Gains and Losses from Internal Migration: Evidence from Migrant-Sending Households in Ghana

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Acknowledgements

Abstract

Migration is a common strategy adopted to escape poverty and improve living standards, but it is not without risks and there are no guarantees of success. We analyse the impact of migration on the welfare of migrant-sending households in Ghana by exploring what their living standards might have been had their migrant members remained at home. We do this by estimating a counterfactual consumption distribution for households with migrants. We examine the importance of selection bias and compare results obtained with and without selection controls. We illustrate how sensitive conclusions about the welfare gains of migration are to the decision to address selection issues. We present preliminary results which suggest that estimated gains are sensitive to whether and how we address selection bias. While the uncorrected results suggest an average gain from migration for households with migrants, once we control for potential selection bias we find that on average households with migrants are worse off than they might have been had their members stayed at home. Our selection corrected results also suggest that initially better off households are more likely to experience gains from migration and that poorer households lose out. Our results are consistent with qualitative research conducted with a small sample of migrants from our migrant-sending households.

Executive Summary

This paper presents preliminary results of our research on whether migrant-sending households in Ghana benefit from migration. We use data from a household survey conducted in rural areas of five regions of Ghana and model the determinants of household consumption to predict the likely consumption of households had their members not migrated. As migrants are not drawn randomly from the population, we compare results obtained with and without adjustments for selection bias.

Our results thus far suggest that selection bias is important, and that estimates of the gains and losses from migration are extremely sensitive to whether we correct for selection. We find evidence that migrants are positively selected thus failing to control for selection bias suggests that on average households would gain from having migrants, while the opposite finding emerges when we model the selection process formally. Our research underlines the importance of examining the existence and significance of selection bias when analysing the impact of migration for household welfare.

The second key finding which emerges from our analysis is gains from migration are larger for those households with higher levels of consumption, and that poorer households are more likely to lose form the experience of migration, to the extent that this may lead to households falling below the poverty line.

Finally we set out an agenda for further research. Firstly it would be useful to revisit the identification strategy adopted in this paper. While we believe that using local ethnic migration rates is a useful approach, it is likely that the contemporaneous nature of our ethnicity based community migration rates could be improved upon by using historical data. Secondly, we would like to explore the importance of the longer migration experience of households in our sample. Finally, we intend to exploit the panel nature of our survey by exploring welfare outcomes other than consumption, notably household assets for which we have comparable data in two waves.

1. Introduction

Migration is widely viewed as a strategy adopted by households to spread risk, smooth consumption and escape poverty. Internal migration in Ghana is a long established and well documented phenomenon, following colonial routes from the poorer northern regions to more prosperous southern regions and to the east and west in response to booms in cocoa, palm oil, rubber and mining. Molini and Paci (2015) show that internal migration continues to be significant in the 21st century: using census and survey data they estimate an internal migration rate of 43 percent in 2010 and that 4.7 million people moved to urban areas between 2005 and 2012.

A major issue that has featured prominently in migration studies is identifying the impact of migration. In examining this subject, various outcomes have been explored, notably, the impact of migration on the community of origin, migration's impact on the destination community, the impact of migration on the wellbeing of the migrant, and on the living standards of the household of origin. While studies show that the impact of migration can be positive or negative, various approaches have been employed to address this important subject. From a broad perspective, the studies have included both quantitative and qualitative approaches, and the data used for the studies have also ranged from subjective or self-reported impact assessments to data obtained from quantitative household surveys. We contribute to this body of literature with preliminary results of an analysis of the consumption expenditure gains migrant-sending households experience as a result of having migrant members. As it is not possible to observe the welfare of households had they not experienced migration, we estimate a counterfactual consumption distribution and compare it with the actual consumption distribution to understand whether gains are on average positive and how these are distributed. We explore the sensitivity of our estimates of gains to the presence of selection bias.

In reviewing the relevant issues in the literature, we proceed by first providing a general overview of the findings regarding the benefits of migration. This is followed by a review of methodological issues relating to the evaluation of migration's impact, focussing mainly on the application of a counterfactual assessment of the impact of migration. In this regard, we also highlight the findings of some studies that have employed the counterfactual approach to the analysis of migration's impact.

2. Benefits of migration

The relationship between migration and welfare outcomes is quite complex (Skeldon, 1997; Fischer, et al., 1997) and can be mediated by several factors including gender and age of the migrant (Awumbila et al., 2014). However, there is a general agreement that the majority of migrants, be they internal, cross-border, regional or international, can benefit economically from their movements. According to DFID (2007), migration can increase income, lead to new skills, improve social status, build assets and improve quality of life for individual migrants and their families. It is generally acknowledged that although migration may result in the loss of local financial and human capital in the short term, it can also be beneficial and contribute to the long-term development of rural areas (IOM, 2007). According to the Development Research Centre (DRC) (2009), migration is a common livelihood strategy of the poor, and

represents an important route out of poverty for many poor people. Migration, as a livelihood strategy, has been found to reduce unemployment as many people migrate for employment opportunities (Awumbila et al., 2014; Siddique, 2004, (Anarfi and Kwankye, 2005; Awumbila and Ardayfio-Schandorf, 2008). In a study in India, Zachariah et al. (2002) found that migration from Kerala to the Gulf States caused wages to rise, reduced unemployment, and improved the economic situation of those left behind. Some of the benefits of migration are due to remittance flows from migrants to their households at origin, and there are a number of studies that show that both international and internal remittances can make a significant difference to incomes of poor households.[1]

Using a counterfactual analysis to evaluate the impact of migration

Consistent with general methodologies for impact evaluation, the analysis of migration's impact requires the generation of the counterfactual. In other words, any assessment of migration's impact must strive to answer the following question: *What might the current outcome of interest be in the absence of migration?* Here, the "outcome of interest" can refer to the wellbeing of the migrant, the income distribution in the community of origin, the poverty status of the household of origin, etc. A key feature of a counterfactual analysis is that the focus is on a "with and without" comparison and not a "before and after" comparison.

The empirical challenge is that the "with and without" cannot both be observed, hence various techniques for carrying out a counterfactual analysis have been developed. In the applied economics literature, the major techniques include propensity score matching (PSM), instrumental variable approaches, and the difference in differences (DID) approach. The objective of all of the approaches is to identify a credible control group for the analysis of the counterfactual scenarios.

In assessing the impact of migration, some studies (for example, Yap, 1976; Switek, 2016) have employed an approach that compares the outcome of interest between migrants (or migrant households) and non-migrants (or non-migrant households). A common strategy with such approaches is the inclusion of a dummy variable (for migration status) in regressions estimating the outcomes of interest. The intuition behind such a strategy is that the coefficient of the dummy variable will presumably capture the impact of migration on the outcome of interest, such as income or wellbeing. Such an approach has, however, been criticized on grounds that non-migrants (or households without migrants) do not constitute a credible control group for assessing the counterfactual. This is because of the strong likelihood that migrants (or their households) are non-randomly selected since they may possess some unobservable characteristics that non-migrants (or their households) lack. We provide a brief overview of some key papers.

McKenzie et al. (2010) used a unique panel dataset on Tonga to explore the reliability of different methods of estimating the counterfactual. They found that non-experimental methods other than instrumental variables techniques overestimate the gains from migration

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[1] See *inter alia* Adams (2005), Awumbila et al. (2014), Deshingkar and Grimm (2004). DFID (2007), IIOM, 2007), Lucas and Stark (1985), Kwankye and Anarfi (2011), Quartey (2006), Siddique and Abrar (2003).

by 20-82 percent, with the difference-in-differences method and bias-adjusted matching estimators outperforming other alternatives to the instrumental variables approach.

Using data from the 2001 Mexican Health and Aging Study (MHAS), Antman (2011) used instrumental variables techniques to analyse the effect of international migration on the health of elderly parents left behind. On the whole, the study's results suggest that having a child migrate to the US increases the probability that the elderly parent in Mexico will be in poor physical health. In a more recent study, Kuhn, Everett, and Silvey (2011) employed panel data from the Indonesian Family Life Survey to examine the effects of children's migration on the health of elderly kin. Using a propensity score matching technique, Kuhn, Everett, and Silvey found a positive association between the health of the elderly and the migration of their children.

In a study of the effect of male migration on employment patterns of women in Nepal for which data from the 2004 Nepal Household Survey was used, Lokshin and Glinskaya (2009) employed an instrumental variables technique to account for unobserved factors that can affect men's decision to migrate, as well as women's decision to participate in the labour market. The study's results showed that males' migration had a negative impact on labour market participation of women in the migrant-sending households.

For Ghana, few studies have examined the impact of migration from a counterfactual perspective. In a study of the welfare dimension of Ghana's rural-urban linkages using data from the 1998/99 Ghana Living Standards Survey (GLSS), Boakye-Yiadom (2008) employed the Heckman two-step technique[2] to assess the impact of rural-urban migration on migrants' consumption expenditure, as well as the impact of urban-rural migration on the consumption expenditure of urban-to-rural migrants. The results of the study suggested that whereas rural-to-urban migrants were, on average, considerably better-off than they would have been if they had not migrated, urban-to-rural migrants were generally worse off than they would have been if they had stayed in the urban areas. While Boakye-Yiadom's study is a significant contribution to the Ghana literature on the impact of migration, it lacks an analysis of factors that influence a migrant's likelihood of gaining from migration.

The findings of Boakye-Yiadom (2008) are consistent with those of Ackah and Medvedev (2012) who analysed internal migration in Ghana, using data from the 2005/06 Ghana Living Standards Survey. They employed a two-stage treatment effects estimator to assess the impact of migration on the welfare of migrant-sending households. Ackah and Medvedev found that households with migrants tend to be better off than similar households without migrants, but that this is particularly so for households with urban migrants. Adams (2006) has also employed the same counterfactual framework to analyse the impact of remittances on poverty in Ghana. Using the Heckman two-step approach, Adams concluded that both internal and international remittances resulted in a reduction in the incidence, depth, and severity of poverty in Ghana. Most recently, Molini et al. (2016) used the GLSS-6 data to analyse the impact of migration on the welfare measured as consumption level of the households who moved within Ghana compared to those households that did not move. They also apply the Heckman selection model to control for selection and they find that households that move across regions in Ghana are significantly better off than those staying behind.

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[2] See Lee (1978) and Heckman (1979).

We build on these studies by focusing on the impact that migration has on migrant-sending households. We follow the literature by estimating a two-stage model to address the selection bias issue.

3. Migrating out of Poverty data

The data for our analysis is drawn primarily from the second round of two household surveys conducted in Ghana in 2013 and 2015.[3] The household survey comprises of two rounds of data from approximately 1400 households in March 2013 and 1100 households surveyed in March 2015 in five regions of Ghana (Northern, Upper East, Upper West, Brong Ahafo, and Volta). The sample is not nationally or regionally representative but is intended to be representative of rural households in the five regions covered. The questionnaire includes information on individual demographic characteristics, education and occupation. It has a strong focus on the migration history of current as well as return migrants, identifying the year of migration and the destination.

The two rounds of data provide a panel of households, however, in terms of welfare indicators, household consumption is only available in the 2015 survey, which restricts the methodological options available for estimating the counterfactual. While we do have information in both waves of the survey on household assets, income sources and remittance receipt, as well as subjective well-being, we focus here on an analysis of the 2015 data only, and intend to exploit the panel data in subsequent work. This allows us to develop a methodology that can be applied to other similar single-wave cross-section household surveys which are the most commonly available type of survey, including our own MOOP data for Ethiopia and Zimbabwe.

The sample for this analysis is restricted to households with no current migrants and those with only internal current migrants. We define current migrants as household members who are currently not living in the household and have been away for at least three months but less than five years. This definition draws on Bilsborough (1988) and is motivated by the need to exclude very short visits away from home as migration events and also to restrict the recall period for households. After excluding households with incomplete data, we have a sample of 783 households, of which 300 have a current migrant within Ghana. These households are located in the five regions as shown in Table 1.

Table 1: Sample across regions of Ghana						
	Migrant status of household					
Region	No migrants		With migrants		Total	
	N	%	*N*	%	*N*	%
Brong Ahafo	*74*	15.3	*59*	19.7	*133*	17
Northern	*157*	32.5	*61*	20.3	*218*	27.8
Upper East	*48*	9.9	*58*	19.3	*106*	13.5
Upper West	*60*	12.4	*49*	16.3	*109*	13.9

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[3] See http://migratingoutofpoverty.dfid.gov.uk/research/migrationdata for more on our MOOP data and for a public release version of the 2013 survey data.

Volta	*144*	29.8	*73*	24.3	*217*	27.7
Total	*483*	100	*300*	100	*783*	100

Table 2 summarizes a number of measures of living standards covering household consumption, assets and access to key infrastructure, as well as subjective measures of households' own economic situation. [4]

Table 2: Household welfare by migrant status of household

	Without migrants		With migrants	
	N	Mean	*N*	Mean
Annual total expenditure per capita (in GHN Cedis)	*483*	1505.2	*300*	1502.5
Annual food consumption per capita (in GHN Cedis)	*483*	866.5	*300*	873.7
Bedrooms per member	*482*	0.76	*298*	0.82
Asset ownership:				
Dwelling	*394*	0.82	*260*	0.87
TV	*236*	0.49	*142*	0.47
Fridge	*115*	0.24	*68*	0.23
Bike	*280*	0.58	*179*	0.60
Car	*44*	0.09	*37*	0.12
Livestock	*228*	0.47	*164*	0.55
Land	*241*	0.50	*154*	0.51
Access to infrastructure:				
Electricity	*347*	0.72	*199*	0.66
Sewage	*42*	0.09	*26*	0.09
Drinking water	*362*	0.75	*226*	0.75
Perceptions of household's own Economic status				
Financial situation is adequate (=1, =0 if inadequate)	*300*	0.62	*197*	0.66
Financial situation has:				
improved compared to two years ago	*141*	0.29	*100*	0.33
is the same as to two years ago	*155*	0.32	*105*	0.35
deteriorated compared to two years ago	*186*	0.39	*94*	0.31

We can see that households with migrants have a very similar level of per capita total consumption as households without migrants. Food consumption is slightly higher amongst households with migrants, but this simply illustrates the difficulties in making such a comparison and drawing inferences about whether migration improves living standards. We do not know if households with migrants were on average better off than those without

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[4] See Appendix 2 for details of how we calculated household expenditure and a comparison with estimates from the latest GLSS.

migrants before migration occurred, nor whether households with migrants might have been better off had their migrants stayed. Households with migrants are slightly more likely to own their own dwelling and livestock but otherwise asset ownership is very similar. In contrast, households without migrants appear to live in communities with better infrastructure, particularly electricity. However, the data in Table 2 just shows us the current situation of households, and does not allow us to infer whether the households with migrants have improved their standard of living and maybe they used to be worse off than non-migrant households and migration enabled them to catch up. For this reason we conduct the counterfactual analysis.

We also explore how households judge their own welfare status, exploiting responses to two questions in our survey, first whether or not households view their situation to be adequate, and second whether they feel their situation has improved in the last two years. Households with migrants are more likely to perceive their financial situation as adequate compared to households without migrants, and furthermore, they are more likely to report an improvement.

In terms of demographic characteristics[5], households with and without current migrants appear very similar. The only striking differences are found in terms of the dependency ratio and age of the household head, both of which are significantly higher in households with migrants, and the two results suggest that households with migrants have lost, even if temporarily, potentially valuable household labour, whose contribution to household welfare may or may not be replaced with remittances.

Heads of households with migrants also seem to be slightly less well educated. , although this does not appear to be reflected in any differences in terms of overall education levels in the households nor in the occupation of household heads. For all households in the sample, self-employment is the main activity of household heads, in farming or own business, with the agricultural sector being the main source of income for almost half of our sample.
One interesting observation on main income sources for households is the dependency on public and private transfers: almost a third of households without current migrants report that government benefits are the main source of household income, and this is higher than for households with migrants. In contrast, around 16% of households with migrants report that remittances are their main source of income, compared to just 4% of households without migrants.

Finally, we observe that most communities, over 90%, in our sample have access to motorable roads. Financial institutions are present in almost half of the communities (Table A6). Despite this, only around a third of the households live in communities with a post office, a permanent market or a secondary school, although there appears to be some correlation between migration and the latter two.

As well as data from the household and community survey we also have survey data on a sample of approximately sixty migrants from our migrant-sending households who we were

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[5] Full tables are presented in Appendix A1.

able to track to Accra, as well as transcripts from semi-structured interviews with a small sample of ten of these migrants.

4. Methodology

This analysis aims to estimate the impact of migration on the welfare, specifically household consumption, of households who have a migrant living somewhere else in Ghana. We establish a counterfactual for these households: what would they have experienced in terms of welfare if their migrant(s) had not left?

We adopt a method similar to that employed by Adams (2006) and Boakye-Yiadom (2008), that is, we estimate a counterfactual level of consumption based on data from households without migrants, controlling for selection with a two-step Heckman model.

The analysis proceeds in four steps. First, we define a comparison group – the sub-group of households are those without a current migrant. This is complicated by the fact that our definition of current migrant does not rule out the possibility that some households categorized as households without migrants in 2015 may have a member who migrated, but more than five years ago. There are 208 such households which is a large proportion of our overall sample (see table A2 in Appendix). In this paper we address this very simply by including a control variable for this characteristic in our analysis, although in future work aim to model this more formally.

Having identified our sample of households without migrants, we then model consumption for these households and use the parameter estimates to predict consumption levels for migrant-households. Our consumption model corrects for selection by modelling the probability that a household has no current migrants, thus providing us with selection-corrected estimates. We describe in more detail both our model specification and how we address the selection bias problem below.

Thirdly, we compare the predicted counterfactual expenditures of households with migrants with their actual consumption observed in the data, both descriptively and slightly more formally via regression analysis. We compare distributions of the actual and counterfactual consumption and we explore the poverty transitions that result from migration. Finally, we describe some of the characteristics of households and their migrants associated with consumption gains.

Model specification

We estimate a consumption model with the sample of households without current migrants, as follows:

$$c_h^{nm} = \alpha + \beta_1 X_h^{nm} + \beta_2 C_c + \beta_3 D_d + e_h \qquad [1]$$

C_h^{nm} is per capita household consumption of households without current migrants. We carry out our analysis for both overall consumption, results presented in the main body of the paper, and for food consumption only, shown in Appendix A3. X_h^{nm} is a set of household

characteristics that are important determinants of consumption expenditure: household size, age-based dependency ratio (the ratio of dependents--people younger than 15 or older than 64--to the working-age population--those aged 15-64 in the household), gender ratio (ratio of female to male household members older than 15 years), household head characteristics (sex, age, education and occupation), highest level of education in the household, the main source of household income, asset ownership (dwelling, house, TV, fridge, car, bike/motorbike, livestock). C_c represents community variables (community size, dummies for presence of post office, financial institution and daily market in community), and D_d are district dummies. e_h is the error term. Our consumption model specification is informed by Boakye-Yiadom (2008) with the addition of community variables collected in our survey. Based on this estimation we can then predict the counterfactual consumption of households with migrants:

$$\hat{c}^m_h = \alpha + \hat{\beta}^{nm}_1 X^m_h + \hat{\beta}^{nm}_2 C_c + \hat{\beta}^{nm}_3 D_d \qquad [2]$$

$\hat{\beta}^{nm}$ is a vector of the predicted coefficients from [1] and X^m_h are the household characteristics of migrant households. We adjust the household composition variables to what they would have been had the migrant stayed at origin, i.e. household size, dependency and gender ratio, as well as highest education level attained by any member of the household.

Selection

The methodology described above is based on the assumption that migrant and non-migrant households are comparable groups and that migration is a random event across households. However, this is a strong assumption and unlikely to hold in most country contexts. Migration is the outcome of a decision, taken by individuals and/or their families and thus driven by characteristics that are unlikely to be randomly distributed across households. It is also likely that unobserved characteristics, such as high motivation, risk-preference or personal contacts in other parts of the country, determine the decision whether a household sends a migrant or not. If these characteristics also affect household welfare, this will create a bias in the predicted consumption of migrant households based on the estimation of non-migrant household characteristics.

In order to account for this selection bias, we estimate a two-stage selection model. We first identify the likelihood of a household not having a current migrant and then use the extracted selection term as control for selection in the prediction of a consumption counterfactual.

$$\Pr(NM = 1)_h = \alpha + \delta Z_h + \gamma_1 X_h + \gamma_2 C_c + D_d + \varepsilon_h \qquad [3]$$

The probability of a household not having a current migrant is estimated with a probit model where the outcome variable is binary equal to 1 if the household has no current migrants, and equal to zero otherwise. X_h is the set of household characteristics used also for the consumption estimation and Z_h is an identifying variable that affects the probability of being a household with no migrants, but not the consumption level. This variable is excluded from the main consumption estimation and thus ensures the model is identified. From this

estimation we obtain the Inverse Mills ratio, which captures an estimation of the selection bias. Then we proceed with the consumption estimation as above, but including the Inverse Mills Ratio in order to control for selection. If this term has a statistically significant coefficient λ_h in the consumption model, then we can conclude that we would prefer to use the selection-corrected estimates to predict consumption rather than those obtained from OLS. For the selection equation we need to find an instrument Z_h which is correlated with the migration decision, but not with consumption levels. Following the migration literature (McKenzie and Sasin 2007) we capture social networks that facilitate migration. Social networks are an important determinant for migration decisions (e.g. Woodruff and Zenteno 2007, Munshi 2003, Molini et al, 2016). The existence of social networks with migration experience at origin and destination eases the migration process. Networks reduce migration costs due to more information and an established infrastructure. It is also likely to reduce the risk of migration, or at least the perception of that risk, as the outcome is more likely to be successful through the help of a social network at the destination. Thus, if two households look similar and have a potential migrant, the household with a social network with previous migration experience is more likely to send this potential migrant than the household without such a network. In Ghana social networks are strongly based along ethnic lines and relate to stronger networks for prospective migrants than just the prevalence of migration within a region (Adams, Cuecuecha and Page 2008). In order to capture the existence of such networks, we use the share of migrants within the same community of the same ethnicity as the household head.[6] This variable captures the network migrants can rely on to gather information about the migration process (travel options, fees etc.) as well as opportunities for employment, business and accommodation. This variable varies across households. Households within the same village can have a different likelihood of having a migrant because they have different social networks as they belong to different ethnic groups. Thus, even in villages with high migration prevalence, some households are more likely than others to have a migrant because their ethnic group has a larger network of migrants.

We also explored using our ethnicity based migration data at the district level (i.e. a higher level of aggregation than the community), non-ethnicity based migrant network data from the GLSS6, migrant network data from an earlier round of the MOOP survey, as well as distance to regional capital. Unfortunately, we were unable to match enough district level data from the GLSS to districts in our sample, and the geo-code data for our communities is incomplete, thus for this working paper we rely on data obtained from our own surveys. We show a summary of the results obtained from using different instruments below. Our initial analysis reported here draws on the literature suggesting that migration is facilitated by ethnicity-based social networks. Our data allows us to estimate this at both the community level and the district level, and also for 2013 as well as 2015, and provides us with variation at the household level within communities and districts.

Table 3 reports summary results obtained using a number of alternative identifying variables. Column one shows the coefficient obtained in the probit model, with the dependent variable taking values of 1 for households without migrants, and zero otherwise. The model specification is shown in Table 13 and was identical for all alternative instruments. Significant coefficients indicate the instrument is a suitable instrument as it is indeed an important factor

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[6] In all but 16 cases the household head and the migrant have the same ethnicity.

in determining whether or not a household has a current migrant. Surprisingly, ethnicity based migration data from the earlier 2013 round of data is not a useful instrument as it has no effect on the probability of whether or not a household in 2015 has a migrant, whether we measure this in absolute or relative terms or at the level of the district or community. Our more successful attempts are obtained using data from the 2015 survey at the community level: higher migration rates from a given community of people with the same ethnicity as each household head results in a lower probability of a given household not having migrants. This is consistent with the literature that suggests social networks, especially those based on kinship ties, are an important driver of migration decisions.

Column two shows the coefficient on the inverse mills ratio, with the sign and significance indicating the direction of selection bias and whether that selection bias is statistically significant. A negative sign indicates that the error terms in the selection and consumption equations are negatively correlated so that unobservable factors that make the probability of not having a current migrant higher are more likely to be associated with lower consumption. This suggests that migrants are on average positively selected. We will see further evidence of this when we explore the results below. Only our community level data for 2015 yield significant selection effects, so we adopt these as our preferred instruments.

Table 3: Coefficients of alternative instruments in first stage and selection term in second stage.

	Coefficients	
	Instrument in first stage	Selection term
Number of migrants of same ethnicity as household head in *community 2013*	-0.009	-0.478
	(0.008)	(0.313)
Share of migrants of same ethnicity as household head relative to all migrants in *community 2013*	-0.226	-0.307
	(0.216)	(0.289)
Number of migrants of same ethnicity as household head in *district 2013*	0.005	0.156
	(0.005)	(0.320)
Share of migrants of same ethnicity as household head relative to all migrants in *district 2013*	-1.243	0.054
	(1.644)	(0.309)
Number of migrants of same ethnicity as household head in *community 2015*	-0.073***	-0.633***
	(0.009)	(0.203)
Share of migrants of same ethnicity as household head relative to all migrants in *community 2015*	-0.795***	-0.463**
	(0.237)	(0.214)
Number of migrants of same ethnicity as household head in *district 2015*	-0.009	0.026
	(0.006)	(0.297)
	-0.981***	-0.141

Share of migrants of same ethnicity as household head relative to all migrants in *district 2015*	(0.303)	(0.237)
Notes: full spec of models are as in Table 4.		

5. Results

Table 4 shows the results of the OLS (non-selection corrected) and the two-stage estimation procedure, where stage one is a probit model of the probability of a household not having migrants and stage two is a consumption model. In the first column we present the results of the OLS model, i.e. without any attempt at selection correction. Column two shows the estimation of the probability that a household has a current migrant in 2015 using the number of migrants of the same ethnicity as the household head and the resulting selection-corrected estimates of consumption for the sample of households without migrants, and the third column shows the probit model using the share of migrants with the same ethnicity as the head of the household and the resulting selection-corrected expenditure estimation results.

Recall that the purpose of this exercise is not so much to explore which individual factors affect the probability of migration or variations in the level of consumption but rather to estimate as well as possible the average level of consumption. What is interesting is to compare the OLS results with the selection-corrected results and to analyse the effect of the selection bias. If we use the coefficient on the selection term in column three, -0.463, together with an estimated average Mills' ratio of 0.985, we obtain an average truncation effect of -0.456. This is how much the conditional consumption distribution is shifted down due to selection. The interpretation of this is that a household with average characteristics which decides to not have a current migrant has [exp(-0.456)-1]*100=37% lower consumption than a household drawn at random. We get slightly larger estimates of selection bias using the number, rather than the share, of migrants with the same ethnicity as the household head, but the story is qualitatively the same. Put simply, households with migrants are positively selected.

Table 4: OLS and 2-stage selection model with probit estimation of being a non-migrant household and Selection-corrected Consumption model.

	1	2		3	
	OLS results	IV: Number of migrants of same ethnicity as household head in community (2015)		IV: Share of migrants of same ethnicity as household head relative to all migrants in community (2015)	
		Pr(No migrant = 1)	Log(Per capita consumption)	Pr(No migrant = 1)	Log(Per capita consumption)

Instrumental Variable	-	-0.073***		-0.795***	
		(0.009)		(0.237)	
Inverse Mills Ratio	-		-0.633***		-0.463**
			(0.203)		(0.214)
Dummy whether household had previous migration history	-0.405***	-0.858***	-0.183*	-0.819***	-0.230**
	(0.062)	(0.108)	(0.102)	(0.109)	(0.113)
Dependency ratio	-0.216***	0.210*	-0.246***	0.201*	-0.241***
	(0.052)	(0.112)	(0.054)	(0.106)	(0.054)
Age of household head	-0.005**	0.000	-0.004**	0.000	-0.004**
	(0.002)	(0.004)	(0.002)	(0.004)	(0.002)
Sex of household head (1 = Female)	0.117	0.309	0.052	0.281	0.053
	(0.110)	(0.195)	(0.114)	(0.189)	(0.120)
Marital status of household head (Base = Single)					
Married	-0.030	-0.098	-0.023	-0.103	-0.031
	(0.150)	(0.225)	(0.147)	(0.225)	(0.153)
Living with partner	0.279	-0.051	0.248	0.038	0.251
	(0.359)	(0.550)	(0.343)	(0.563)	(0.347)
Separated	-0.093	0.540	-0.151	0.431	-0.121
	(0.222)	(0.408)	(0.221)	(0.374)	(0.221)
Divorced	-0.284	-0.476	-0.129	-0.418	-0.190
	(0.226)	(0.384)	(0.210)	(0.376)	(0.214)
Widowed	-0.067	-0.341	0.021	-0.416	-0.003
	(0.195)	(0.315)	(0.197)	(0.308)	(0.192)
Ethnicity of household head (Base = Akan)					
Ga-Dangme	-0.216	-0.922**	0.028	-0.842**	-0.042
	(0.193)	(0.455)	(0.184)	(0.418)	(0.187)
Ewe	-0.420*	0.045	-0.329	-0.042	-0.248
	(0.215)	(0.266)	(0.215)	(0.282)	(0.215)
Guan	-0.006	-0.059	0.027	0.039	0.069
	(0.164)	(0.367)	(0.172)	(0.408)	(0.153)
Mole Dagbani	-0.201	-0.130	-0.091	-0.041	-0.101
	(0.183)	(0.282)	(0.168)	(0.360)	(0.180)
Gruni	-0.751**	-0.991	-0.307	-0.736	-0.537*
	(0.285)	(1.105)	(0.330)	(1.020)	(0.300)
Grussi	-0.326	-0.879	-0.158	-1.145*	-0.228
	(0.245)	(0.612)	(0.212)	(0.592)	(0.269)
Others	-0.259*	-0.183	-0.198	-0.172	-0.200
	(0.141)	(0.256)	(0.134)	(0.272)	(0.135)
Occupation of household head (Base = In school)					

Paid employee	-0.077	0.183	-0.101	0.010	-0.102
	(0.348)	(0.640)	(0.339)	(0.669)	(0.337)
Paid self-employed	-0.117	0.152	-0.123	-0.049	-0.144
	(0.348)	(0.631)	(0.338)	(0.656)	(0.336)
Unemployed	0.053	0.060	0.119	-0.309	0.063
	(0.396)	(0.659)	(0.389)	(0.689)	(0.390)
Unpaid worker	-0.139	0.277	-0.202	0.001	-0.166
	(0.353)	(0.618)	(0.345)	(0.638)	(0.340)
Retired	0.143	0.217	0.131	-0.115	0.156
	(0.399)	(0.662)	(0.377)	(0.649)	(0.376)
Others	-0.083	0.325	-0.150	0.005	-0.139
	(0.391)	(0.605)	(0.373)	(0.586)	(0.384)

Education of household head (Base = None)

Primary	0.002	0.317	-0.101	0.341	-0.077
	(0.098)	(0.256)	(0.103)	(0.242)	(0.110)
Junior	-0.009	0.302	-0.073	0.266	-0.079
	(0.086)	(0.209)	(0.087)	(0.200)	(0.094)
Senior	0.152	0.649***	-0.056	0.593***	-0.019
	(0.112)	(0.241)	(0.133)	(0.230)	(0.155)
Higher	0.420***	0.583*	0.255	0.454	0.254
	(0.154)	(0.298)	(0.169)	(0.287)	(0.182)

Highest level of education in household (Base = None)

Primary	-0.210	-0.319	-0.095	-0.318	-0.163
	(0.136)	(0.282)	(0.137)	(0.279)	(0.137)
Junior	0.000	-0.240	0.068	-0.219	0.048
	(0.119)	(0.245)	(0.112)	(0.251)	(0.119)
Senior	-0.221*	-0.705***	-0.031	-0.574**	-0.089
	(0.128)	(0.244)	(0.134)	(0.251)	(0.147)
Higher	-0.093	-1.281***	0.258	-1.170***	0.177
	(0.120)	(0.298)	(0.173)	(0.304)	(0.169)

Main income source of household (Base = Agriculture, fishing and forestry not including value of own consumption)

Agricultural waged work	0.027	-0.150	-0.018	-0.006	0.034
	(0.154)	(0.217)	(0.138)	(0.216)	(0.157)
Renting out land or other assets	0.057	-0.114	0.019	-0.156	-0.097
	(0.251)	(0.348)	(0.248)	(0.341)	(0.231)
Small scale mining	0.475*	0.240	0.296	0.332	0.367
	(0.281)	(0.657)	(0.273)	(0.659)	(0.235)
Non-agricultural waged work	0.432*	-1.662***	0.848***	-1.575***	0.878***
	(0.251)	(0.637)	(0.297)	(0.595)	(0.317)
Trade and business (non-farm)	0.078	0.124	-0.013	0.202	0.032
	(0.124)	(0.249)	(0.121)	(0.267)	(0.129)

Government benefits	0.152	0.043	0.074	0.021	0.132
	(0.149)	(0.205)	(0.142)	(0.214)	(0.152)
Payments/benefits from religious/charity/NGO organization	0.080	-0.153	0.011	0.011	0.062
	(0.217)	(0.428)	(0.203)	(0.433)	(0.221)
Money sent by family members living somewhere else in Ghana	0.054	-1.602**	0.647**	-1.277*	0.407
	(0.222)	(0.673)	(0.287)	(0.655)	(0.295)
Money sent by other private individuals who are not members of your family who live within Ghana	0.175	-1.189***	0.472*	-1.066***	0.442*
	(0.205)	(0.266)	(0.248)	(0.259)	(0.252)
Money sent by other private individuals who are not members of your family and live outside Ghana	0.114	-0.091	0.122	-0.225	0.183
	(0.301)	(0.579)	(0.327)	(0.599)	(0.318)
Household assets (Dummies =1 if household owns/has access to any of these)					
Household owns dwelling	0.054	0.083	0.013	0.175	0.016
	(0.089)	(0.183)	(0.092)	(0.191)	(0.093)
TV	0.243***	0.013	0.240***	-0.074	0.240***
	(0.076)	(0.152)	(0.070)	(0.147)	(0.076)
Bike	0.105*	0.100	0.119**	0.036	0.102
	(0.062)	(0.131)	(0.059)	(0.119)	(0.062)
Car	0.281***	-0.291	0.354***	-0.170	0.345***
	(0.100)	(0.198)	(0.099)	(0.198)	(0.107)
Livestock	-0.021	0.034	-0.022	-0.018	-0.018
	(0.064)	(0.115)	(0.062)	(0.119)	(0.065)
Land	-0.031	0.108	-0.052	0.063	-0.033
	(0.063)	(0.127)	(0.062)	(0.128)	(0.066)
Fridge	0.151	-0.101	0.144	0.038	0.143
	(0.109)	(0.197)	(0.102)	(0.202)	(0.110)

Electricity	-0.099	-0.003	-0.084	0.078	-0.082
	(0.079)	(0.156)	(0.076)	(0.164)	(0.080)
Sewage	-0.083	0.314	-0.132	0.140	-0.144
	(0.131)	(0.229)	(0.118)	(0.244)	(0.133)
Drinkwater	0.101	0.166	0.064	0.037	0.084
	(0.085)	(0.146)	(0.086)	(0.138)	(0.087)
Community variables					
Log(Community size)	0.021	-0.143	0.043	-0.042	0.056
	(0.048)	(0.098)	(0.042)	(0.107)	(0.047)
Motorable road	0.098	-0.195	0.157	-0.248	0.193
	(0.198)	(0.287)	(0.188)	(0.336)	(0.183)
Post office	-0.105	0.316*	-0.165	0.198	-0.207
	(0.149)	(0.166)	(0.134)	(0.191)	(0.152)
Financial institution	0.068	-0.195	0.035	0.054	0.018
	(0.153)	(0.178)	(0.134)	(0.205)	(0.151)
Permanent market	-0.192*	0.353	-0.213**	0.027	-0.153
	(0.108)	(0.219)	(0.097)	(0.240)	(0.110)
Secondary School	0.074	-0.354*	0.122	-0.105	0.093
	(0.109)	(0.193)	(0.098)	(0.202)	(0.113)
Constant	7.580***	2.807**	7.618***	2.086*	7.395***
	(0.543)	(1.091)	(0.491)	(1.185)	(0.500)
District dummies	Yes	Yes	Yes	Yes	Yes
Observations	462	762	462	757	457
R-squared	0.486		0.506		0.476

* p<.10, ** p<.05,
*** p<.01

Some additional observations can be made. Recall that we define households without migrants as those without current migrants, but this does not rule out the possibility that these households have a longer history of migration not captured in our definition. Our 2013 data however allows us to control for whether the household at that point had a migrant, and the results from the probit models suggest this is positively correlated with the probability of being a household with current migrants in 2015. It is also associated with a lower level of consumption among households with no current migrants.

Having waged employment outside of agriculture appears to improve consumption standards as does receiving financial support from non-family members: over sixty of the households with no current migrants receive private transfers from outside their family. Table 5 shows remittances received by households, broken down by those received from current migrants and those from other family or non-family members living elsewhere.

Table 5: Remittance receipt in past 12 months by migrant status of households, in GH Cedis

|	Households with no migrant		Households with migrants	
	N	Mean	*N*	Mean
Total remittances	*66*	5504.3	*157*	3094.0
Remittances from current migrant	*0*	.	*122*	626.2
Remittances from other or non-family members	*66*	5504.3	*63*	6497.7

While relatively few households with no migrants receive any remittances at all, the mean value is high compared to that for households with migrants. Around one third of the households with migrants receive remittances from their current migrant within Ghana. However, the value of remittances is significantly smaller than that received from other family or non-family members from within Ghana or abroad.

We turn now to the prediction of the counterfactual consumption distributions. Table 6 shows the actual and counterfactual consumption estimates derived from the OLS model and the selection-corrected estimates from column three of table 4 for migrant households. We can see that controlling for selection makes a substantial and qualitative difference in whether mean consumption is higher or lower under the counterfactual, that is, whether on average migration raises or lowers consumption. Using the OLS, non-selection corrected results, it would appear that on average, households with migrants are better off than they would have been if they had not sent a migrant, whereas the opposite is the case when we consider the selection-corrected results. Controlling for selection, we conclude that on average migration has made migrant-sending households worse off.

Table 6: Log per capita expenditure - Actual data and predicted values, difference			
	Households with migrants		
	N	Mean	SD
Actual	*300*	7.010	0.732
OLS Counterfactual	*300*	6.871	0.519
Difference (actual-OLS counterfactual)	*300*	0.138***	0.673
Selection-corrected Counterfactual	*300*	7.275	0.523
Difference (actual-selection-corrected counterfactual)	*300*	-0.265***	0.693
Mills ratio	*300*	0.985	0.498

We can see further evidence of this by comparing the distributions of actual and counterfactual consumption. Figure 1 plots the kernel density distribution of log per capita

consumption of migrant households comparing the actual and counterfactual values. It shows that the counterfactual distribution lies almost everywhere to the right of the actual distribution, meaning that the distribution of consumption would have been higher had migrants stayed at home.

Figure 1 Counterfactual and Actual Consumption Distributions
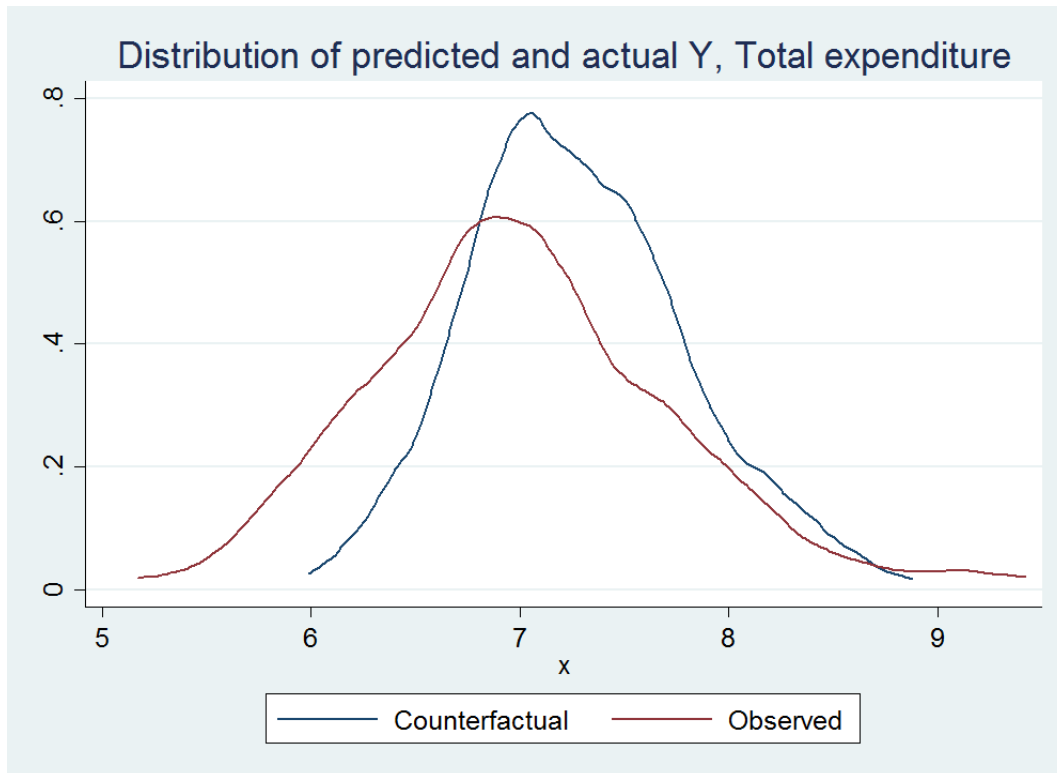
However, that does not mean that all households are worse off as the analysis above does not reveal to what extent households changed their position in the distribution of consumption. Rather than comparing the two distributions we need to track how households' own consumption levels are different between the actual and counterfactual scenario. In fact, of the three hundred households with migrants, around fifty were made better off by migration, around one hundred were no better or worse off[7], and the remaining one hundred and fifty households were made worse off.

The distributional graph of the actual and counterfactual consumption level of migrant households indicates that the counterfactual scenario while on average positive might be different for different households. One question arising is whether the counterfactual scenario looks different across the consumption distribution. We plot the difference between actual and counterfactual consumption against the log consumption of households in 2015 in Figure 2. It shows that households at the lower end of the (current) distribution of

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[7] By this we mean the difference between the actual and counterfactual was less than 5%.

consumption experienced losses as a result of migration, and that the loss becomes smaller and gradually positive as we move up the consumption distribution.

Figure 2: Difference between actual and counterfactual expenditure across consumption levels
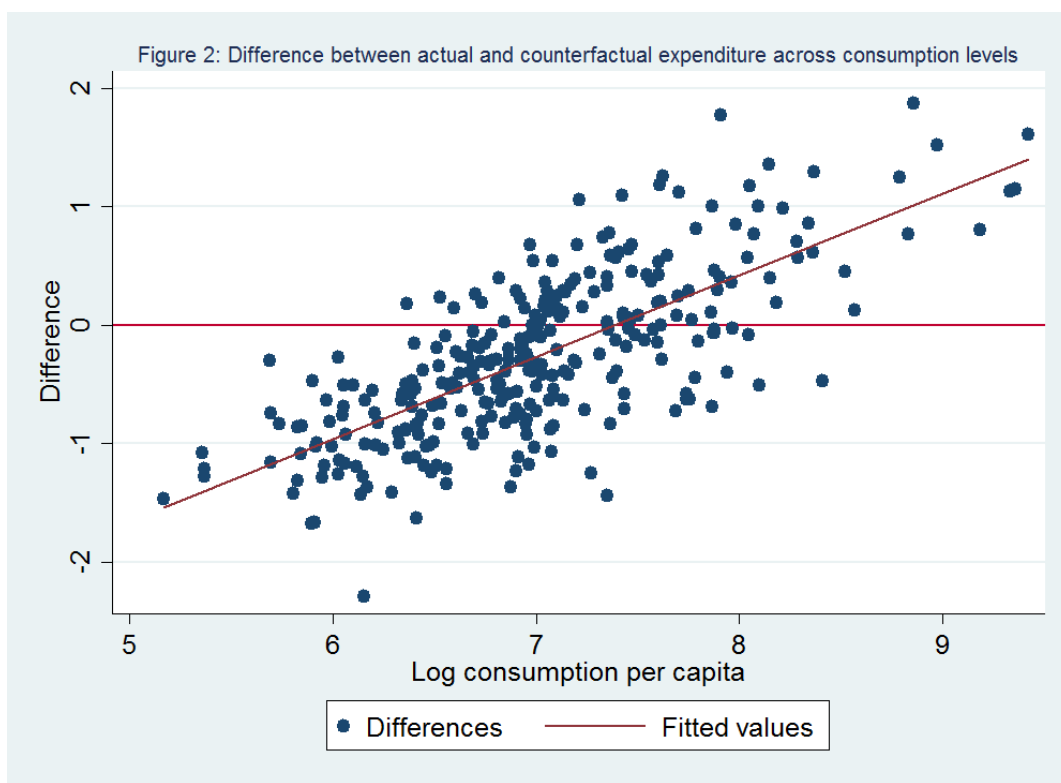
A further way to explore the impact of migration is to examine poverty transitions between the actual and counterfactual scenarios. Table 7 below shows poverty transitions for our sample of households with migrants using two poverty lines, the extreme poverty line which captures the cost of meeting food needs and a higher poverty line which allows for non-food consumption expenditure.[8] First, note that our sample has high poverty rates under the counterfactual, 37% using the extreme poverty line and 73% when the poverty line is used.[9] We can see that amongst the group of households which experienced losses as a result of migration, the majority (56.5%) became extremely poor. In contrast, of those who gained from migration, almost half (48%) escaped from extreme poverty. The second panel shows a similar story in that households which experienced losses had a very high risk of remaining or becoming poor. The graphs shown in Figure 3 illustrate this. We can also interpret the tables in a slightly different way: of those households estimated to be extremely poor under the counterfactual, less than a quarter (25 out of 112) escaped from extreme poverty because of migration. Further, of those households estimated to be not poor in the counterfactual

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[8] See GSS 2014 for more on the poverty line estimation and a detailed poverty profile.

[9] Our sample estimates of poverty are high compared to the national estimates of extreme poverty at 8.4% and of poverty at 31.9%, but our sample is drawn from the rural population where poverty rates are much higher. GSS 2014 reports that 78% and 88% of the poor and extremely poor respectively are rural.

scenario, more than one half became extremely poor. Hence we again conclude that migration proved to be an unsuccessful strategy for escaping poverty, at least in the time scale under consideration in this paper.

Table 7: Poverty Transitions between counterfactual and actual poverty status								
Extreme poverty Status	Losses		Gains		Same		Total	
	N	%	N	%	N	%	N	%
Poor – Poor	39	26.5	4	7.7	33	32.7	76	25.3
Poor – Non-Poor	0	0	25	48.1	11	10.9	36	12
Non-Poor – Non-Poor	25	17	23	44.2	40	39.6	88	29.3
Non-Poor - Poor	83	56.5	0	0	17	16.8	100	33.3
Total	147	100	52	100	101	100	300	100
Pearson chi2(6) = 147.1195 Pr = 0.000								
Poverty Status	Losses		Gains		Same		Total	
	N	%	N	%	N	%	N	%
Poor – Poor	96	65.3	20	38.5	77	76.2	193	64.3
Poor – Non-Poor	0	0	23	44.2	4	4	27	9
Non-Poor – Non-Poor	9	6.1	9	17.3	18	17.8	36	12
Non-Poor - Poor	42	28.6	0	0	2	2	44	14.7
Total	147	100	52	100	101	100	300	100
Pearson chi2(6) = 141.8446 Pr = 0.000								

Figure 3: Actual and Counterfactual Distributions for Winners and Losers
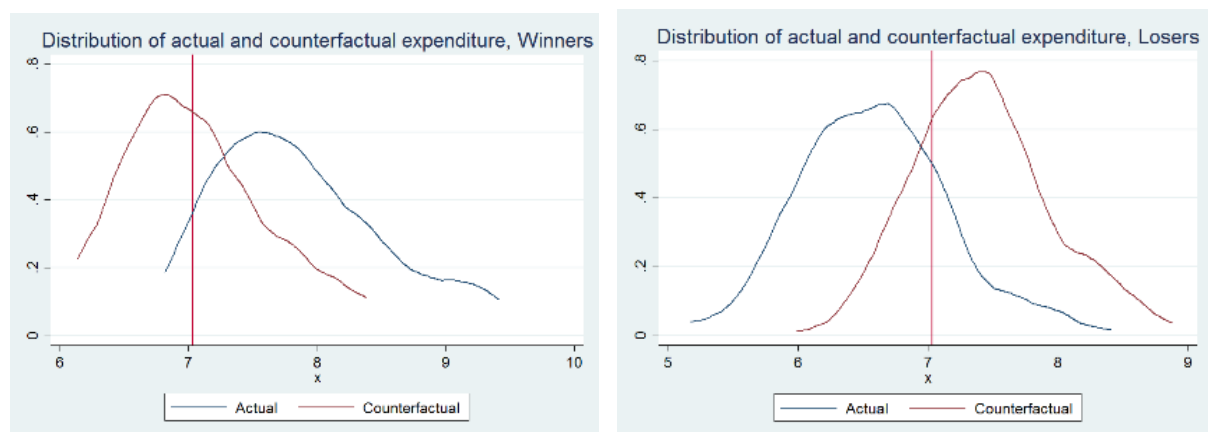
Finally, we explore the reasons why some households benefit and others lose. We estimate a very simple probit model of the probability a household experienced a gain. Appendix 4 Table A11 shows the full set of results, which we summarise here. First we observe that there are regional differences in the probability of a household with migrants gaining from migration, and there seem to be particularly significant effects for households located in the Upper East, as shown by the coefficient on the Upper East dummy and also on the coefficients of the interaction terms between region of the migrant-sending household and destination of the migrant: when migrants move outside of their home district their household is more likely to experience a gain even if they do not leave the region. Secondly we observe some evidence that migration due to poor agricultural opportunities at home is associated with higher probabilities of households benefitting from migration. Finally, female migrants appear to boost households' chances of benefitting from migration.

When we explore some of the household and migrant characteristics more simply, we find some additional associations with whether the household has gained or lost from migration (see tables A12-A15 in Appendix 4). For example, migrants from gaining households tend to be better educated than migrants from households who lost. But surprisingly, having a job arranged at destination before migration does not seem to have been of any benefit: migrants from households which lost were if anything more likely to have a job arranged prior to migration. Households which lost are more likely to have had a migrant who previously worked in farming at their origin, compared to gaining households. Perhaps this suggests the importance of having transferable skills. We also see that migrants from households which lost were more likely to have used savings or family loans to finance their migration; migrants from households which gained use savings as well, but also report using remittances from other, earlier migrants, to finance their migration. Our data suggest that most of the debts had been paid off by the time of the survey, but it would be useful to explore the importance of indebtedness in more depth.

Finally we turn to our data obtained from migrants in Accra, tracked from our origin households. The sample size is quite small, at just sixty migrants in total with ten interviewed in more depth, so discerning strong patterns of association between their responses and whether their households gained or lost through their migration is difficult. We observe the importance of contacts, and specifically how close the contact is. A large proportion of the migrants said they had a contact at the destination yet we see little association between this and the outcomes experienced by their households. What is striking though is how the nature of the contact varies between migrants coming from households which gained or lost. Table A16 illustrates: migrants from households who have gained from their migration are much more likely to have had contacts who are close: parents or siblings; whereas those migrants from households who lost, appear to have contacts but more distant contacts, including other relatives. It would be interesting to explore if the closeness of the contact is related to the type of job arranged prior to migration. Secondly we observe that almost half of the migrants in Accra believe their families would have been worse off had they not migrated: interestingly none of the migrants from households which we predict gained from migration thought their households would have been worse off had they stayed at home, while those migrants whose households we predict as having not gained from migration were more pessimistic about whether migration had benefitted their families. The sample sizes here are very small, too

small to read much into these observations other than a suggestion that perhaps our findings are in line with what migrants themselves think.

6. Conclusions

This paper presents preliminary results of our research on whether migrant-sending households in Ghana benefit from migration. We use data from a household survey conducted in 2015 in rural areas of five regions of Ghana, focussing on internal migrants. To construct the counterfactual we model the determinants of household consumption of households without migrants and use the resulting parameter estimates to predict the likely consumption of households had their members not migrated. As migrants are not drawn randomly from the population, we compare results obtained with and without adjustments for selection bias using a Heckman two –stage method, modelling first the probability a household has no current migrants and then the consumption outcome.

Our results thus far suggest that selection bias is important, and that estimates of the gains and losses from migration are extremely sensitive to whether we correct for selection. We find evidence that migrants are positively selected thus failing to control for selection bias suggests that on average households would gain from having migrants, while the opposite finding emerges when we model the selection process formally. Our research underlines the importance of examining the existence and significance of selection bias when analysing the impact of migration for household welfare.

The second key finding which emerges from our analysis is gains from migration are larger for those households with higher levels of consumption, and that poorer households are more likely to lose from the experience of migration, to the extent that this may lead to households falling below the poverty line. This holds for both poverty and extreme poverty thresholds.

Our preliminary results allow us to draw some cautious conclusions about the overall impact of migration on migrant-sending households. Migration is risky and our results suggest that households who decide to send migrants attempt to mitigate against these risks in a number of ways. Firstly the finding that migrants are positively selected means households and their members do not make the make the decision to migrant lightly. Migrants tend to have higher education levels than those who remain, suggesting a degree of transferable skills that have the potential to enable to migrant to make a strong contribution to household living standards than if they remained at home. Secondly we observe that household who are able to make use of very close family contacts at the destination are also more likely to have a positive experience of migration. Perhaps parents and siblings provide the migrant with better information prior to migration and more support at destination enabling the migrant to find better or more secure work and accommodation. Thirdly, while we do not observe high levels of indebtedness amongst the migrants, we might interpret the higher use of remittances to finance migration costs among households who gain as an important signal of the likely success of the planned migration decision.

Finally we set out an agenda for further research. Firstly it would be useful to revisit the identification strategy adopted in this paper. While we believe that using local ethnic migration rates is a useful approach, and in line with approaches adopted by other authors, it is likely that the contemporaneous nature of our ethnicity based community migration rates

could be improved upon by using historical data, either form the GLSS or census data. Secondly, given that some of households without current migrants have had migrants more than ten years previously, we would like to explore the importance of the longer migration experience of households in our sample. We might restrict the comparison group to households which not only have no migrants in the previous ten years but also had no migrants over longer than a ten year period. Thirdly, we intend to explore the finding that households with female migrants appear to have a higher probability of success. It is possible that our selection approach may need to account for different processes in the selection of male versus female migrants, but also that there are potentially interesting avenues to explore around the nature of women's motivations for migration, activity at destination and remittance behaviour. Finally, we intend to exploit the panel nature of our data by exploring welfare outcomes other than consumption, notably household assets for which we have comparable data in two waves.

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Appendices

Appendix 1: Additional Descriptive tables

Table A1: Number of observations with missing and non-missing values by migrant status of households

	No migrant		Internal migrant	
	Missing	Non-missing	Missing	Non-missing
Log(total expenditure per capita)	5	654	3	412
Dummy whether household had a current migrant in 2013	5	654	3	412
Dependency ratio	3	656	.	.
Age of household head	15	644	7	408
Gender of household head	2	657	1	414
Marital status of household head	9	650	1	414
Ethnicity of household head	26	633	8	407
Main activity of household head	35	624	19	396
Education of household head	58	601	36	379
Highest education in household	20	639	9	406
Dwelling ownership	8	651	6	409
Community size	49	610	25	390
Community has access to motorable road	20	639	7	408
Community has access to post office	13	646	14	401
Community has access to financial institution	7	652	5	410
Log(total expenditure per capita)	5	654	3	412
Dummy whether household had a current migrant in 2013	5	654	3	412
Dependency ratio	3	656	.	.

Table A2: Current migrant in household in 2015 and 2013 survey households

	No migrant in 2015		Internal migrant in 2015	
	N	%	N	%
Current migrant in 2013 survey	227	0.47	230	0.77
Current migrant in 2015 survey	0	0	300	1

Table A3: Demographic characteristics of households by migrant status of households

	No migrant		Internal migrant	
	N	Mean	N	Mean
Size (excluding migrant)	483	6.96	300	6.93
Dependency ratio (excluding migrant)	483	0.60	294	0.69
Gender ratio (excluding migrant)	438	0.50	270	0.50
Number of current migrants	483	0.00	300	1.96

	N	%	N	%
Age of household head	483	49.7	300	53.5
Female household head	124	0.26	80	0.27
Marital status of household head:				
Single	47	0.10	20	0.07
Married	354	0.73	222	0.74
Living with partner	4	0.01	2	0.01
Separated	17	0.04	4	0.01
Divorced	14	0.03	10	0.03
Widowed	47	0.10	42	0.14
Ethnicity of household head:				
Akan	56	0.12	33	0.11
Ga-Dangme	9	0.02	7	0.02
Ewe	117	0.24	64	0.21
Guan	21	0.04	8	0.03
Mole Dagbani	138	0.29	97	0.32
Gruni	12	0.02	12	0.04
Grussi	2	0.00	4	0.01
Others	128	0.27	75	0.25

Table A4: Education in households by migrant status of households

	No migrant		Internal migrant	
	N	%	N	%
Education of household head:				
None	203	0.42	145	0.48
Primary	49	0.10	26	0.09
Junior	111	0.23	65	0.22
Senior	57	0.12	25	0.08
Higher	63	0.13	39	0.13
Highest level of education in household (excluding migrant)				
None	75	0.16	48	0.16
Primary	46	0.10	29	0.10
Junior	129	0.27	81	0.27
Senior	144	0.30	82	0.27
Higher	89	0.18	60	0.20
Occupation of household head:				
In school	3	0.01	2	0.01
Paid employee	74	0.15	47	0.16
Paid self-employed	256	0.53	146	0.49
Unemployed	11	0.02	9	0.03
Unpaid	73	0.15	55	0.18
Retired	22	0.05	19	0.06
Apprenticeship	3	0.01	0	0.00
Others	41	0.08	22	0.07

Table A5: Main source of income of household (Maximum value of income reported from various sources) by migrant status of households

	No migrant		Internal migrant	
	N	*%*	*N*	*%*
Agriculture, fishing and forestry not including value of own consumption	47	0.10	33	0.11
Agricultural waged work	168	0.35	85	0.28
Renting out land or other assets	10	0.02	8	0.03
Small scale mining	3	0.01	1	0.00
Non-agricultural waged work	1	0.00	7	0.02
Trade and business (non-farm)	93	0.19	46	0.15
Government benefits	129	0.27	63	0.21
Payments/benefits from religious/charity/NGO organization	7	0.01	5	0.02
Money sent by family members living outside Ghana	5	0.01	0	0.00
Money sent by family members living somewhere else in Ghana	1	0.00	6	0.02
Money sent by other private individuals who are not members of your family who live within Ghana	11	0.02	43	0.14
Money sent by other private individuals who are not members of your family and live outside Ghana	3	0.01	3	0.01
Others	5	0.01	0	0.00

Table A6: Community characteristics by migrant status of households

	No migrant		Internal migrant	
Community has	*N*	*%*	*N*	*%*
Motorable road	457	0.95	284	0.95
Post office	155	0.32	91	0.30
Financial institution	205	0.42	107	0.36
Permanent market	164	0.34	94	0.31
Secondary school	162	0.34	105	0.35
	N	Mean	*N*	Mean
Number of people living in community	483	2348.2	300	2516.4

Appendix 2: Ghana consumption data

The household questionnaire used in Ghana by the Migrating out of Poverty (*MOOP*) project in 2015 includes a section on expenditure including both food and non-food items. We compare the *MOOP* consumption data to that of the most recent available nationally representative data available for Ghana, the Ghana Living Standard Survey 6 collected in 2012/13.

In order to compare the two data sources we account for inflation between the two surveys. The Ghana Statistical Service (GSS) provide regularly updated Consumer Price Indices

disaggregated by region and type of items (non-food and food). Using the Statistical bulletin of the Consumer Price Index from May 2015, the month in which the *MOOP* survey was conducted, we can compute the regional inflation rates for food and non-food consumption compared to the base year 2012, in which the GLSS6 was conducted.

From this information we get the following regional inflation rates (Table A7). The table shows the importance to account for regional differences in prices and price changes over time.

Table A7: Regional inflation rates, 2012 to 2015			
Region			
	Food	*Non-food*	*Total*
BRONG AHAFO	0.22	0.6	0.43
NORTHERN	0.29	0.6	0.45
UPPER EAST	0.16	0.66	0.41
UPPER WEST	0.22	0.46	0.36
VOLTA	0.26	0.64	0.45

Table A8 presents the average annual household expenditure on food, non-food and all items by regions comparing the GLSS6 estimates and the *MOOP* data. The MOOP questions on food expenditure were not as disaggregated as might be found in a typical survey. Rather, to save survey time in the field we aggregated some food categories and narrowed our focus to a basket of food items representative of approximately 80% of the national average. Overall therefore we tend to underestimate food consumption, but we also obtain a different ranking of households as that suggested by the GLSS. In the Northern region our estimates appear to over-estimate consumption, suggesting perhaps that our survey instrument was not as well suited for the Northern region or that data collection was not as rigorous as in the areas.

Our questions on non-food expenditure were slightly broader than those in the GLSS, including festivals and ceremonies but also in places contain more detail on some items such as schooling. For example, the *MOOP* survey asks for eight sub-items for education related expenses, while the GLSS6 combines those into one item labelled 'Education'. It is possible, that households recall more expenses when asked in more detail. Our estimates are therefore higher and less comparable to those in the GLSS.

Table A8: Consumption data comparison between GLSS6 and *MooP* data by regions				
	GLSS6 data, Nominal unweighted		*MooP* data	
	Food expenditure			
Region	*Mean*	*Median*	*Mean*	*Median*
BRONG AHAFO	1147.6	872.6	806.9	770.1
NORTHERN	866.8	624.9	1439.8	1368.5
UPPER EAST	908.4	687.3	819.4	745.2
UPPER WEST	715.2	394.8	743.3	703.1

Region	Mean	Median	Mean	Median
VOLTA	1322.5	903.3	961.4	827.9

Non-food expenditure

Region	*Mean*	*Median*	*Mean*	*Median*
BRONG AHAFO	1312.3	759.2	2037.6	1522.3
NORTHERN	737.8	409.3	2058.3	1753.2
UPPER EAST	746.4	445.8	2111.2	1445.7
UPPER WEST	731.7	322.8	749.7	547.7
VOLTA	1171.5	715.6	1479.2	1177.1

Total expenditure

Region	*Mean*	*Median*	*Mean*	*Median*
BRONG AHAFO	2460.0	1729.1	3066.2	2718.9
NORTHERN	1604.6	1098.2	3791.0	3509.1
UPPER EAST	1654.8	1186.8	3477.4	3200.8
UPPER WEST	1446.8	776.6	1819.2	1743.8
VOLTA	2493.9	1742.2	2688.9	2367.2

Note: All measures are annualised consumption for the household. The MooP data is from 2015 and thus adjusted for inflation to be comparable to the GLSS6 data from 2012/13

Overall, the comparison suggests that our estimates are similar in magnitude to those of the GLSS, at least for food consumption. Given we are not attempting to make comparisons between regions, of poverty outcomes, and that we control for location fixed effects which will pick up differences in unobservables between regions such as enumerator error, survey error etc. we are confident that our consumption data is useful. However given the high estimates for non-food consumption we present results for both food and total consumption.

Appendix 3: Estimations with annual log food consumption per capita

Table A9: 2-stage selection model: 1. Probit estimation of being a non-migrant household, 2. Consumption estimation controlling for selection, Food consumption

	OLS	IV: Share of migrants of same ethnicity as household head relative to all migrants in community (2015)	
	Log(Per capita consumption)	Pr(No migrant = 1)	Log(Per capita consumption)
IV	-	-0.795*** (0.237)	
Lambda (Inverse Mill's Ratio)	-		-0.470** (0.220)

Dummy whether household had a current migrant in 2013	-0.386***	-0.819***	-0.211*
	(0.071)	(0.109)	(0.117)
Dependency ratio	-0.217***	0.201*	-0.250***
	(0.054)	(0.106)	(0.054)
Age of household head	-0.007***	0.000	-0.006***
	(0.002)	(0.004)	(0.002)
Sex of household head (1 = Female)	0.118	0.281	0.060
	(0.097)	(0.189)	(0.108)
Marital status of household head (Base = Single)			
Married	0.004	-0.103	0.012
	(0.169)	(0.225)	(0.168)
Living with partner	0.412	0.038	0.409
	(0.285)	(0.563)	(0.278)
Separated	-0.157	0.431	-0.204
	(0.203)	(0.374)	(0.211)
Divorced	-0.114	-0.418	-0.021
	(0.240)	(0.376)	(0.229)
Widowed	-0.028	-0.416	0.043
	(0.199)	(0.308)	(0.196)
Ethnicity of household head (Base = Akan)			
Ga-Dangme	-0.105	-0.842**	0.022
	(0.173)	(0.418)	(0.164)
Ewe	-0.338*	-0.042	-0.278
	(0.201)	(0.282)	(0.203)
Guan	-0.014	0.039	-0.005
	(0.166)	(0.408)	(0.163)
Mole Dagbani	-0.157	-0.041	-0.097
	(0.166)	(0.360)	(0.166)
Gruni	-0.951***	-0.736	-0.762**
	(0.284)	(1.020)	(0.292)
Grussi	0.212	-1.145*	0.266
	(0.349)	(0.592)	(0.378)
Others	-0.154	-0.172	-0.121
	(0.133)	(0.272)	(0.130)
Occupation of household head (Base = In school)			
Paid employee	0.060	0.010	0.017
	(0.373)	(0.669)	(0.362)
Paid self-employed	0.022	-0.049	-0.008
	(0.357)	(0.656)	(0.343)
Unemployed	0.263	-0.309	0.279
	(0.410)	(0.689)	(0.402)
Unpaid worker	0.152	0.001	0.094
	(0.361)	(0.638)	(0.345)
Retired	0.543	-0.115	0.509

	(0.392)	(0.649)	(0.373)
Others	0.191	0.005	0.140
	(0.389)	(0.586)	(0.381)

Education of household head (Base = None)

Primary	0.040	0.341	-0.032
	(0.119)	(0.242)	(0.127)
Junior	-0.021	0.266	-0.078
	(0.098)	(0.200)	(0.104)
Senior	0.133	0.593***	-0.024
	(0.128)	(0.230)	(0.169)
Higher	0.384**	0.454	0.253
	(0.193)	(0.287)	(0.217)

Highest level of education in household (Base = None)

Primary	-0.200	-0.318	-0.131
	(0.150)	(0.279)	(0.152)
Junior	-0.047	-0.219	-0.007
	(0.126)	(0.251)	(0.129)
Senior	-0.273**	-0.574**	-0.148
	(0.127)	(0.251)	(0.145)
Higher	-0.211*	-1.170***	0.050
	(0.127)	(0.304)	(0.182)

Main income source of household (Base = Agriculture, fishing and forestry not including value of own consumption)

Agricultural waged work	-0.055	-0.006	-0.054
	(0.167)	(0.216)	(0.168)
Renting out land or other assets	-0.376	-0.156	-0.366
	(0.235)	(0.341)	(0.237)
Small scale mining	0.256	0.332	0.143
	(0.222)	(0.659)	(0.199)
Non-agricultural waged work	0.639**	-1.575***	1.011***
	(0.277)	(0.595)	(0.336)
Trade and business (non-farm)	0.030	0.202	-0.028
	(0.130)	(0.267)	(0.133)
Government benefits	0.051	0.021	0.023
	(0.156)	(0.214)	(0.157)
Payments/benefits from religious/charity/NGO organization	-0.296	0.011	-0.312
	(0.329)	(0.433)	(0.337)
Money sent by family members living somewhere else in Ghana	0.000	-1.277*	0.433
	(0.251)	(0.655)	(0.335)

Money sent by other private individuals who are not members of your family who live within Ghana	0.267	-1.066***	0.522**
	(0.214)	(0.259)	(0.261)
Money sent by other private individuals who are not members of your family and live outside Ghana	0.144	-0.225	0.200
	(0.248)	(0.599)	(0.260)

Household assets (Dummies =1 if household owns/has access to any of these)

Household owns dwelling	0.074	0.175	0.029
	(0.107)	(0.191)	(0.111)
TV	0.158*	-0.074	0.159*
	(0.089)	(0.147)	(0.089)
Bike	0.065	0.036	0.072
	(0.066)	(0.119)	(0.066)
Car	0.122	-0.170	0.183
	(0.127)	(0.198)	(0.135)
Livestock	-0.073	-0.018	-0.065
	(0.071)	(0.119)	(0.070)
Land	-0.007	0.063	-0.022
	(0.068)	(0.128)	(0.069)
Fridge	0.120	0.038	0.117
	(0.118)	(0.202)	(0.117)
Electricity	-0.047	0.078	-0.047
	(0.089)	(0.164)	(0.088)
Sewage	-0.062	0.140	-0.066
	(0.127)	(0.244)	(0.127)
Drinkwater	-0.004	0.037	-0.019
	(0.085)	(0.138)	(0.083)

Community variables

Log(Community size)	0.003	-0.042	0.012
	(0.048)	(0.107)	(0.047)
Motorable road	0.229	-0.248	0.291
	(0.231)	(0.336)	(0.219)
Post office	-0.144	0.198	-0.186
	(0.145)	(0.191)	(0.145)
Financial institution	0.009	0.054	-0.031
	(0.141)	(0.205)	(0.141)
Permanent market	-0.044	0.027	-0.061
	(0.101)	(0.240)	(0.102)
Secondary School	0.098	-0.105	0.154
	(0.108)	(0.202)	(0.118)
Constant	7.016***	2.086*	7.108***
	(0.555)	(1.185)	(0.538)
District dummies	Yes	Yes	Yes

Observations	455	757	455
R-squared	0.398		0.403

* p<.10, ** p<.05, *** p<.01

Table A10: Log per capita food consumption - Actual data and predicted values, difference

	Migrants		
Total expenditure for everything	N	Mean	SD
Actual	*299*	6.478	0.732
OLS Counterfactual	*300*	6.369	0.486
Difference (actual - OLS counterfactual	*299*	0.108***	0.718
Selection-corrected Counterfactual	*300*	6.778	0.505
Difference (actual-selection-corrected counterfactual)	*299*	-0.301***	0.752
Mills ratio	300	0.985	0.498
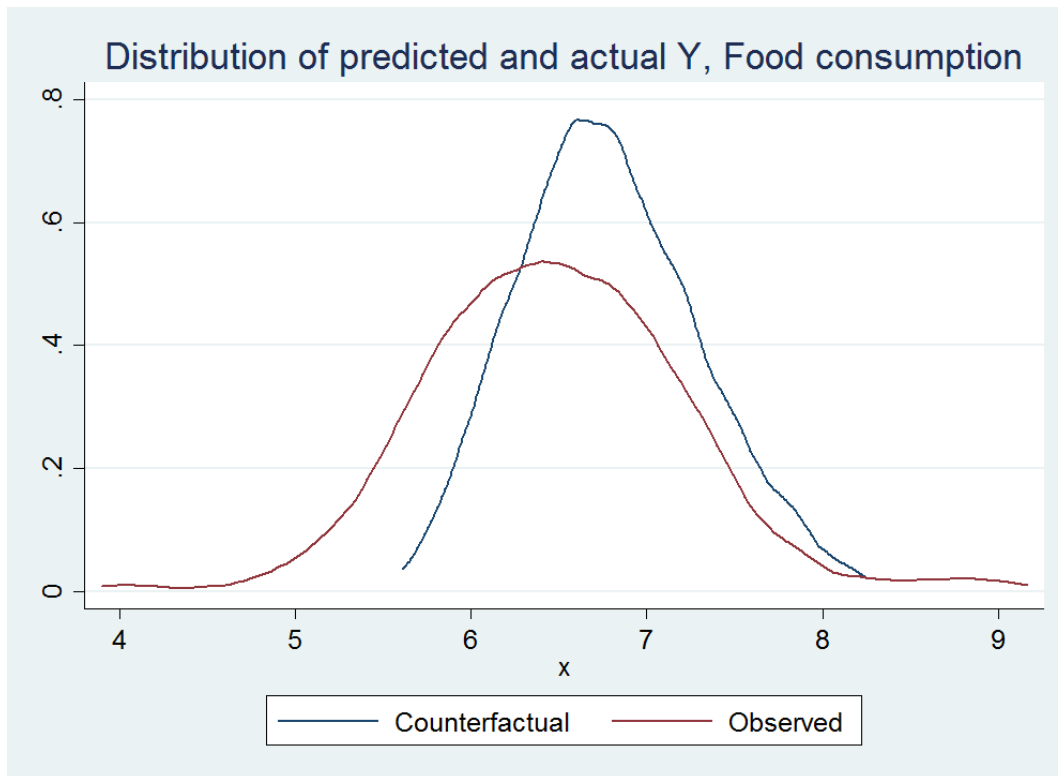
A4 Descriptive statistics of households gaining and losing from migration

Table A11 Probability of migrant coming from a 'winning' household, marginal effects

	Total Expenditure		Food consumption	
Region (base = Brong Ahafo)	*1*	*2*	*1*	*2*
Northern	0.083	0.000	-0.083	0.000
	(0.084)	(0.000)	(0.115)	(0.000)
Upper East	0.271**	0.000***	-0.086	0.000***
	(0.106)	(0.000)	(0.135)	(0.000)
Upper West	0.183*	0.000	-0.011	0.000
	(0.105)	(0.000)	(0.126)	(0.000)
Volta	0.233**	0.000	0.034	0.000
	(0.104)	(0.000)	(0.125)	(0.000)
Sex (1 = Female)	0.178***	0.178***	0.106*	0.093
	(0.057)	(0.059)	(0.062)	(0.065)
Age	0.007***	0.007**	0.005	0.004
	(0.003)	(0.003)	(0.003)	(0.003)
Marital status (Base = single)				
Married	-0.040	-0.046	0.110	0.104
	(0.066)	(0.065)	(0.070)	(0.071)
Other (Widowed, divorced, separated)	-0.038	-0.004	-0.003	0.023
	(0.146)	(0.149)	(0.123)	(0.124)
Number of children left behind	0.007	0.017	-0.035	-0.026
	(0.027)	(0.031)	(0.031)	(0.034)
Reason for migrating: (Base = Job transfer/opportunity)				
Seek work/better job	0.056	0.094	0.015	0.026
	(0.082)	(0.082)	(0.108)	(0.108)
Study training	0.028	0.066	0.147	0.138
	(0.107)	(0.102)	(0.121)	(0.126)
To get married	0.148	0.193	-0.065	-0.056
	(0.157)	(0.161)	(0.140)	(0.134)
To accompany family	-0.029	0.022	-0.060	-0.034
	(0.230)	(0.218)	(0.219)	(0.215)
To join family	-0.012	-0.011	-0.058	-0.083
	(0.112)	(0.112)	(0.116)	(0.110)
Declining yields in agriculture	0.488***	0.559***	0.317*	0.274*
	(0.138)	(0.135)	(0.164)	(0.160)
For medical treatment	0.212	0.230	0.251	0.246
	(0.324)	(0.343)	(0.318)	(0.325)
Others	0.092	0.157	0.085	0.133
	(0.151)	(0.159)	(0.188)	(0.193)
Time since migration (months)	0.002	0.003	0.001	0.001
	(0.002)	(0.002)	(0.002)	(0.002)

Sex of household head (1=Female)	-0.055	-0.077	-0.009	-0.016
	(0.094)	(0.093)	(0.089)	(0.093)
Dependency ratio in household	0.006	-0.002	-0.025	-0.029
	(0.028)	(0.028)	(0.032)	(0.032)
Migrant destination:				
Within district	-0.285**	-0.260	-0.231*	-0.253
	(0.129)	(0.195)	(0.120)	(0.186)
Another district within region	0.035	0.113	-0.044	-0.009
	(0.093)	(0.102)	(0.093)	(0.100)
Another region	-0.060	-0.222*	-0.110	-0.163
	(0.106)	(0.128)	(0.117)	(0.159)
Destination by region of origin:				
Within district				
Brong Ahafo		0.000		-0.117
				(0.363)
Northern		-0.240		-0.060
		(0.211)		(0.231)
Upper East		0.000		0.000
Upper West		0.000		0.000
Volta		0.058		0.298
		(0.343)		(0.270)
Another district within region				
Brong Ahafo		-0.289		-0.212
		(0.199)		(0.184)
Northern		-0.296		0.014
		(0.186)		(0.185)
Upper East		1.703***		1.630***
		(0.163)		(0.208)
Upper West		-0.254		-0.117
		(0.186)		(0.183)
Volta		-0.299*		-0.113
		(0.182)		(0.215)
Another region				
Brong Ahafo		0.000		0.000
Northern		0.000		0.000
Upper East		1.393***		1.397***
		(0.145)		(0.237)
Upper West		0.000		0.000
Volta		0.000		0.000

Observations	325	316	325	321
Chi-squared	61.9	2310	56.1	2452

* p<.10, ** p<.05, *** p<.01

Table A12: Gains and Losses by education of migrant

Q14. What is the highest level of education migrant has completed?	Losses		Gains		OK		Total	
	N	%	N	%	N	%	N	%
Primary	34	12.8	8	8.2	27	13.7	69	12.3
Middle	7	2.6	2	2.1	7	3.6	16	2.9
JSS/JHS	60	22.6	25	25.8	36	18.3	121	21.6
Commercial / Vocational	1	0.4	3	3.1	0	0	4	0.7
O'Level	0	0	0	0	1	0.5	1	0.2
SSS/SHS	40	15.1	26	26.8	31	15.7	97	17.4
Training College	8	3	0	0	5	2.5	13	2.3
Prof./Tech	3	1.1	4	4.1	7	3.6	14	2.5
Tertiary	19	7.2	3	3.1	5	2.5	27	4.8
Koranic	3	1.1	0	0	1	0.5	4	0.7
Others	13	4.9	6	6.2	10	5.1	29	5.2
None	77	29.1	20	20.6	65	33	162	29
Don't know	0	0	0	0	2	1	2	0.4
Total	265	100	97	100	197	100	559	100

Pearson chi2(24) = 42.8426 Pr = 0.010

Table A13: Gains and Losses by job arrangement of migrant

Q24. Did name already have a job fixed up prioir to moving?	Losses		Gains		OK		Total	
	N	%	N	%	N	%	N	%
Yes	59	26.3	8	10.5	34	19.8	101	21.4
No	165	73.7	68	89.5	138	80.2	371	78.6
Total	224	100	76	100	172	100	472	100

Pearson chi2(2) = 8.8643 Pr = 0.012

Table A14: Gains and Losses by employment of migrant prior to migration

Q32. What kind of paid work/job was name doing before he/she left	Losers		Winners		OK		Total	
	N	%	N	%	N	%	N	%
Farming	55	44	10	22.7	33	37.1	98	38
Fishing	3	2.4	4	9.1	0	0	7	2.7
Mining and quarrying	2	1.6	3	6.8	0	0	5	1.9
Masonry	7	5.6	1	2.3	1	1.1	9	3.5
Driving	4	3.2	2	4.5	5	5.6	11	4.3
Carpentry	2	1.6	0	0	0	0	2	0.8
Teaching	12	9.6	0	0	4	4.5	16	6.2
Manufacturing	1	0.8	0	0	0	0	1	0.4
Electrician	1	0.8	1	2.3	3	3.4	5	1.9
Plumbing	1	0.8	0	0	1	1.1	2	0.8
Trading	12	9.6	6	13.6	10	11.2	28	10.9
Self employed	7	5.6	2	4.5	6	6.7	15	5.8
Others	18	14.4	15	34.1	26	29.2	59	22.9
Total	125	100	44	100	89	100	258	100
Pearson chi2(24) = 43.7345 Pr = 0.008								

Table A15: Gains and Losses by migration finance of migrant								
Q28.1 How did name finance his/her most recent migration?	Losses		Gains		OK		Total	
	N	%	N	%	N	%	N	%
Savings	116	51.8	31	36.5	92	55.1	239	50.2
Formal loan	3	1.3	2	2.4	1	0.6	6	1.3
Loan from family	15	6.7	1	1.2	1	0.6	17	3.6
Borrowing from money lender	2	0.9	1	1.2	1	0.6	4	0.8
Advance from recruitment agent	1	0.4	1	1.2	0	0	2	0.4
Sale of assets	21	9.4	8	9.4	17	10.2	46	9.7
Gov't schemes	1	0.4	0	0	1	0.6	2	0.4
Remittances from other migrants in the HH	8	3.6	11	12.9	9	5.4	28	5.9
Others	57	25.4	30	35.3	45	26.9	132	27.7
Total	224	100	85	100	167	100	476	100

Pearson chi2(16) = 31.2897 Pr = 0.012

Table A16. What kind of contacts did you have prior to migrating to Accra?								
	Household experience of migration							
	Losses		Winners		Same		Total	Total
	N	%	N	%	N	%	N	%
Father	1	7.7	2	16.7	1	10	4	11.4
Mother	0	0	1	8.3	0	0	1	2.9
Siblings	2	15.4	4	33.3	3	30	9	25.7
Relatives	8	61.5	1	8.3	2	20	11	31.4
agent	1	7.7	0	0	0	0	1	2.9
Other	1	7.7	4	33.3	4	40	9	25.7
Total	13	100	12	100	10	100	35	100
Pearson chi2(10) = 13.8643 Pr = 0.179								

About the Migrating out of Poverty Research Programme Consortium

Migrating out of Poverty is a research programme consortium (RPC) funded by the UK's Department for International Development (DFID). It focuses on the relationship between migration and poverty – especially migration within countries and regions - and is located in five regions across Asia and Africa. The main goal of *Migrating out of Poverty* is to provide robust evidence on the drivers and impacts of migration in order to contribute to improving policies affecting the lives and well-being of impoverished migrants, their communities and countries, through a programme of innovative research, capacity building and policy engagement. The RPC will also conduct analysis in order to understand the migration policy process in developing regions and will supplement the world-renowned migration databases at the University of Sussex with data on internal migration.

The *Migrating out of Poverty* consortium is coordinated by the University of Sussex, and led by CEO Professor L. Alan Winters with Dr Priya Deshingkar as the Research Director. Core partners are: the Refugee and Migratory Movements Research Unit (RMMRU) in Bangladesh; the Centre for Migration Studies (CMS) at the University of Ghana; the Asia Research Institute (ARI) at the National University of Singapore; the African Centre for Migration & Society (ACMS) at the University of the Witwatersrand in South Africa; and the African Migration and Development Policy Centre (AMADPOC) in Kenya.

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