0.052	0.005	0.000
q99_6	0	0.034	0.064	0.000	0.000	0.045	0.000
	1	0.000	0.064	0.003	-0.137	0.045	0.000
q99_7	0	0.034	0.069	0.001	-0.004	0.068	0.000
	1	0.001	0.069	0.032	0.238	0.068	0.007
q101_1	0	0.033	0.232	0.001	-0.008	0.166	0.000
	1	0.002	0.232	0.016	0.162	0.166	0.009
q101_2	0	0.034	0.286	0.000	-0.001	0.038	0.000
	1	0.000	0.286	0.004	0.090	0.038	0.000
q101_3	0	0.033	0.423	0.001	-0.001	0.003	0.000
	1	0.002	0.423	0.019	0.025	0.003	0.000
q101_5	0	0.021	0.551	0.029	-0.112	0.551	0.052
	1	0.013	0.551	0.048	0.184	0.551	0.085
q101_6	0	0.018	0.661	0.043	0.157	0.618	0.086
	1	0.016	0.661	0.048	-0.173	0.618	0.095
q101_7	0	0.033	0.013	0.001	-0.003	0.013	0.000
	1	0.002	0.013	0.030	0.064	0.013	0.001

Source: Authors' calculations based on MooP Ghana panel study.

Table A1 :First and second moments of covariates after applying entropy balancing weights, by group in 2013

	Mean		Variance		Standardized difference
	Treated	Control	Treated	Control	
Dependency ratio	0.660	0.658	0.846	0.844	0.002
Female household head	0.299	0.298	0.211	0.210	0.001
Highest level of education in household					
Primary	0.075	0.075	0.070	0.069	0.000
Middle/Junior	0.224	0.224	0.175	0.174	0.001
High/Senior	0.313	0.313	0.217	0.216	0.001
College/Technical	0.343	0.343	0.227	0.226	0.001
Ethnicity of head					
Akan	0.194	0.194	0.158	0.157	0.001
Ewe	0.194	0.194	0.158	0.157	0.000
Mole Dagbani	0.231	0.231	0.179	0.178	0.001
Main income source					
Private sector	0.052	0.052	0.050	0.050	0.000
Own business	0.269	0.268	0.198	0.197	0.001
Own farm	0.500	0.499	0.252	0.251	0.003
Private transfers	0.075	0.075	0.070	0.069	0.000
Others	0.030	0.030	0.029	0.029	0.000
Asset purchases in preceding 2 years					
Electronic goods	0.403	0.402	0.242	0.241	0.002
White goods	0.187	0.186	0.153	0.152	0.000
Livestock	0.284	0.283	0.205	0.204	0.001
Generator	0.022	0.022	0.022	0.022	0.000
Car	0.067	0.067	0.063	0.063	0.000
Computer	0.052	0.052	0.050	0.050	0.000
Electric Appliances	0.082	0.082	0.076	0.076	0.000
Other Investments	0.104	0.105	0.094	0.094	-0.001
Agricultural land	0.224	0.224	0.175	0.174	0.001
Agricultural machinery	0.022	0.022	0.022	0.022	0.000
Non-agricultural land	0.127	0.127	0.112	0.111	0.000
New house	0.313	0.313	0.217	0.216	0.001
Household size (excluding migrants)	7.299	7.280	9.640	9.615	0.006
Age of household head	55.276	55.136	218.021	217.450	0.009
Marital status					
Married/ living with partner	0.739	0.737	0.194	0.194	0.004
Separated/ Divorced/ Widowed	0.216	0.216	0.171	0.170	0.001
Main occupation of head					
self employed	0.522	0.521	0.251	0.250	0.003
unpaid/unemployed	0.246	0.246	0.187	0.186	0.001
inactive etc.	0.090	0.090	0.082	0.082	0.000
Community employment rate	0.090	0.090	0.005	0.005	0.003
Household has returnee	0.246	0.246	0.187	0.186	0.001
Household receives remittances	0.545	0.543	0.250	0.249	0.003
Number of current migrants	2.090	2.084	1.842	1.837	0.004

Number of rooms					
2	0.149	0.149	0.128	0.127	0.000
3	0.201	0.201	0.162	0.161	0.001
4	0.179	0.179	0.148	0.147	0.000
5 or more	0.425	0.424	0.246	0.245	0.002
Dwelling ownership(Base = Owned)					
Rented	0.119	0.119	0.106	0.105	0.000
Bathroom	0.403	0.402	0.242	0.241	0.002
Main source of drinking water (Base = pipe borne water inside)					
Pipe borne water outside	0.209	0.209	0.167	0.166	0.001
Borehole	0.343	0.343	0.227	0.226	0.001
Dug well	0.127	0.127	0.112	0.111	0.000
Tanker service	0.000	0.000	0.000	0.000	
Stream/river/lake	0.149	0.149	0.128	0.127	0.000
Rain water	0.007	0.007	0.007	0.007	0.000
Bottled or sachet water	0.052	0.052	0.050	0.050	0.000
Floor material(base = Polished wood)					
Mud	0.291	0.291	0.208	0.207	0.001
Raw wood, boards	0.000	0.000	0.000	0.000	
Cement/concrete	0.679	0.677	0.220	0.219	0.004
Burnt brick	0.015	0.015	0.015	0.015	0.000
Floor tile	0.007	0.007	0.007	0.007	0.000
Wall material (base = others)					
Bamboo or other organic materials	0.060	0.060	0.057	0.056	0.000
Cloth, cardboard, cans	0.022	0.022	0.022	0.022	0.000
Zinc	0.396	0.395	0.241	0.240	0.002
Mud, adobe, cane wall	0.493	0.491	0.252	0.251	0.002
Block, bricks, stone, prefabricated material, polished wood	0.030	0.030	0.029	0.029	0.000
Access to public services					
Electricity	0.634	0.633	0.234	0.233	0.003
Natural gas	0.142	0.142	0.123	0.122	0.000
Safe drinking water	0.694	0.692	0.214	0.214	0.004
Sewerage system	0.067	0.067	0.063	0.063	0.000
Garbage collection	0.112	0.112	0.100	0.100	0.000
Telephone	0.291	0.291	0.208	0.207	0.001
Region(Base = Brong Ahafo)					
Northern	0.142	0.142	0.123	0.122	0.000
Upper East	0.201	0.201	0.162	0.161	0.001
Upper West	0.134	0.134	0.117	0.117	0.000
Volta	0.224	0.224	0.175	0.174	0.001

Source: Authors' calculations based on MooP Ghana panel study.

Table A2: Effect of having a new migrant on asset index excluding local employment rate, weighted least squares

	Asset index
New Migrant * 2015	-0.016 (0.011)
2015 (=1)	0.010 (0.010)
Household has return migrant (=1)	-0.015* (0.009)
Dependency ratio	0.001 (0.004)
<i>Occupation of household head (base = inactive/others)</i>	
Employee	0.015 (0.015)
Self-employed	0.001 (0.015)
Unpaid work / unemployed	-0.002 (0.018)
Entropy balancing weights	Yes
Household fixed effects	Yes
Observations	960
Adjusted R-squared	0.524
Number of clusters	93

Notes: * p<.10, ** p<.05, *** p<.01; S.E. clustered at community level

Source: Authors' calculations based on MooP Ghana panel study.

Table A3: Effect of having a new migrant on asset index using pooled data to construct index, weighted least squares

	Asset index
New Migrant * 2015	-0.016 (0.010)
Household fixed effects	Yes
Entropy balancing weights	Yes
Other controls	Yes
Observations	960
Adjusted R-squared	0.539
Number of clusters	93

Notes: * p<.10, ** p<.05, *** p<.01; S.E. clustered at community level; Other controls include whether the household has a returned migrant, occupation of the household head, dependency ratio and community employment rate.

Source: Authors' calculations based on MooP Ghana panel study.

Table A4: Effect of new migrant on household welfare

	Asset index	Asset index
New Migrant*2015	-0.016 (0.011)	-0.024 (0.017)
Community in sample	0.023** (0.011)	
Entropy balancing weights	Yes	Yes
Other controls	Yes	Yes
Household fixed effects	Yes	Yes
Observations	960	960
Adjusted R-squared	0.529	0.532
Number of clusters	93	93

Notes: * p<.10, ** p<.05, *** p<.01; S.E. clustered at community level; Other controls include whether the household has a returned migrant, occupation of the household head, dependency ratio and community employment rate.

Source: Authors' calculations based on MooP Ghana panel study.