



**The impact of migration on the welfare
of households left behind
in rural Ghana:
A quasi-experimental impact evaluation**

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Abstract

Using panel data collected in 2015 and 2018, this paper employs econometric techniques to evaluate the impact of migration on the welfare of households left behind in rural Ghana. We find that poverty is an important driver of migration. Households with lower baseline food and nonfood consumption are more likely to have a member migrating over the three-year period of the study. Specifically, households with migrants had a lower level of consumption at baseline compared to non-migrant households. Using both propensity score matching (PSM) and difference-in-differences (DID) estimation approaches to explore migration's welfare impact, we find no significant differences between treated and control households once initial baseline differences in consumption are accounted for. Our results suggest that migration has helped to bridge the gap in welfare between disadvantaged (low consumption) and advantaged (higher consumption) households in rural Ghana.

Keywords: Internal migration; household welfare; rural inequality; subjective wellbeing; Ghana

JEL Classification: I30, J61, R23

Executive Summary

The welfare impact of migration, especially for developing countries, has been the focus of much debate in both policy and academic circles. In some developing countries such as Ghana, public discussions on migration have historically endorsed the view that the phenomenon is often unnecessary and detrimental to national development. The discussions have, however, usually been carried out without much quantitative evidence.

This study employs standard quantitative techniques to evaluate, for rural Ghana, the impact of migration on the welfare of migrants' rural households of origin. The study used panel data collected from two rounds (2015 and 2018) of the Migrating out of Poverty household survey. The methodology used in the study mainly consisted of the propensity score matching (PSM) and the difference-in-differences (DID) quantitative techniques. It should be noted, however, that descriptive statistics were also employed to gain insight into the drivers of migration. For the objective measure of welfare, we used household consumption expenditure per person, taking into account gender and age differences among household members. On the other hand, the subjective measure of welfare employed is households' subjective self-assessment of changes in their financial situation.

For both the propensity score matching (PSM) and the difference-in-differences (DID) approaches, no significant welfare differences were found between migrant-sending and non-migrant-sending households, once initial baseline differences in consumption are accounted for. These results show that while there could be potential benefits of migration, three years may be too short a period to observe migration's welfare impact. It is also a reflection of the time it takes for migrants to adjust at their destination to be able to substantially support their former households. We find similar results for the analysis of migration's impact on subjective welfare.

The study also finds some notable descriptive results. First, there is a high incidence of internal migration from households in rural Ghana. About 37% of the 2015 households that had not sent-out a migrant had become a migrant-sending household by 2018, whereas only 2% had sent out international migrants by 2018. We find that poverty seems to be an important driver of migration in rural Ghana. Households with lower baseline food and nonfood consumption seem to be more likely to have a member migrating over the three-year period of the study than households with higher baseline food and non-food consumption.

In examining transition (improvement or otherwise) in households' subjective financial situation, we find significant gains for migrant households that originally in 2015 had a deteriorated financial situation. On the contrary, the majority of the non-migrant households that had a deteriorated financial situation in 2015 did not perceive a significant improvement in their

financial situation in 2018. Thus, in terms of financial situation migrant-sending households that had 'deteriorated financial situations' seem to be the biggest gainers of migration. A similar analysis for consumer welfare, however, did not yield similar results. This is a caution that an analysis of consumption welfare can produce results that appear to contradict that of subjective welfare.

Based on the findings of this study, we conclude that internal migration may not have a short-term beneficial impact on the welfare of migrants' former household members. There is, however, the potential for migration to exert a long-term favourable impact on the welfare of rural households left behind.

It is also important for policymakers to put in place policies and structures to help rural households harness the benefits of migration. In this regard, the inputs of all stakeholders would be critical.

Introduction

Although migration is not a new phenomenon, its effects on the socio-economic development of migrant sending areas and welfare of household members left behind has been the focus of much debate in both policy and academic circles (Ratha, 2007; de Haas, 2010; Serbeh et al. 2016). While migration optimists assume that migration and associated remittances contribute to socio-economic development and improved welfare in migrant-sending areas (Andrews et al. 2008), migration pessimists argue that migration rather contributes to underdevelopment and poverty in sending areas (de Haan and Yaqub, 2009).

In developing countries, in particular, the discourse on migration and remittances has gained heightened interest, in view of the numerous studies that aimed at identifying their effects on various welfare outcomes (Quartey, 2006; Fajnzylber and Lopez 2007, Anyanwu and Erhijakpor 2010, Mendola, 2012). While there is a general perception that remittances have beneficial welfare effects (Ratha, 2007 Mohapatra et al. 2009), some researchers have pointed out that out-migration can sometimes negatively affect welfare in some migrant sending communities (Cuong et al. 2009). In some developing countries such as Ghana, public discussions on migration have historically endorsed the view that migration is often unnecessary and detrimental to national development. Consequently, many policy initiatives tend to discourage people from moving from rural areas to urban areas in particular (Awumbila et al, 2014). Yet there is lack of data on the actual welfare impacts of migration from rural Ghana, in particular.

The aim of this paper is to examine the the impact of migration on the welfare of the migrants' former households, that is, the households left behind. Thus, while migration's welfare impact can be viewed from three main perspectives, namely, the impact on the migrant, the impact on the place of origin, and the impact on the place of destination, our focus in this paper is the welfare impact on the place of origin. We seek to answer the following questions: (a) What is the impact of migration on the welfare (proxied by consumption expenditure) of migrants' former households? (b) What is the impact of migration on the wellbeing (proxied by households' subjective assessments of financial position) of migrants' former households? and (c) Does migration's welfare impact on left-behind households differ across different types of households?

This type of investigation is important for a couple of reasons. First, from a developing country perspective, it is believed that apart from the anticipated personal gain from migrating, many migrants are motivated to migrate because of the expected welfare benefit for their left-behind

households (Stark 1991). The second point – related to the first – is the significance of such a focus for the New Economics of Labour Migration (NELM) hypothesis that migration is usually a collective decision by the prospective migrant's household (or family) (Stark 1991; de Haas, 2010).

In the next section, we highlight some of the main issues discussed in the literature on migration's welfare impact, noting conceptual and methodological challenges. The third section provides a description of the methodology and the data employed. In the fourth section, we present and discuss the estimated results relating to migration's welfare impact on households left behind. Section five concludes the paper with a summary and policy recommendations.

Insights from relevant literature

This section provides an overview of both the theoretical perspectives and empirical literature on welfare impacts of migration and remittances.

The effects of Migration on Welfare and Poverty Reduction

The effects of labour migration on welfare and by implication poverty reduction in migrant sending communities has been a source of debate in the migration literature. In the 1960s and 1970s, two opposing schools of thought, namely migration optimists and pessimists, dominated this debate (de Haas 2010). Drawing insights from neo-classical migration economic and developmentalist modernisation theories, migration optimists argue that migration contributes positively to poverty reduction and improved welfare. The neo-classical migration scholars argue that individuals usually take the decision to migrate if the expected gains outweigh the risks associated with migration (Andrews *et al.* 2008). The neo-classical theorists further argued that labour migration from a region with low wages and surplus labour supply to a region with high wages and high demand for labour is a form of optimal allocation of productive factors in both the migrant's places of origin and destination (de Haas 2010). The reallocation of labour from poor labour surplus regions to more developed regions is seen as a major component of the development process. Neo-classical migration scholars argue further that labour mobility ceases at the later stages of development when wages at the sending and receiving areas converge. Given that the neo-classical optimists focus on individual migration decision-making rather than household migration decision processes, they did not emphasise the role of remittances in contributing to socio-economic development and poverty reduction in migrant sending areas. The migration optimists, on the other hand, emphasise the role of migrant remittances in the

economic development and poverty reduction process at migrants' places of origin (see Serbeh et al. 2016).

The migration optimists' assumption that population mobility contributes to socio-economic development and welfare in migrant-sending areas was contested by the migration pessimists who have drawn on structuralist social and dependency theories to argue that migration rather contributes to underdevelopment and poverty in sending areas through brain drain (Baldwin 1970; de Haan and Yaqub 2009). Thus, while the optimists see migration as good for development, the pessimists suggest that poor regions (especially in the third world) should restrict the movement of labour to core countries. The pessimists argue further that in most cases, a significant proportion of remittances to migrant-sending regions is spent on daily consumption and not invested to generate more income. The pessimists assert that with time, the remittance recipients become overly dependent on migrants and may not even be willing to work.

Since the 1980s, these extreme opposing perspectives were replaced by pluralist perspectives which considered agency and structure as important factors in the migration-development debate (de Haas 2010; Serbeh et al. 2016). For instance, having criticized the neoclassical theory for assuming that migration decisions are only taken by individuals, the New Economics of Labour Migration (NELM) theory argued that migration decisions are often taken by households to diversify livelihoods and insure the household against future risks. Consequently, one of the main goals of migrants is the transfer of remittances to household members left behind (Stark 1991). Supporting the role of remittances in promoting development and welfare at migrants' origins, Ratha (2007) asserted that remittances are the most tangible link between migration and development. He argued that remittances have both direct and indirect effects on the welfare of the population in the migrant sending countries.

Some other researchers have reported positive correlation between remittances on one hand and poverty reduction in Latin America, Africa, South Asia (Fajnzylber and Lopez 2007, Gupta et al. 2007, Anyanwu and Erhijakpor 2010). In an earlier study in Ghana, for instance, Quartey (2006) reported that international remittances helped households to minimize the effects of economic shocks on household welfare. Similarly, Mohapatra et al. (2009) reported that, in Ethiopia, remittances-receiving households used the cash received to cope with drought and thereby avoided selling of livestock (Mohapatra et al. 2009). Despite these positive reports on migration and welfare nexus, some studies have shown that migration and remittances does not reduce poverty in some countries (Cuong et al. 2009). It has been shown that in some cases, recipients may become dependent on remittances, and fall into poverty when the migrant stops sending money (Ratha, 2010).

The empirical literature on impact of migration on welfare

A key issue that requires attention in any assessment of migration's welfare impact is the choice of the welfare measure. Given that welfare (or wellbeing) may be defined as living standard or quality of life, the sheer broadness of the notion poses a challenge to any attempt to measure it. This has resulted in the adoption of various proxies for welfare, notable ones being income, consumption expenditure, and multidimensional measures (see Deaton 2016), with the occasional use of subjective wellbeing measures (see Gori-Maia 2013). While none of these proxies for welfare is perfect, the use of consumption expenditure has gained considerable appeal for some years now. This has further been boosted by the increased availability of various rounds of Living Standards Measurement Survey (LSMS) type of data for a number of developing countries (). Thus, the choice of consumption expenditure as a proxy for welfare is often considered to be a reasonable one.

Regarding the empirical assessment of the welfare impact of migration, studies have typically drawn on the broader literature on impact evaluation (see for example Ravallion, 2007) These studies usually adopt a counterfactual framework by trying to compare the current welfare level with the counterfactual level of welfare, that is, what the current welfare level would have been in the absence of migration. In dealing with non-experimental data, like the kind available for estimating migration's welfare impact, the counterfactual scenario cannot be observed. This has compelled scholars to employ various econometric and/or quantitative approaches to establish the counterfactual levels of welfare to facilitate the impact evaluation. The various quantitative techniques for carrying out an impact evaluation include the instrumental variable approach, pipeline comparison, propensity score matching (PSM), regression discontinuity, and difference-in-differences (DID) methods.

One of the basic approaches to the assessment of migration's welfare impact is the use of a welfare regression that includes a dummy variable for migration status (see, for example, Yap 1976). Here, the coefficient of the dummy variable would, all things being equal, be expected to capture migration's effect on the welfare outcome of interest. While this method is intuitive, it is weakened by the concern that non-migrants (or non-migrant households) are not necessarily an appropriate control group for establishing counterfactual welfare levels, since the sample of migrant households is likely to be non-random. Estimating the impact of migration on household welfare is challenging. The opportunities to adopt an experimental technique are limited, as there are few experiments that can be credibly applied in the field of migration. Notable exceptions include the visa lottery analysis by Gibson et al, (2011) and the experiment by Bryan et al (2011) which focuses on incentives to migrate. As a result, others have attempted to circumvent this drawback by estimating separate welfare equations for migrants (or migrant households) and non-migrants, with an appropriate adjustment for selectivity bias. These separate selectivity-adjusted regressions then become the basis for the estimation of

counterfactual welfare scenarios for evaluating migration's welfare impact (see, for example, Nakosteen and Zimmer 1980; and Tunali 2000). Using this approach and data from the 1999/2000 Ghana Living Standards Survey (GLSS), Boakye-Yiadom (2008) estimated that migration had a favourable impact on the well-being of rural-to-urban migrants, but had a converse welfare impact on urban-to-rural migrants. These findings are similar to those of Ackah and Medvedev (2012) who also employed a similar technique, but with 2005/2006 GLSS data.

As one would expect, the various quantitative techniques for assessing the welfare impact of migration have their strengths and drawbacks. Nevertheless, some have gained considerable appeal. In this regard, the propensity score matching (PSM) technique and the difference-in-difference (DID) method are notable (see Brauw et al, 2018; Cox-Edwards and Rodríguez-Oreggia, 2009; Namayengo et al., 2016; Winters et al., 2011; Feder et al., 2011; Li and Hu, 2011; Bernard, 2010, Gibson and Mckenzie, 2014, Yang, 2008), for empirical application). The PSM method, which was developed by Rosenbaum and Rubin (1983) tries to use the observed characteristics of both treated and control samples (migrant and non-migrant households in our case) to match units from both samples that have very similar probabilities of receiving a treatment or intervention (migration, in our context). This matching then becomes the basis for a comparison of welfare outcomes between the treated (e.g. migrant households) and control (e.g. non-migrant households). The DID method, on the other hand, is a technique that uses observations for treated and control units before and after the intervention. The difference-in-difference method, therefore, requires panel (or similar) data for its successful application. Thus, while the DID technique has the advantage of employing a richer set of data for the impact assessment, the stringent feature of the data requirements is also a disadvantage.

Data and methodology

To examine the effect of changes in migration status on household welfare, we use two rounds of the Migrating out of Poverty household survey data from rural Ghana. A sample of around 1400 households were interviewed about their migration experience and data was also collected on a range of welfare outcomes in 2015. The sample of households were selected in a two-stage process. Enumeration areas in rural areas of five regions were randomly selected, and households were pre-screened as to their migration status in order to generate reasonable samples of households with and without migrants. Households were re-interviewed in 2018 with replacement of households which dropped out of the sample. This paper is largely based on only the households that were surveyed in both 2015 and 2018.

This dataset uniquely allow us to observe households that did not have migrants over a three-year period. Over the three-year period, between 2015 and 2018 we can observe and examine changes in household migration status, changes in remittances, and changes in the household's objective and subjective welfare. In the 2015 wave of the data set, a total of 409 households had

no migrants (whether current migrants, returned migrants, internal or international migrants). Table 1 presents a migration transition matrix for the households without a migrant household member interviewed in 2015. So, we treat 2015 as the pretreatment period, while the data collected on the same households in 2018 is treated as post-treatment data. Of these 409 households that had no migrant in 2015, a total of 152 households or about 37 percent had internal migrants by 2018. Two hundred and eighteen (218 or 53 percent) of the households in 2015 without a migrant member still had no migrant member in 2018. Eight representing 2 percent had international migrants. In addition, over the three-year period, some households have had returned migrants. Specifically, 28 households had internal returned migrants whereas 3 households had international returned migrants.

Since the number of households with international migrants between the two waves of the data is small (8), we focus on the impact of internal migration on household welfare. Thus, the treatment households (migrant households) are household that did not have a migrant household member in 2015 but reported having a migrant in 2018 (152 households) and control households (non-migrant households) are the households still without a migrant member in 2018. Thus, the targeted sample for the analysis is 370 households. The nature of the data sets the tone for two clear empirical strategies: propensity score matching (PSM) estimators on the 2018 data and DID using the panel. Under the PSM, we estimate the probability of having a household member being a migrant in 2018. The rationale of the PSM is to match households in the treatment group (migrant households) with those in the control comparison group (non-migrant households) based on propensity scores. Based on the estimated propensity scores (pscores), households with similar scores but different treatment statuses are matched to estimate the impact of the treatment (change in household migration status) on welfare outcomes. The matching is done to ensure that the treatment and comparison groups are balanced on observable characteristics and such as such any remaining differences served can be attributed to the treatment (Khandker, Koolwal, and Samad, 2010; Namayengo et al, 2018). To reduce the level of biasedness resulting from choosing observable covariates for which the matching is carried out to generate the propensity scores, many variables were tried (King and Nielson, 2016). Thus, under the PSM approach, we estimate the probability of having a household member being a migrant in 2018 based on observable household characteristics. The average treated effect on the treated (\mathbb{T}_{ATT}) is defined as:

$$\mathbb{T}_{ATT} = E(\mathbb{T}|D = 1) = E[Y(1)|D = 1] - E[Y(0)|D = 1], \quad (1)$$

where $D = 1$ if the household had a migrant member in 2018 and $D = 0$ when the household had no migrant member in 2018. $Y(D)$ is the welfare outcome of each household. The \mathbb{T}_{ATT} can be expressed as (see Rosenbaum and Rubin, 1983):

$$\mathbb{T}_{ATT} = E_{P(X)|D=1}[E(Y(1)|D = 1), P(X)] - E[Y(0)|D = 0], P(X)], \quad (2)$$

where $P(X)$ is the propensity score, which captures the probability of a household recording a migrant in 2018 given observed characteristic X .

The results on the impact of migration on welfare from the PSM may be biased because there may be factors that may drive the likelihood of a member migrating that is not properly captured in the estimation of the pscore i.e., omitted variable bias. Any such omission could impact the reliability of our empirical estimates. A DID estimation approach is able to control for any unobserved characteristic that remains unchanged from 2015. Another advantage of the DID approach is that any permanent differences in outcomes between the treatment and the comparison group in 2015 can be netted out to find the true impact of the treatment. According to Khanddker et al. (2010), the method recognizes that unobserved heterogeneity may be present, but assume that such factors are time-invariant and are therefore controlled for in DID estimation. Thus, our DID estimator measures the impact of having a migrant in 2018 by comparing treatment households with comparison households on changes in outcomes of interest over time relative to the outcomes observed at baseline in 2015. The DID estimation approach, therefore, allows us to take full advantage of the panel nature of our data.

The DID estimator is specified in Equation 3.

$$hh\ Welfare_i = \alpha + \beta Treatment + \gamma Time + \delta Treatment * Time + \varphi_i \quad (3)$$

The variable $Treatment$ is a dummy, which takes on a value one ($Treatment = 1$) for a household that had no migrant in 2015 but had a migrant household member in 2018, and takes on the value of zero ($Treatment = 0$) for households that did not have any migrant household member in 2015 and also reported not having any migrant household member in 2018. The variable $Time$ is also a dummy that takes on a value of one ($Time = 1$) for 2018 and zero ($Time = 0$) for 2015. This time variable captures the effect of time on the outcome variable if there was no treatment. The DID estimator which captures the effect of treatment on the outcome is given by the coefficient on the interaction between treatment and time (δ).

Table 1: Household migration transition matrix

2015 HH migration status	2018 HH migration status						
		Internal current	International current	Internal returned	International returned	Non-migrant	Total
Non-migrant		152	8	28	3	218	409

Measurement of Poverty

Poverty is a complex phenomenon that is difficult to define and measure in empirical research. Neoclassical economic models measured poverty by employment and income status (Harris and Todaro, 1970), but new economics of labour models, which focus on households rather than individuals, have provided a broader conceptualization of poverty which considers other indicators such as education, healthcare, and asset accumulation (Massey 1999; Awumbila, 2016). The World Bank (2000:15) provides a broader definition of poverty as a “pronounced deprivation in well-being”. This definition considers achievement in education and healthcare and not only income. Following this nuanced conceptualization and the definition often used by Ghana Statistical Service (GSS 2007:1), we define poverty as a lack of capabilities to function which may include a lack of income, malnutrition, a lack of access to education, poor health, insecurity and poor shelter among others.

Different approaches to the measurement of poverty have been used by different researchers. One of these is absolute poverty, which is usually measured in terms of income and is defined by reference to a particular quantitative measure that distinguishes the poor from the non-poor (Frye 2005). Absolute poverty reflects the lack of adequate resources to meet a specified minimum quantum of basic needs which is established based on the cost of purchasing a minimum basket of goods and services required for human survival (Todaro and Smith 2011:212). The World Bank’s definition of poverty with reference to this amount is a minimum threshold of US\$1.25 a day.

While the above expenditure measurement is useful for comparing poverty levels in different geographical regions (World Bank, 2000:16), it ignores other dimensions of well-being such as literacy, good health, and security (Cohen, 2009:24). In this study therefore, we collected data on consumption expenditure levels but also measured poverty based on respondents’ subjective assessment of the overall welfare of their households. In this paper we, used a national “poverty line of GH¢1,314.0 per adult equivalent per year and an extreme poverty line of GH¢792.2 per adult equivalent per year” and this was consistent with the poverty line reported by the Ghana Statistical Service (based on the GLSS7 poverty report).

Results

Descriptive statistics and balance

Table 1 summarizes and compares basic 2018 demographic information of the two groups (treatment and control), distinguishing between households who had migrant members in 2018 and households without migrant members in 2018. As indicated earlier, both the control and treated groups did not have migrant household members. Thus, the change in the migration status of the households over the three-year period does allow us to examine the impact of

having a migrant (internal migrant) on household outcomes. Overall, we were successful at tracking 370 households who did not have any migrant in 2015. Out of that number, 152 (41%) reported having an internal migrant in 2018 whereas 218 households reported still not having an internal migrant in 2018 (or any migrant).

On average, treated households (household have a migrant in 2018) are more likely to have a high percentage of household members who are married (39.4 percent), compared with controlled households (households without a migrant in 2018) (29.78 percent). This difference is statistically significant. On average, household members are less than 30 years old, with both treated and control households having an average age of 29 years. So, there are no significant differences in this variable between treatment and control households. Also, in terms of gender differences within the households, we find that about 56 percent of the members of treated households are males, whereas approximately 50 percent of controlled households are male. Thus, there seem to be slightly more males in controlled households than in the treated households (p -value=0.008).

We also compare differences in education between treated and control households. There seem not to be significant differences in the educational level of the household head between treated and control households. Precisely, 9 percent of household heads in both treated and control households have primary education as the highest attained level of education. In terms of high school education, 21 percent and 20 percent of household heads in treated and control households, respectively, have a high school education. The proportion of household heads with secondary school and tertiary education are balanced between treated and control households. Education of the household head is tightly linked to the gender of the household head. Education of the household head is tightly linked to the gender of the household head. We find that about 37 percent of treated households are headed by females whereas 24 percent of controlled households are headed by females. This is not too surprising considering the fact that, in absolute terms the majority of migrants are males, leaving behind their wives.

We are also interested, as an outcome variable, in differences in welfare between control and treated households. We find that per capita nominal consumption in treated households of 1480GHS at baseline is slightly lower compared with consumption expenditure of 1810GHS in control households (p -value=0.009). Thus, households that recorded migrant members over the three years are more likely to be households with lower baseline consumption levels. It must be noted that the dependency ratio is slightly higher in control households than in treated households. Other variables such as household head employment and asset ownership are well-balanced between control and treated households.

Table 1: Descriptive on covariates used for computing the propensity scores for treatment and control.

Variable	Treatment			Control			P-value of difference
	Obs	Mean	Std. Dev.	Obs	Mean	Std. Dev.	
Percentage of household members who are married	152	39.35	26.42	218	29.78	26.21	0.001
average age of household members	152	28.90	8.71	218	29.27	12.80	0.757
Square of the average age of household members	152	910.41	584.80	218	1019.56	1049.25	0.246
Percentage of household members who are males	152	46.09	21.42	218	49.75	24.39	0.137
Education of the HH head: primary (base is none)	152	0.09	0.29	218	0.09	0.28	0.870
Education of the HH head: JHS/middle school	152	0.21	0.41	218	0.20	0.40	0.755
Education of the HH head: SHS	152	0.08	0.27	218	0.08	0.27	0.973
Education of the HH head: Tertiary	152	0.11	0.32	218	0.08	0.27	0.269
Per capita nominal consumption/100	151	14.80	9.11	214	18.10	13.54	0.009
Household size	151	6.90	3.37	214	6.03	3.30	0.015
Age of HH head	151	54.03	16.26	214	49.10	14.98	0.003
Female head	151	0.37	0.48	215	0.24	0.43	0.008
HH head is married	152	0.64	0.48	218	0.78	0.42	0.004
HH dependency ratio	152	0.33	0.23	218	0.38	0.24	0.046
Hh head has paid employment	152	0.13	0.34	218	0.13	0.34	0.968
Hh owns land	152	0.51	0.50	218	0.55	0.50	0.407
Hh has a toilet facility	152	0.43	0.50	218	0.28	0.45	0.001

Hh has a car	152	0.10	0.30	218	0.07	0.25	0.302
Hh has a fridge	152	0.22	0.41	218	0.24	0.43	0.631
Region: North (base is BA)	152	0.20	0.40	218	0.25	0.44	0.280
Upper East	152	0.17	0.38	218	0.18	0.38	0.846
Upper West	152	0.21	0.41	218	0.12	0.33	0.025
Volta	152	0.33	0.47	218	0.26	0.44	0.132

Table 2 presents the poverty incidence based on the consumption expenditure on food and non-food items at the household level. The questions on food expenditure were on a weekly basis whereas that on non-food was on a monthly basis. To obtain the yearly food expenditure for a typical household, the weekly expenditure of all food items per week were summed and then annualized by multiplying by 52. With regards to the nonfood expenditure, the yearly expenditure was obtained by summing the monthly expenditure of several items on a monthly basis and annualized by multiplying by 12. The total yearly household consumption expenditure is obtained by summing the food and nonfood expenditures. In order to obtain real values of our consumption expenditures, the values for each household were deflated with the 2012 consumer price index (CPI₂₀₁₂). The “poverty line of GH¢1,314.0 per adult equivalent per year and an extreme poverty line of GH¢792.2 per adult equivalent per year” were used, so as to be consistent with the poverty line reported by the Ghana Statistical Service (based on the GLSS7 poverty report). All poverty incidences in our data across the five regions sampled in our study are compared with GLSS6 and 7 poverty estimates for the same selected regions.

There is a clear indication from our sample (and that of the GLSS for these selected regions) that welfare appears to have deteriorated. In our case, welfare has deteriorated between the two waves both for treatment and control households. The poverty incidence for 2015 shows that 28% of households that did not have a migrant household member was considered poor whereas, in 2018, the incidence of poverty among non-migrant households increased to 51.8%. For migrant households, whereas 33.3% were considered poor in 2015, that share increased to 71.7%. Note that among all households that did not have a migrant household member in 2015, 41% had internal migrants in 2018. Our finding shows that poverty is a critical driver in rural migration and sadly short-term migration does not address initial household poverty. Thus, at most three years of having a migrant member of the household has not been enough to improve household welfare. Based on our estimates in Tables 1 and 2, poverty is still relatively high among rural migrant households in our sample compared to the GLSS all rural estimates.

Table 2: Comparing poverty incidence for treatment and control in 2015 and 2018 to GLSS rates.

Region	2015		2018		2012/13 (GLSS 6)	2016/17 (GLSS 7)
	Non-Migrant	Had a Migrant	Non-Migrant	Had a Migrant	Rural	Rural
Brong Ahafo	16.2	16.7	43.2	66.7	36.3	38.9
Northern	21.8	32.3	48.2	90.3	61.1	74.3
Upper East	38.5	26.9	64.1	96.3	50.1	64.8
Upper West	59.3	59.4	74.1	68.8	80.3	80.5
Volta	19.6	26.0	42.4	50.0	39.0	46.6
Total	28.0	33.8	51.8	71.7		

Based on our 2018 poverty line of GH¢1,314.0 per adult equivalent per year, we estimated poverty incidence across the various regions. For rural households with a migrant in 2018, we found the poverty incidence in the Northern and Upper East regions to be over 90% in each case. Notably, even though from the GLSS7 data, the incidence of poverty among rural households in the Upper West region was 80.5%, our data show that migrant households are a little better. In general, a three-year migrant household status seems not to improve welfare. It is possible that families left behind may have to remit in-kind to support their migrant members at the onset of migration, thereby putting pressure on resources at the origin. This can be teased out properly in a qualitative study. We note also that while the GLSS7 Report on poverty trends states that Ghana recorded a marginal drop in poverty incidence between 2012/2013 and 2016/2017, it asserts that five out of ten regions (Volta Region, Brong Ahafo Region, Northern Region, Upper East Region, and Upper West Region) have extreme poverty incidences higher than the national average (GSS, 2018). The Report further adds that extreme poverty incidence worsened between 2012/13 and 2016/17 in these regions. Incidentally, these five regions are the very regions this study focuses on. Moreover, given that the households sampled in our study are predominantly rural, and that Ghana's poverty is largely a rural phenomenon, these observations place our findings in context.

We now present data on poverty transition among households between the 2015 survey and that of the 2018 survey. Overall we see that households in our treatment group (with no migrants in 2015 but with migrants in 2018) were more likely to remain poor or to fall into poverty than households in our control group. A poverty transition matrix (Table 3) is presented for treatment and control households separately. The data show that for the non-migrant households in 2015 who had a migrant in 2018 (migrant households), 33.8 percent were poor in 2015 whereas 66.2 percent were non-poor that year. The Table also shows that 7.3 percent of migrant households had a switch of poverty status from poor to non-poor between the two survey years, whereas 45.7 percent experienced a transition from non-poor to poor between 2015 and 2018. On the other hand, 26.5 percent of migrant households remained poor over the two periods, while 20.5

migrant households were non-poor in both periods. Regarding the control (non-migrant) households, 22.4 percent remained poor in both 2015 and 2018, while 42.1 percent remained non-poor in both periods. On the contrary, 5.6 percent of non-migrant households had experienced a transition in status from poor to non-poor, while 29.9 percent of non-migrant households registered a switch from being non-poor to being poor between 2015 and 2018.

Table 3: Poverty transition table for treatment and control

		2018		
Poverty status		Non-Poor	Poor	Total
2015	Treatment: had a Migrant			
	Non-Poor	20.53	45.7	66.23
	Poor	7.28	26.49	33.77
	Total	27.81	72.19	100
	Control: Non-Migrant			
	Non-Poor	42.06	29.91	71.96
	Poor	5.61	22.43	28.04
	Total	47.66	52.34	100

As presented earlier, household consumption expenditures for food and nonfood are used to measure welfare in this study. Another important measure of welfare which we use in this study is the subjective change in the financial situation in the household as described by the head of the household. Respondents were asked to rate their financial situation with regards to basic needs at the time of the interview as compared to 2 years earlier. The response options for this variable were ‘improved a lot’, ‘somewhat improved’, ‘remained the same’, ‘somewhat deteriorated’ and ‘deteriorated a lot’.

Our objective is to investigate the effect of a change in household migration status on subjective wellbeing. Table 4 presents data on treatment and control households’ responses to the question of changes in subjective wellbeing. The data shows that whereas 3.3 percent of treated households think the financial situation with regards to basic needs has improved, only 1.4 percent of control household hold a similar opinion. In terms of ‘somewhat improved’ option, we find that 42.8 percent of treated households feel that their financial situation with regards to basic needs have somewhat improved while approximately 40 percent of control group household hold this opinion. Thus, it appears that a higher percentage of the treatment group had experienced some improvement (46.1%) as compared to the control group (41.3%) on average. But the Pearson chi-square statistic is not significant, meaning there is not enough

evidence to assert that the treatment group experienced any differences in the subjective financial situation than the control group¹.

Table 4: Subjective financial situation in 2018 for treatment and control (percent).

Subjective financial situation in 2018	Treatment	Control
Improved a lot	3.3	1.4
Somewhat improved	42.8	39.9
Remained the same	32.9	33.5
Somewhat deteriorated	13.8	17.9
Deteriorated a lot	7.2	7.3
Total- Pearson chi2(4) = 2.6214 Pr = 0.623	100	100

Table 5 presents data on households transition matrix on improvements or otherwise of subjective financial situation between 2015 and 2018 for both treatment (migrant) and control (non-migrant) households. Precisely, we explore, for example, households whom in 2015 indicated that their financial situation had improved a lot compared to three years prior, how their subjective financial situation has changed in 2018. We start by reporting the transition in financial situation among treated (migrant) households. Using the data presented in Table 5, we find that out of the 2 percent of households that indicated that their financial situation had improved a lot in 2015, 0.7 percent suggest ‘somewhat’ deterioration of their financial situation in 2018 whereas 1.3 percent have had ‘somewhat’ improvement. None of these households reported household welfare improving a lot over the 2015 level. So, we see some deterioration of household welfare among households that originally reported significant improvement in welfare in 2015. Other significant differences in subjective welfare transition are observed 25.6 percent of households that reported ‘somewhat improved’ financial situation in 2015. Among this group, notably, 2.7 percent and 1.3 percent reported experiencing significant deterioration in financial situation – ‘Somewhat deteriorated’ and ‘Deteriorated a lot’, respectively – in 2018. Approximately, 8.6 percent of households that reported ‘somewhat’ improvement in financial situation in 2015, thought that their situation has remained the same whereas 11.9 percent reported that their financial situation has ‘somewhat improved’. Notably, 2 percent of migrant household who thought their financial situation had improved reported that their financial situation had ‘improved a lot’.

Interestingly, out of 34.4 percent of households that reported in 2015 that their financial situation had remained the same, 15.9 percent reported ‘somewhat’ improvement in financial situation in 2018 while 5.3 percent reported a deterioration of financial situation. For about 13.3 percent of households in this category, their financial situation has not changed since 2015. For households that thought that their financial situation in 2015 had ‘somewhat deteriorated’ (23.8%), 8.6 percent think that their situation in 2018 had deteriorated beyond that of 2015.

¹ A table in the appendix presents the transition matrix of subjective financial situation for the treatment and control groups.

However, the situation is not all that gloomy for this group. About 9.3 percent of households that reported ‘somewhat deterioration’ in financial situation in 2015, in 2018, reported improvement financial situation. Lastly, for the 13.3 percent of migrant households that reported in 2015 that financial situation has worsened prior to the change in migration status, 6 percent reported improvement in financial situation in 2018.

We now turn our attention to transition in the subjective financial situation among non-migrant controlled households. For all non-migrant controlled households that reported that their financial situation has improved a lot in 2015, none reported a similar improvement in financial situation. Hundred percent (100%) of non-migrant households that reported that their financial situation has improved a lot in 2015 reported somewhat improvement in financial situation in 2018. Notable transition among the non-migrant households is recorded for the 12.1 percent of households that in 2015 reported that their financial situation had worsened. For this group, 5.6 percent reported worsened financial situation beyond their 2015 deteriorated level. This compares with 2.7 percent of treated migrant households in the same category. Overall, examining transition in household subjective welfare, we find significant gains for migrant treated households that originally in 2015 had deteriorated financial situation at baseline. Majority of the non-migrant controlled household that had deteriorated financial situation in 2015 did not see significant improvement in financial situation. We acknowledge that these are made on the basis of our descriptive statistics. In the empirics that follow, we test whether these observed differences in subjective welfare between treated migrant households and control non-migrant households are statistically significant.

Table 5: Household transition matrix on subjective financial situation for treatment and control

		2018					
2015		Improved a lot	Somewhat improved	Remained the same	Somewhat deteriorated	Deteriorated a lot	Total
	Treatment						
	Improved a lot	0.0	1.3	0.0	0.7	0.0	2.0
	Somewhat improved	2.0	11.9	8.6	2.7	1.3	26.5
	Remained the same	0.0	15.9	13.3	4.0	1.3	34.4
	Somewhat Deteriorated	0.7	8.6	6.0	4.6	4.0	23.8
	Deteriorated a lot	0.7	5.3	4.6	2.0	0.7	13.3
	Total	3.3	43.1	32.5	13.9	7.3	100.0

	Control					
Improved a lot	0.0	1.9	0.0	0.0	0.0	1.9
Somewhat improved	0.5	18.6	7.0	3.3	0.9	30.2
Remained the same	0.9	13.0	9.8	6.1	1.4	31.2
Somewhat deteriorated	0.0	5.1	11.2	6.1	2.3	24.7
Deteriorated a lot	0.0	1.4	5.1	2.8	2.8	12.1
Total	1.4	40.0	33.0	18.1	7.4	100.0

Matching Estimation

First, we ask whether having a migrant household member for at most three-years improves household welfare in rural areas. This analysis is carried out on all household without any migrant household member in 2015. In 2018, some of these households reported having a migrant household member. Using the 2018 data, and applying the PSM estimation approach, we estimate the impact of having a migrant household member on household welfare. Two broad welfare indicators are examined in this study: consumption expenditure (both food and nonfood) and subjective wellbeing. Table 6 presents the marginal effects of the variable used to generate the propensity scores (p-scores) as explained under the methodology. The list of observable variables in Table 6 gives the best fit as per the trials. The coefficients are the marginal effects of the variables in predicting the probability of a household having a migrant in 2018.

From Table 6, we find that the key drivers of household migration status in 2018 includes, proportion of household members who are males, education of the household head, marital status of the household head, age of household head, household assets ownership (land ownership, toilet in the house, and having a car), and regional differences. Specifically, Table 6 suggests that households with more male members are less likely to have a migrant household member in the three-year period of this study. This result is economically meaningful in the sense that households with more male members are 2 percent less likely to have a migrant household member, and consistent with descriptive findings which shows that males are more likely to be the first to migrate than females. The positive coefficient estimate on the tertiary education of household heads suggests that household heads with tertiary education are about 20 percent more likely to have a migrant household member with the three-year period than households with headed by primary education school leavers. This result buttresses the importance of education as an important driver of household migration decisions. With regards to other key drivers, we find that households with married household heads are about 17% less likely to have

a migrant household member with the three-year period of the study, whereas the age of household heads is positively related to the migration of household members. Thus, for the latter, households with older heads are more likely to have one of their members migrating to support the families left behind.

Table 6: Marginal effects of the probit results for computing the propensity scores.

VARIABLES	Marginal effect
proportion of household members who are married	0.0012 (0.0010)
average age of household members	0.0209 (0.0141)
Square of the average age of household members	-0.0004** (0.0002)
proportion of household members who are males	-0.0021* (0.0011)
Education of the HH head: primary (base is none)	0.0810 (0.0799)
JHS/middle school	0.0669 (0.0696)
SHS	0.0439 (0.1005)
Tertiary	0.2044** (0.1002)
Per capita nominal consumption /100	-0.0039 (0.0028)
Hhsize	0.0105 (0.0097)
Age of HH head	0.0058*** (0.0022)
Female head	0.0054 (0.0620)
HH head is married	-0.1692*** (0.0632)
HH dependency ratio	-0.1545 (0.1481)
Hh head has paid employment	-0.0815 (0.0780)
Hh owns land	-0.0803* (0.0472)
Hh has a toilet	0.2054*** (0.0546)
Hh has a car	0.1432* (0.0862)
Hh has a fridge	-0.0953 (0.0638)
Region: North (base is BA)	0.2097** (0.0881)
Upper East	0.2769***

	(0.0866)
Upper West	0.2926***
	(0.0871)
Volta	0.2975***
	(0.0760)
Pseudo R2	0.1785
Observations	365
Standard errors in parentheses:*** p<0.01, ** p<0.05, * p<0.1	

The role of assets in migration decisions of households have been discussed at length in the literature (Awumbila et al., 2014; Teye et al., 2019). Interestingly, we find that different assets have different impacts on migration decisions within rural households. Firstly, we find that since many rural dwellers are involved in agriculture, land ownership is an important consideration for migration decisions within a rural household. Rural households with land are about 8% less likely to have a member migrate compared to households that do not own land. Secondly, having a toilet in the household positively impacts migration decision. We do not have clear reasons why this should be the case. In some rural communities with few toilet facilities, households with toilets tend to charge a small fee when others want to use their toilets. So, having a toilet could increase liquidity in the household or could just be picking up the general effect of household wealth on migration. Thirdly, household ownership of a car positively impacts the decision of household members to migrate. Households that own cars are about 14% more likely to have had a member migrate within the past three years.

The matching method used in this study is Nearest-neighbor matching. The treatment households were matched to three control households with the closest propensity score value and with replacement. The condition of common support was specified, and 14 treatment households were discarded by the estimation for lack of common support.² Four welfare variables at the household level are used as outcome measures. These are per capita food consumption in 2018, per capita non-food consumption in 2018, per capita food and non-food consumption in 2018, adult equivalent food and non-food in 2018 and a dummy for current financial situation improving a lot/somewhat improved or otherwise. Before discussing the main results, it is worth mentioning that the results of a test of biasedness of the covariates presented in Table 7 showing a mean bias of 5.2, is very acceptable in the literature. Appendix (Table Z) presents the balance test after matching between the treated migrant and control non-migrant households for all individual covariates. We see improvement in the balance of many of the covariates after matching is performed. The B and R are summary measures proposed by Rubin

²The Stata command used for the matching is psmatch2. E. Leuven and B. Sianesi. (2003). "PSMATCH2: Stata module to perform full Mahalanobis and propensity score matching, common support graphing, and covariate imbalance testing". <http://ideas.repec.org/c/boc/bocode/s432001.html>. version 4.0.12 30jan2016.

(2001). The expectation is that B, should be below 25 for a balanced control group (Hagen, 2016). In our case the value of 30.2 is not very far from 25. Rubin's R is expected to be between 0.5 and 2. Therefore the value of 0.86 is within this range and acceptable and the balancing of pre-treatment (migration) differences is acceptable between the two groups in the matching estimations.

Table 7: Testing the biasedness of covariates in the matching estimation.

Sample	Ps R2	LR chi2	p>chi2	Mean Bias	Med Bias	B	R	%Var
Unmatched	0.178	88.35	0	15.9	12.5	103.7*	0.81	38
Matched	0.016	6.24	1.0	5.2	4.4	30.2*	0.86	0

Table 8 presents the ATT effect of having a migrant in the past three years on household welfare. Based on the consumption measures, estimates from the unmatched samples show that per capita food consumption by the treatment households is lower (GH¢779.28) than that of the control households (GH¢958.48). From this estimate, one is tempted to argue that short-term or short-period migration does have negative consequences for households left behind. However, after matching the households on observables, it appears that there is no statistically significant evidence to conclude that migration of a household member made the families left behind worse off. Similar results are found nonfood consumption and for total consumption (both food and nonfood consumption). The results are also consistent whether consumption is measured on per capita or adult equivalent basis.

With regards to the subjective wellbeing outcome, we find that even though for the unmatched sample showed an insignificant improvement in subjective wellbeing for treated households, the matched sample ATT effect shows insignificant differences in improvement in wellbeing between the treated migrant households and control non-migrant households. So, in general, our overall results show that short-term migration (within three years) does not improve the welfare of families left behind significantly compared to the welfare of non-migrant households.

Table 8: Impacts of sending an internal migrant on welfare in rural Ghana using PSM

Variable	Sample	Treated	Controls	Difference	S.E.	T-stat
Per capita food in 2018	Unmatched	779.28	958.48	-179.21	85.04	-2.11
	ATT	770.53	802.02	-31.49	95.53	-0.33
Per capita non-food in 2018	Unmatched	589.14	685.56	-96.42	106.75	-0.9
	ATT	589.65	567.92	21.73	118.62	0.18

Per capita food and non-food in 2018	Unmatched	1368.42	1644.05	-275.63	174.64	-1.58
	ATT	1360.18	1369.94	-9.76	187.15	-0.05
Adult equivalent food and non-food in 2018	Unmatched	1701.39	2091.90	-390.50	206.57	-1.89
	ATT	1687.66	1720.48	-32.83	227.09	-0.14
Financial situation improved a lot or somewhat improved=1,	Unmatched	0.46	0.42	0.04	0.05	0.78
	ATT	0.46	0.46	0.00	0.08	-0.06

Difference-in-difference (DID) estimator

Now we exploit the panel nature of our data to estimate the impact of having a migrant member on welfare using difference-in-difference (DID) approach. As indicated earlier under the methodology, the DID estimation approach improves the estimates obtained under the PSM estimator and also allow us to take full advantage of the panel nature of our data. Table 9 presents the DID impact of migration on welfare. Columns 1 to 3 present the DID estimated results for household consumption as an outcome variable whereas column 4 presents the results for the subjective welfare indicator. Precisely, Column 1 presents the DID estimated results for food consumption whereas column 2 presents the results for nonfood consumption. The DID impact of treatment on total consumption is presented in column 3.

The DID results, as presented in Table 9, shows that the treatment variable is negative and significant in columns 1 – 3, signifying significant differences in real per capita consumption (food, nonfood, and total consumption) between treatment and comparison group at time zero (*Time* = 0) or in the year 2015. For example, in column 1 of Table 9 households that ended up having a migrant member in 2018 (migrant households), in 2015 had real per capita food consumption of about 283.26GHS lower than households that did not experience any migration of members in 2018 (non-migrant households. In terms of non-food consumption (column 2), the difference in real per capita non-food consumption level between migrant households and non-migrant households in 2015 was 158.04GHS. Precisely, non-migrant households had a higher non-food consumption of about 158.04GHS than migrant households. Overall, as shown by Column 3, consumption levels at baseline in 2015 on average was about 475.92GHS higher in non-migrant households compared with that of migrant households. This overall difference is about 100USD.³ These differences are consistent with the estimated differences in baseline consumption between migrant and non-migrants which was explained under the descriptive results. As explained earlier, this significant initial differences in consumption outcomes in 2015 are accounted for, in estimating the causal impact of migration. The coefficient on the interaction between the treatment dummy and the time dummy, which represents the DID estimate is found

³ The exchange rate as at December 31, 2018 was 4.8176GHS to the US Dollar.

to be positive indicating that having a migrant positively impacts household consumption. However, this coefficient is not significant.

The DID impact result shows that there could be potential benefits of migration, but three years may be too short a period to observe the impact of migration. It is also a reflection of the time it takes for migrants to adjust in their destination to be able to substantially support their households left behind. We find similar results for the subjective welfare outcome. The DID estimates show that there are no significant differences in the subjective perception of the financial situation of households with regards to basic needs between migrant and non-migrant households, even though the descriptive analysis shows a much higher improved financial situation for migrant households. Overall, comparing all households that did not have any migrant household members in 2015 overtime, and examining how changes in household migration three years after 2015 have impacted welfare, we conclude that internal migration does have instantaneous impact on helping disadvantages households to catch-up to advantaged high-consumption households.

Table 9: Impacts of sending an internal migrant on welfare in rural Ghana- using difference-in-difference⁴

	(1)	(2)	(3)	(4)
VARIABLES	real per capita food consumption	real per capita non-food consumption	real per capita food and non-food consumption	Financial situation improved or otherwise
Treatment	-283.2645***	-158.0407*	-475.9208***	-0.0336
	(95.1581)	(85.9176)	(167.5718)	(0.0484)
Time	-431.1311***	-331.1189***	-931.4429***	0.0963**
	(96.8694)	(90.0916)	(175.6615)	(0.0460)
Treatment*Time	99.4178	65.5651	199.5985	0.0813
	(124.3436)	(137.3873)	(237.6075)	(0.0714)
Constant	1,394.7952***	1,017.2328***	2,581.2208***	0.3165***
	(76.0144)	(62.0720)	(130.9258)	(0.0316)
Observations	735	734	735	740
R-squared	0.0623	0.0310	0.0732	0.0199
Robust standard errors in parentheses:*** p<0.01, ** p<0.05, * p<0.1				

⁴ As a diagnostic check, Table A3 in the Appendix shows the results for the case where there is matching at the base. It can be seen that qualitatively, there the two sets of results are fairly similar.

Conclusion

Using a unique data set that allows us to follow households that originally did not have any migrant for three years, we examine how changes in household migration status have impacted household welfare. Baseline data on all households that did not have any migrant was collected in 2015 with the follow-up data collected in 2018. Using this rare data, we explored how migration by a member household have impacted household's consumption and subjective financial situation. We also find some important descriptive results that ought to be described. First, we find a high incidence of internal migration in rural Ghana. About 37% of the original households that did not have a migrant household member in 2015 had an internal migrant member in 2018 whereas 2% o recorded an international migrant in 2018. This result supports the findings by Teye et al. (2019) which shows that, despite the migration narrative that points to a mass exodus of Africans to Europe, in fact, a high percentage of migration is internal migration. From our data, roughly 53% of the original households without any migrant in 2015 remained non-migrant households in 2018. Due to the small incidence of international migration in our data, we examine the causal impact of internal migration welfare of households' left behind.

As a first step, we compared baseline households' per capita consumption, adult equivalent consumption, and subjective financial situation at baseline between households that ended up having a migrant household member in 2018 and those that had no migrant household in both 2015 and 2018. We find that poverty seems to be an important driver of migration in rural Ghana. Households with lower baseline food and nonfood consumption seem to be more likely to have a member migrating over the three-year period of the study than households with higher baseline food and nonfood consumption. To be more precise, migrant households had a lower level of consumption at baseline compared to non-migrant households. In examining transition (improvement or otherwise) in household subjective financial situation, we find significant gains for migrant households that originally in 2015 had deteriorated financial situation at baseline. Specifically, for migrant households that reported in 2015 that their financial situation had worsened prior to the change in migration status, 45 percent reported improvement (improved a lot and somewhat improvement) in financial situation in 2018. On the contrary, the majority of the non-migrant household that had deteriorated financial situation in 2015 did not see significant improvement in financial situation. About 46.2 percent of non-migrant households that reported deteriorated financial situation in 2015 reported that their situation had worsened in 2018. Thus, in terms of financial situation migrant households that had 'deteriorated financial situations' seem to be the biggest gainers of migration.

Lastly, using both propensity score matching (PSM) and difference-in-differences (DID) estimation approaches to explore the causal impact of migration on welfare, we find no significant differences between treated and control households once initial baseline differences in consumption are accounted for. The results show that migration does not have instantaneous effects on the welfare of families left behind.

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Appendix Tables

Table A1: Descriptives on covariates used for computing the propensity scores

Variable	Obs	Mean	Std. Dev.	Min	Max
Treatment: HH sent a migrant between 2015 and 2018	370	0.411	0.493	0	1
Percentage of household members who are married	370	33.710	26.681	0	100
average age of household members	370	29.115	11.286	12	86
Percentage of household members who are males	370	48.242	23.253	0	100
Education of the HH head: primary (base is none)	370	0.089	0.285	0	1
Education of the HH head: JHS/middle school	370	0.203	0.403	0	1
Education of the HH head: SHS	370	0.078	0.269	0	1
Education of the HH head: Tertiary	370	0.092	0.289	0	1
Per capita nominal consumption	365	1673.685	1200.485	124.8	10976
Hhsize	365	6.392	3.353	1	15
Age of HH head	365	51.140	15.689	16	102
Female head	366	0.295	0.457	0	1
HH head is married	370	0.724	0.447	0	1
HH dependency ratio	370	0.360	0.236	0	1
Hh head has paid employment	370	0.132	0.339	0	1
Hh owns land	370	0.532	0.500	0	1
Hh has a toilet	370	0.341	0.475	0	1
Hh has a car	370	0.081	0.273	0	1
Hh has a fridge	370	0.230	0.421	0	1
Region: North (base is BA)	370	0.232	0.423	0	1
Upper East	370	0.176	0.381	0	1
Upper West	370	0.159	0.367	0	1
Volta	370	0.286	0.453	0	1

Table A2: Descriptives on covariates used for computing the propensity scores after matching.

Variable	Treatment			Control			P-value;
	Obs	Mean	Std. Dev.	Obs	Mean	Std. Dev.	
Percentage of household members who are married	137	37.96	25.62	214	29.52	25.90	0.003
average age of household members	137	28.70	8.94	214	29.23	12.84	0.668
Square of the average age of household members	137	902.78	602.80	214	1018.74	1055.70	0.243
Percentage of household members who are males	137	46.76	21.20	214	49.51	24.37	0.280
Education of the HH head: primary (base is none)	137	0.08	0.27	214	0.08	0.28	0.899
Education of the HH head: JHS/middle school	137	0.21	0.41	214	0.20	0.40	0.809
Education of the HH head: SHS	137	0.09	0.28	214	0.08	0.27	0.787
Education of the HH head: Tertiary	137	0.10	0.30	214	0.07	0.26	0.371
Per capita nominal consumption/100	137	14.54	9.05	214	18.10	13.54	0.007
Hhsize	137	6.88	3.34	214	6.03	3.30	0.020
Age of HH head	137	52.49	15.64	214	49.10	14.98	0.043
Female head	137	0.34	0.47	214	0.24	0.43	0.059
HH head is married	137	0.68	0.47	214	0.79	0.41	0.026
HH dependency ratio	137	0.33	0.23	214	0.38	0.24	0.088
Hh head has paid employment	137	0.15	0.35	214	0.14	0.34	0.783
Hh owns land	137	0.50	0.50	214	0.56	0.50	0.297
Hh has a toilet	137	0.39	0.49	214	0.28	0.45	0.029
Hh has a car	137	0.09	0.28	214	0.07	0.25	0.441

Hh has a fridge	137	0.21	0.41	214	0.24	0.43	0.563
Region: North (base is BA)	137	0.22	0.42	214	0.26	0.44	0.419
Upper East	137	0.18	0.39	214	0.18	0.39	0.996
Upper West	137	0.22	0.42	214	0.13	0.33	0.021
Volta	137	0.29	0.46	214	0.26	0.44	0.536

Table A3: Impacts of sending an internal migrant on welfare in rural Ghana- using difference-in-difference, with matching at baseline

	(1)	(2)	(3)	(4)
VARIABLES	real per capita food consumption	real per capita non-food consumption	real per capita food and non-food consumption	Financial situation improved or otherwise
Treatment	-135.5211*	-32.5797	-187.2951	-0.0255
	(80.2401)	(79.2854)	(145.5556)	(0.0510)
Time	-365.5997***	-284.8685***	-801.8307***	0.1044**
	(72.6916)	(65.7557)	(126.6856)	(0.0503)
Treatment*Time	64.2509	35.5130	118.9582	0.0737
	(106.3441)	(125.7988)	(206.2312)	(0.0752)
Constant	1,224.1069***	884.5871***	2,260.0565***	0.3132***
	(58.5562)	(50.6450)	(102.3419)	(0.0345)
Observations	656	655	656	656
R-squared	0.0637	0.0301	0.0804	0.0218
Robust standard errors in parentheses:*** p<0.01, ** p<0.05, * p<0.1				

About Migrating out of Poverty

Migrating out of Poverty research programme consortium is 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 – 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 their countries through a programme of innovative research, capacity building and policy engagement.

Migrating out of Poverty is coordinated by the University of Sussex and led by Research Director Dr Priya Deshingkar and Dr Robert Nurick as Executive Director. Core partners are the Centre for Migration Studies (CMS) at the University of Ghana, and the African Centre for Migration & Society (ACMS) at the University of the Witwatersrand in South Africa, the Organisation for Social Science Research in Eastern and Southern Africa (OSSREA) at Addis Ababa University, Ethiopia and L'Université Assane Seck Ziguinchor (UASZ) in Senegal. Past partners included the Refugee and Migratory Movements Research Unit (RMMRU) in Bangladesh, the Asia Research Institute (ARI) at the National University of Singapore; and the African Migration and Development Policy Centre (AMADPOC) in Kenya. Please visit the website for more information.

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