Does Internal Migration Improve Overall Well-Being in Ethiopia?

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Abstract

Standard economic models suggest that individuals participate in migration to improve their well-being, whether those decisions are made at the individual or the household level. However, explicit and implicit barriers to movement both within and between countries can hinder migration, potentially affecting welfare improvement. In this paper, we use a unique panel dataset of tracked migrants and non-migrants that originate from 18 villages in Ethiopia to examine the welfare impacts of internal migration. Using a number of techniques and various objective and subjective measures, we measure the impacts of migration on the welfare of migrants versus non-migrants. We find large gains to objective welfare measures such as consumption, of more than 284 percent. However, relative to household heads subjective welfare measures are similar for migrants. The large welfare gains to migration suggest that barriers exist, even within countries such as Ethiopia, against the free movement of people to places where they would be objectively better off.

Introduction

Individuals normally participate in migration to improve their well-being, whether those decisions are made at the individual or the household level (Lipton, 1980; de Haan, 1999). Standard models of migration predict that migrants move due to wage gaps between rural and urban areas (Lewis, 1954; Harris and Todaro, 1970). More recent models suggest migration is part of an overall household livelihood strategy (Lucas and Stark, 1985). Whereas migration can allow households to improve the welfare of all of their members, it can also help reduce the overall riskiness of the household income portfolio (Rosenzweig and Stark, 1989). Empirically, the gains to migration among individuals can be quite large, whether for internal or international migration (McKenzie, Gibson, and Stillman, 2010; Beegle, de Weerdt, and Dercon, 2011).

However, explicit and implicit barriers to movement both within and between countries can hinder migration, potentially affecting welfare improvement.[1] From an international perspective, legal costs to migrating can act as a significant barrier (McKenzie, 2007), and potential source countries may limit immigration through quotas or other barriers to entry. From an internal perspective, explicit policy barriers sometimes exist, hindering internal movement. For example, in China the *hukou* system explicitly limited movement from rural to urban areas (e.g. Fan, 2007). Other policies can create implicit barriers as well, such as policies related to land tenure, which can potentially hinder movement within countries, though evidence is mixed (e.g. Yang, 1997; de Brauw and Mueller, forthcoming). Implicitly, migrants may lack information about opportunities to migrate, and may perceive migration as too risky, particularly if most opportunities in urban areas are informal, as in Africa (Fox and Gaal, 2008).

If migration has the potential to improve welfare, why are policymakers reluctant to encourage or even subsidize worker movement? Fear of slum emergence, drawing from South Africa and Nigeria as examples, is one reason. Food insecure countries, often also vulnerable to macroeconomic shocks, implement policies that foster agricultural production. Furthermore, migration is not given as much weight in strategizing development—despite the extensive research on the topic[2]—because studies fail to convincingly demonstrate improvements in living standards. The burden of proof comes from having to account for migration as a systematic process rather than a random

[1] For a philosophical treatment of the rationale to lower international barriers to migration, see Clemens (2010). We briefly discuss such barriers in the context of Ethiopia shortly.
[2] See Lipton (1980) and de Haan (1999) for literature reviews.

one. Migration is attractive for and practiced by a special group of people. Without adequately acknowledging this process, the research will certainly produce biased, migration impacts.[3]

These issues are particularly pertinent in Ethiopia, where land scarcity would seem to lead to high potential for migration, yet internal migration is relatively rare.[4] In Ethiopia, the average rural household sustains the food needs of five on only 1 hectare of land (World Bank, 2005). Episodic droughts or other natural disasters further challenge the stability of agricultural income in the absence of insurance. Although land per capita levels are low and agricultural production is risky, the urbanization level in Ethiopia is quite low, even by African standards. Whereas in the rest of sub-Saharan Africa 36 percent of the population lives in cities, in Ethiopia only 16 percent of the population lives in cities (World Bank, 2008). If returns to migration are high, increased migration could be quite positive for overall growth.

In this paper, we use a unique panel dataset of migrants and non-migrants that originate from 18 villages in Ethiopia to examine the welfare impacts of internal migration. Most migration studies are missing one of two things: i) information on the migrant's outcomes after he leaves the village or ii) information on the migrant and his household prior to the move. The advantage of tracking individuals who move and stay in the villages over time is that we can measure changes in welfare over time for individuals that stay and move from a fixed place conditioning on a number of changes in individual and household level characteristics.[5] As in Beegle, de Weerdt, and Dercon (2011) and McKenzie, Gibson, and Stillman (2010), we can measure welfare levels both before and after migrants leave among those who migrate and those that do not, and we can therefore learn about welfare improvements among those that leave. Both Beegle et al. (2011) and McKenzie et al (2010) find large, positive changes in welfare among migrants.

Despite the advantages of following migrants and non-migrants over time, we still face several limitations in our study. Specifically, if migration is a household level decision made to maximize income or reduce the risk of the household income portfolio, household selection into migration may depend upon several observable or unobservable factors, such as human capital levels,

[3] While it exists, random variation that causes either internal or external migration in cases when data are available is very rare- the exception being McKenzie, Gibson, and Stillman (2010).
[4] We focus on internal migration due to the nature of our sample, but furthermore, international migration is relatively rare and therefore quite difficult to pick up in a household survey. The migrant stock from Ethiopia was estimated in 2010 as 620 thousand individuals spread across several countries both in the developing world (Sudan, Djibouti, Kenya) and the developed world (United States, Israel, Saudi Arabia), or about 0.7 percent of Ethiopia's population. Notably, international remittances to Ethiopia have risen dramatically during the 2000s, from US$46 million in 2003 to an estimated US$387 million in 2010 (World Bank, 2011).
[5] The benefits of this type of approach for the case of Haiti is discussed in Clemens and Pritchett (2008).

unobserved asset shocks, or even openness to trying new experiences. Further, decisions are made about what individuals to send out as migrants, which may be based on which member is most suitable to obtain off-farm employment, or who is least productive on the farm. Without accounting for the non-random selection process into migration, empirical estimates of the returns to migration may be biased upward.

We approach this problem by estimating the welfare benefits of migration using several different techniques and perspectives. Each is flawed in its own way, but together the methods build a relatively complete picture of the welfare benefits of migration. In our primary analysis, we estimate the benefits of migration for consumption per capita. After looking at descriptive statistics on changes in per capita consumption both among migrants and among non-migrants, we estimate average benefits to migration using the initial household fixed effects (IHHFE) approach used by Beegle et al. (2011). Second, we add instruments associated with the demographic and ethnic background of the migrants to proxy labor demand conditions and historical migration rates at the baseline to the IHHFE regressions, to attempt to better control for the selectivity of migration. Third, we apply difference-in-difference nearest neighbor matching to migrants and the sample of non-migrants, to attempt to better control for observable differences (Abadie and Imbens, 2008), as difference-in-difference matching estimators perform relatively well in comparison to the ideal experimental measures (McKenzie et al. 2010). In secondary analysis, we substitute for consumption using a measure of income per capita, and we describe differences in answers to questions about subjective welfare. For the latter, the household survey was only asked among household heads, so we have to compare answers among migrants with answers among household heads.

All of the estimates in the paper suggest real objective benefits to internal migration, but subjective measures of welfare among migrants and household heads are similar. Measured impacts on objective measures of welfare are robust to our attempts to control for the endogeneity of migration, as well as for income per capita and different measures of welfare. For example, we estimate a 284 percent improvement in consumption from migration with the benefits ranging between 267 and 610 percent upon accounting for selection. A similar scale in improvements is found when using income. We try to further examine what about migration contributes to the massive welfare gains. Controlling for occupational changes in conjunction with movement reduces some of the initial impact estimates, yet we still measure substantial gains from movement alone (272 percent).

To measure gains to migration and subjective welfare of migrants relative to household heads, the paper proceeds as follows. Given our discussion of objective gains, we initially explain why such benefits may be left unexploited in Ethiopia. Next, we discuss the data set in more detail and issues related to measuring consumption and income, as well as how we measure subjective welfare. Third, we describe changes in consumption and income per capita by migrant status, as well as subjective welfare. In the fourth section, we present our methodology, and the fifth section presents results and robustness checks. The sixth section concludes with a discussion of the implications of our findings.

Barriers to Internal Migration in African Countries

Although the evidence from sub-Saharan Africa suggests that returns to labor are likely higher in occupations outside of agriculture within Ethiopia, there are several explicit and implicit barriers to migration that might hinder people from moving. First, information about either formal or informal employment opportunities might be scarce in certain communities. The cost of moving decreases as networks within a village increase, as better information flows into the village about migrant opportunity (e.g., Carrington, Detragiache, and Vishnawath, 1996). Even if information was available, costs must be incurred both to reach potential destinations and to find work once at the destination. Ethiopia's infrastructure is poor, which makes movement costly. As a result, poorer households might not be able to finance migration, because they have few assets and lack access to credit. From this perspective, migration is initially quite risky; potential migrants may fail to find gainful employment if they leave.

A second type of barrier faced by households is the opportunity cost of the potential migrant's labor. If a migrant leaves, the household loses the migrant's labor from household agricultural production (e.g. Rozelle, Taylor and de Brauw, 1999). As migrants tend to be young and able-bodied, the agricultural labor input and its resulting income can decline when family members migrate. In this manner, migration is different from local work because individuals with local off-farm jobs can easily help during busy periods on the farm, whereas migrants cannot. In all cases, when migrants leave, other household tasks—such as rearing children or looking after the elderly or infirm—are shifted to those left behind.

Finally, policies may explicitly or implicitly inhibit migration. While there are no explicit legal barriers to internal migration in Ethiopia, other policies at either the source or destination can affect the decisions of household members to either migrate or not migrate by changing the net

returns to migration. For example, land policy may negatively affect migration (de Brauw and Mueller, forthcoming). Second, through the Productive Safety Nets Program the safety net in rural Ethiopia is stronger than the safety net in urban areas. If one migrates to an urban area, they potentially lose access to social protection. Third, individuals may have a more difficult time obtaining credit or access to other public services, since these are often only available to landholders, as recognized by the *kebele* (Ellis and Woldehanna, 2005). Finally, regions in Ethiopia often differ ethnically, implying that culture and language differ, which might further implicitly hinder migration.

Data

The dataset we use for analysis in this paper matches data from a panel survey, the Ethiopian Rural Household Survey (ERHS), with data from a migrant tracking survey conducted among migrants from the ERHS households in late 2009. The migrant tracking survey was specifically designed to track the type of migrants more likely to be employed and who therefore would be more likely to remit. In this section, we describe how we constructed the sample of matching households and migrants used in this paper.

Ethiopian Rural Household Survey

The Ethiopian Rural Household Survey (ERHS) is a unique, longitudinal household dataset collected by Addis Ababa University, the University of Oxford, and the International Food Policy Research Institute. It follows households from fifteen villages from 1994 to 2009. Three additional villages were added to the 2004 round (and were surveyed in 2005). The 2009 round then included all eighteen villages. The villages were initially chosen to account for the diversity of farming systems in Ethiopia. The survey includes modules, among others, on household characteristics, agriculture and livestock, food consumption, health, and women's activities. The most recent two rounds, used in this study, also included modules on self-reported shocks. The ERHS has been used for a large number of papers studying various aspects of risk and poverty dynamics in Ethiopia (for example, Dercon, Hoddinott, and Woldehanna 2007; Fafchamps, Kebede, and Quisumbing 2009; Kadiyala et al. 2009). We focus on the latest two rounds of the panel, which occurred in 2004/05 and 2009. We use data from the expanded 18 village sample for our analysis (Figure 1).

Migrant Tracking Survey

Approximately three months after the completion of the primary ERHS survey in 2009, all 18 ERHS villages were revisited to conduct a short migrant tracking survey. Enumerators were given household rosters based on the 2004/05 survey and were asked to identify the location of all household members that were enumerated in that round. After locating the household, the enumerator would ask the household head to identify individuals who no longer lived in the household. If the household head was not found but the household was identified in the village, the census was administered to another household member who was deemed most knowledgeable about the household's members. In cases in which whole households had moved out of the village, enumerators asked village leaders about the present whereabouts of each household member and the reason for leaving. We were able to identify 1,595 households out of 1,606 households originally sampled in 2004/05.

The focus of the migrant tracking study was to learn about migration and remittance behavior in Ethiopia. Therefore, we asked the tracking survey respondent several detailed questions to further restrict our sample of migrants to those who likely migrated for the purpose of employment rather than, for example, marriage. We initially asked households to list all household members aged 10 years and above who had moved out of the ERHS village to another peasant association (PA) for at least three months. To further filter our sample, household heads were asked to specify the reason each migrant left the household. Based on these responses, we restricted the sample for tracking to individuals who moved due to the loss of land, for employment, or for schooling and who stayed in their destinations for employment, to follow another family member, or for a resettlement program. Finally, we instructed enumeration teams only to follow family members of the household head, since relatives are more likely to send remittances.[6] When the entire household had moved out of the village, we followed entire households that community leaders reported had left primarily for economic reasons.

Based on our tracking protocol, we found that 473 migrants were eligible to be tracked. Of those migrants, 85 were overseas, leaving a total of 386 possible to track.[7] We successfully tracked

[6] Furthermore, in pilot testing the questionnaire, we found that households had a difficult time helping us with finding non–family members, as they paid less attention to their whereabouts after leaving the household.

[7] The majority of international migrants were in the Middle East (Saudi Arabia or Dubai). See Appendix Table A.1 for a table of destinations.

313 from 244 source households, a tracking success rate of 81 percent.[8] Of those 244 households, 22 were full households, where all members of the household had migrated out of the ERHS village to another destination.

From the perspective of studying changes in well-being in a manner similar to that in Beegle et al. (2011), the tracking rules actually present an important challenge. To truly understand the returns to migration, the best possible comparison is between individuals who left for work and those that stayed behind but are otherwise equivalent, in both observable and unobservable ways. The comparison in well-being is between individuals who left for work and those individuals who essentially considered leaving for work, but did not. Individuals who left for work were positively selected on traits that are associated with higher wages; therefore even when controlling for original household fixed effects, our estimates for welfare levels among migrants might be biased. To deal with this potential bias, we use matching methods to test the robustness of our results from models using original household fixed effects and instrumental variables.

A further problem is that a third group exists—individuals who moved out of the original households but were not tracked (see Figure 2 for an illustration).[9] Since such individuals did not leave the original ERHS households for employment, they may have lower consumption levels than individuals who left for employment. We therefore conduct some thought experiments about well-being levels among this group of individuals, so we can place bounds around overall poverty rates given the existence of these individuals.

Measurement Issues

Our primary goal is to measure the difference in welfare levels between stayers in the ERHS and movers who were included in the migrant tracking study. A primary objective, then, is to measure welfare levels both among individuals who stay and individuals who migrate. We have two types of

[8] Because we knew that we would not find some migrants, we randomly allocated households to two different tracking strategies to attempt to identify any sources of attrition bias; unfortunately, the two strategies were equally successful. From the individual perspective, the only variable we found that had a significant relationship with an indicator variable for successful tracking was whether or not the migrant had a cell phone number. At the household level, there are a few additional statistical differences between households with and without tracked migrants. Tracked migrant households have more adult sons, have a lower propensity to be Muslim, had fewer months in the last year that they were unable to satisfy food needs in the household, and are older. However, the first three differences are only statistically significant at the 10 percent significance level.

[9] As shown in the figure a fourth group exists as well, who are individuals that the migrant tracking survey attempted to track but could not find. We also discuss this potential attrition bias later in the paper.

measures available to us in the two surveys: objective and subjective measures of welfare. We discuss the two in turn.

There are two main ways to measure welfare using the ERHS data: consumption per capita and income per capita. Whereas consumption is the preferred measure, the data on income may be more comparable across space, and so we include this comparison as well.[10] As consumption and poverty based on consumption have been estimated for each round of the ERHS, we deflate all measures to 1994 birr to ensure that statistics are comparable across all rounds of the ERHS. That said, there is an important caveat. Between the 2004/5 and 2009 rounds, significant inflation occurred, particularly among food prices. Given the need to compare statistics with tracked migrants, and due to a lack of alternative deflators for the 2009 migrant tracking survey, we use the CPI published by the Ethiopian Central Statistical Agency (CSA) to deflate between 2004/5 and 2009. It is important to note that we cannot control, therefore, for differences in price levels between urban and rural areas, as such differences are not collected by the CSA. We may, therefore, overstate non-food consumption among migrants. We return to this point later in the paper.

It is next important to note that there is a discrepancy between the way that food consumption was measured in the ERHS and the migrant tracking survey. Whereas a food consumption module was asked in the ERHS, in the migrant tracking survey food purchases were only enumerated when meals were taken away from home at the destination, as was the frequency of consumption of specific types of foods.[11] To be conservative, we measure food consumption as the total amount of money spent on meals away from the household. Therefore we almost definitely understate food consumption, which affects the associated welfare changes from migration.

[10] Consumption is a more favorable measure of welfare to income as it is less susceptible to transitory shocks than income according to the permanent income hypothesis . The measurement error associated with rural income comes from survey timing due to income being heavily dependent on seasonality and the predominance of self-employment in developing countries (Deaton, 2000).

[11] There were two reasons why we did not administer the same consumption module as that included in the ERHS. First, the consumption module asks about household consumption. Many of our migrants are students who might share homes, but do not necessarily share meals with the remaining household members. Additionally, this same demographic might be less inclined to cook or eat meals at home. For example, when asked whether they eat meals inside of their home that is not purchased, 24 percent of our tracked migrants indicated they did not eat meals at home. Second, some of the migrant destinations span different regions as well as cities (whereas the ERHS is predominantly rural). Due to the differences in the composition of food bundles in these alternative locations, we would need to consider changing the consumption module (originally administered by the ERHS) to include additional food items. However, by doing this, the consumption measures across data sets (ERHS panel and migrant tracking survey) would not be comparable as we did not administer the same framing of questions to those households in the ERHS.

Income per capita is computed as the total monthly income gained from farm activities, wages, non-agricultural self-employment, and public and private transfers. Farm income includes the value of self-consumed crops and livestock sales, and is the largest source of income for individuals and households that remain in the village. For migrants, non-agricultural self-employment income and wage income are much larger income sources.

Finally, the 2009 ERHS survey includes a substantial module on subjective welfare measures.[12] However, these questions were not enumerated of all household members; they were asked of the household head and spouse (if the latter was available). The same battery of questions was asked of migrants in the migrant tracking survey, and thus we can compare the subjective welfare of the household head with the subjective welfare of the migrant. Given that we cannot measure changes in individual subjective welfare due to moving, we include this comparison descriptively, and we note that differences between household heads and migrants may be due to actual welfare differences, differences in individual perceptions, or even differences in frames of reference.

Welfare Growth and Subjective Welfare by Mobility

In this section, we describe how internal migration affects welfare growth, as measured by differences in per capita consumption and income growth between individuals that stayed in the village and moved out of the village (in the aggregate, and distinguishing by destination type). These measures are contrasted with the subjective welfare differentials between individuals that stayed in and moved out of the village in 2009 to provide a more complete picture of how internal migration affects living standards.

First, we measure average monthly consumption per capita among individuals who stayed and tracked migrants (Table 1). On average, consumption rose dramatically among migrants, whereas it barely changed among individuals who stayed in the village (363 versus 13.8 birr). The difference between growth in consumption differed by destination; migrants residing in rural areas had lower average growth (319 birr) than urban migrants (447 Birr). A comparison of the distribution of per capita consumption by mobility demonstrates that the distribution of consumption shifts to the right for migrants, and is also quite a bit more variable than among non-migrants (Figure 3). Almost all of the growth in per capita consumption among migrants comes

[12] The measures are also available for 2004/5 for the household head. However, they are not generally available for all individuals in 2004/5 and therefore we cannot measure changes in subjective welfare due to migration.

from a rise in non-food consumption expenditures. Taken together, these differences result in a 35 percentage point reduction in poverty among internal migrants compared to a 12 percentage point reduction in poverty among individuals that stayed in the village over five years. These differences indicate a substantial decrease in poverty among migrants.

We next examine the growth in monthly per capita income by mobility (Table 2).[13] Similarly, moving out of the village generates substantially greater returns over time (283 Birr) relative to staying in the village (19 Birr). Unlike consumption, migrants in urban areas have lower incomes than migrants in rural areas. The distribution of per capita income among migrants (like consumption) shifts to the right relative to those who stay, but unlike consumption appears to have a similar variance (Figure 4). Income growth among those who stayed in the village is predominantly from agricultural income. In contrast, the individuals who moved out of the village benefit greatly from increases in wage and self-employment income; wage income represents about 80 percent of income growth among migrants, and changes in self-employment represent most of the remainder. Changes in specific income sources by mobility suggest that changes in occupational status may play an important role in income growth among migrants; we explore this notion further later in the paper.

Following Beegle et al. (2011), we further disaggregate the growth in consumption per capita by occupational shifts across the two survey rounds (Table 3). We broadly define occupations as agriculture, non-agriculture, and students, since many of the individuals who moved were students in the baseline. There are large gains across all observed occupational shifts. However, gains appear larger when individuals move to non-agricultural occupations.[14] One of the most notable differences occurs among individuals who were students in 2009 and moved to the non-agricultural sector. Whereas students who stay in the village and begin a non-agricultural occupation actually experience a decrease in per capita consumption, those who move experience a large increase in per capita consumption. These observations suggest the importance of conditioning on occupational shifts as well as educational gains.[15]

[13] The migrant tracking survey asks for total annual income. For illustrative purposes, we divide this figure by 12 to compare magnitudes across outcomes.
[14] Similar patterns are found when observing changes in income per capita rather than consumption per capita.
[15] We later also formally condition on the gains to education in a regression framework following Beegle et al. (2011).

While the aforementioned statistics suggest substantial benefits to migration, they do not account for the way that migrants or those left behind might perceive their standard of living. To roughly assess these perceptions, we compare answers to a number of subjective welfare questions that were asked both among household heads and among migrants (Table 4). Individuals were asked to either agree or disagree with the statements listed. There are few differences between the answers among household heads and migrants; we only find that migrants are slightly more likely to agree with the statement, "In general, I would describe myself as doing well, able to meet my needs by own efforts and making some extra." They also feel their health care is more than adequate relative to non-migrants. It is worth noting that these differences are by no means causal; since household heads in the ERHS are substantively older than our sample of tracked migrants, and therefore are generally at different stages of their life cycle. Yet it is notable that migrants do not necessarily perceive their lives as any better than household heads who have stayed in the village.

The surveys further asked about several ordinal measures of subjective welfare. Household heads and migrants were asked to rate their reactions to specific questions on a scale from "strongly disagree" (1) to "strongly agree" (7). We compare average answers among household heads and migrants (Figure 5). In fact, we find that migrants have, if anything, lower numerical answers to those questions. Some of the answers to these questions may particularly be susceptible to the frame of reference. For example, someone who lives in a village might agree differently "I am satisfied with life" given the alternatives within the village than someone who has seen a lot more of the world. Nonetheless, the preliminary evidence suggests that although objective measures of welfare appear significantly higher among migrants than non-migrants, subjective welfare measures do not tell the same story.

Methodology

We have shown by objective measures, welfare among migrants has increased relative to individuals staying in the village. However, the difference could be due to differences in human capital levels, for example, and not due to migration. To initially measure the gains to migration in Ethiopia in a more robust framework, we follow the methodology of Beegle et al. (2011). We specify a model as follows:

$$\Delta \ln C_{iht+1,t} = \alpha + \beta M_{it+1} + \gamma \boldsymbol{X}_{it} + \delta_h + \varepsilon_{it} \qquad (1)$$

where $\Delta \ln C_{iht+1,t} = \ln C_{iht+1} - \ln C_{iht}$, or the change in the logarithm of monthly per capita consumption for individual *i* originally in household *h* at time *t* (or *t+1*).[16] In the above specification, *X* represents individual characteristics measured in the initial period, *M* is an indicator variable for an individual who migrates out of the household between *t* and *t+1*, and δ_h represents a household-specific fixed effect. By including initial household fixed effects (IHHFE in the terminology of Beegle et al., 2011), we identify within household differences in consumption growth, therefore controlling for initial growth paths. A further advantage of this model is that we can control for individual differences through the vector **X**; we include categorical variables for age, gender, marital status, and educational status in **X**.

Although equation (1) controls for individual level characteristics and household fixed effects, individual level unobservables could still affect migration. For example, if individuals who are more risk seeking are more likely to migrate, then even controlling for individual level observables and household fixed effects, the results might at least partially reflect returns to risk seeking rather than returns to migration. Because there is no source of truly exogenous variation that causes migration in this setting, we use two techniques to attempt to control for any potential remaining bias in our estimates of the impacts of migration on measures of well-being.

We consider two different techniques to attempt to control for bias in our estimates of the effect of migrating on consumption or income growth. First, we try instrumenting for migration using variables that should affect the opportunity to migrate, but should not affect consumption or income growth except through individual migration. In this setting, if we can identify an instrument or set of instruments that are both strongly statistically related to migration and not otherwise related to growth in consumption or income, then one can estimate the impacts of migration without bias, at least among individuals likely to respond to changes in the instruments (Angrist and Krueger, 2001). However, if potential instruments are either only weakly correlated with migration or more generally not available, an alternative to using instrumental variables techniques is to use matching to estimate impacts of migration (e.g. Ham, Li, and Reagan, 2011). Because we are able to use a differenced outcome variable and we have a large number of potential baseline characteristics to use as covariates, under standard assumptions matching estimates should be low bias estimates of the average effect of migration on living standards (Heckman et al.,

[16] In models in which we use income as the dependent variable, we treat it the same as consumption. For example, the dependent variable is the change in the logarithm of monthly per capita income.

1997; 1998).[17] We discuss our instrumental variables in more detail as well as the matching approach below in the context of the results.

Regression Results

First, we estimate equation (1) using consumption per capita as the dependent variable (Table 5), sequentially adding groups of explanatory variables (Table 5).[18] When we use consumption per capita as the dependent variable, we find large, stable coefficient estimates for the impacts of migration on consumption. These estimates are reasonably consistent whether we only control for the age and gender of the individual (column 1), age, gender, and education (column 2), or all individual level variables plus initial household fixed effects (column 3).[19] The coefficient in column 3 suggests a 1.35 log point increase in consumption due to migration, which corresponds to a 284 percent increase in consumption among individuals who migrated. This percentage increase is quite consistent with the descriptive statistics reported in Table 1. Furthermore, the estimate clearly suggests that consumption per capita increases for migrants. Even if prices in areas that migrants moved to were double those in the ERHS villages, consumption would have more than doubled among migrants. Moreover, we have underestimated the value of food consumption.

When income per capita is used as the dependent variable, estimating equation (1) actually suggests even higher returns to migration (Table 6). The estimated coefficient on migration in the individual fixed effects specification is 1.96, suggesting a more than sixfold increase in income as a result of migration. Again, this finding is consistent with the descriptive statistics, and even if we are not accounting for all differences in the cost of living between source villages and destination, it is clear that migrants experience a large increase in income when they leave the source village.

Although the estimated impacts of migration on both consumption and income are quite large, one might be concerned that migrants remain positively selected on some unobservable individual characteristics, and therefore we overestimate the impact of mobility on per capita consumption and income. To initially attempt to deal with this potential problem, we instrument for migration using a vector of individual characteristics that should only affect consumption and

[17] The differenced matching estimator does rely on the additive separability of error terms (Heckman et al., 1997), which is not required of cross-sectional matching estimators.

[18] Descriptive statistics of the regressors included in the regression models are provided in Appendix Table A.1.

[19] Markedly the most consistent significant determinant of both consumption and income is primary and secondary education. For income, this finding is consistent with or without the inclusion of the household fixed effect. For consumption, the finding surfaces only in the household fixed effect model. The discrepancy in findings across models is not too surprising given that consumption is more largely determined by the demands specific to the household, hence the reason for drawing mainly on findings from the initial household fixed effects model.

income growth through their effect on migration; that is, they may be strongly correlated with migration but not independently related to consumption or income growth. The variables we use are: i) whether the migrant was the household head or spouse in the baseline interacted with whether he was in the age category of 5 to 15 years, and ii) whether the ERHS household head was of Tigray ethnicity (and Gamo ethnicity) interacted with whether the migrant was in the age category of 5 to 15 years.[20]

Social relationships, push-pull factors, and historical migration rates or networks are strong predictors of migration and have been used in the literature as instruments for migration (McKenzie and Rappaport, 2007; Beegle, de Weerdt, and Dercon, 2011). In particular, labor demand characteristics are possible candidates for instruments as they reflect the economic opportunities in a given location. Following Beegle, de Weerdt and Dercon (2011), we focus on a specific demographic, young adult males (age 5 to 15 years old at baseline), since these individuals are more marketable in migrant occupations that require physical exertion (such as hired rural labor) as well as specific service jobs.[21] To reflect historical migration rates (and network potential), we interact the age variable with the ethnic background of the ERHS household head at baseline. Historical policies such as the resettlement policy of the Derg regime bore impact on migration rates. Though the premise for resettlement was to mitigate vulnerability to famine, scholars suggest an alternative political motivation to subdue national movements driven by ethnic groups (Woldemeskel, 1989). The current regime actively promotes an ethnic democracy, which includes attracting former refugees into ethnic-based federated regions (Mberu, 2006). The policies underlie movement patterns within Ethiopia and suggest the use of ethnic background interacted with demographic characteristics of the individual as instruments for migration. Lastly, the relationship of the migrant to the ERHS household at baseline reflects the cultural norms of who customarily is designated to migrate from the household. Typically, the spouse or household head may be the most expected to migrate.[22]

While intuitively we discussed the predictive power of the instrumental variables on migration behavior, the use of the variables are subject to the exclusion restriction being satisfied. We do not expect the proposed instrumental variables to be correlated with changes in welfare outside of the migration channel for two reasons. First, the majority of the households within the ERHS villages are from the same ethnic group. This precludes excluding individuals from the

[20] We include first stage results in Appendix Table A.3.
[21] Driving and security jobs were very common among migrants surveyed in Addis Ababa (World Bank, 2010).
[22] The son or daughter of the household variables were also used as instruments but were not strong predictors of migration in this case.

network by definition, rendering the value of this form of social capital negligible. Second, heads of households and their spouses are more likely to remain in the household, and together their role is less likely to bear direct consequences on welfare changes irrespective of their fixed position in the household. We later challenge the exclusion restrictions by testing whether they are satisfied statistically.

For both dependent variables, the IV results are largely consistent with the previous results (Table 7). We actually find a larger point estimate for the coefficient on migration when per capita consumption is the dependent variable (columns 1 and 2), and the expected smaller coefficient on migration when per capita income is the dependent variable (columns 3 and 4). Not surprisingly, standard errors on the estimated coefficients are large; IV estimates are generally high variance relative to OLS. Unfortunately, the instruments we try using are not strongly related to migration for the income model. For the consumption model, the Cragg-Donald F statistic passes the critical values reported by Stock and Yogo (2004) with a guaranteed maximal bias of 15% of the IV estimator relative to that of OLS. Therefore we must be somewhat skeptical of doing hypothesis testing using the IV results for the income specification. Nonetheless, the fact that point estimates on the migration variable do not decline dramatically when we instrument for migration indicates that positive selection may not be a large issue.

To provide further evidence that the results are not being driven by unobservables, we next use difference-in-difference matching methods. We begin by estimating the propensity score for migration, using a probit model for migration selection which includes a large set of observable individual and household level characteristics, including the age, gender, and education level of the migrant, some characteristics of the household head, and proxy variables for the wealth of the household (the logarithm of landholdings and the number of tropical livestock units).[23] We use the results of the probit to first predict propensity scores, and then we ensure overlap in the propensity scores by plotting kernel densities of the propensity scores both among migrants and non-migrants (Figure 6). There are two notable points regarding Figure 6. First, there is a lot of density among non-migrants right around zero; in part because the overall migration rate is fairly low in the sample, we do not observe a large proportion of individuals who migrate. Second, we find very little density beyond propensity scores of approximately 0.2. Although there are observations in both the migrant and non-migrant group with propensity scores above 0.2, it is worth testing whether results are sensitive to removing such individuals. Therefore, in estimating matching

[23] The probit model results are in Appendix Table A.4.

models, we test the robustness to trimming the lower and upper tails of the distributions, to ensure better matches.

We estimate the impacts of migration using nearest neighbor matching (two similar non-migrants are matched to each migrant) on both per capita consumption and per capita income (Abadie and Imbens, 2006), where the propensity score values from the above probit model are used to ensure matching quality by trimming the tails of the distribution (Table 8).[24] When using per capita consumption as the dependent variable, we find coefficient estimates largely consistent with the OLS results rather than the IV results; in general, the point estimates are stable regardless of the trimming we do. With the most narrow sample (propensity scores between 0.02 and 0.2), we estimate a coefficient of 1.32, suggesting a 274 percent increase in consumption due to migrating. As with the OLS and IV estimates, the nearest neighbor matching estimate is large, but as they are consistent with other findings and the large increase in non-food consumption we found descriptively among migrants.

When using per capita income as the dependent variable we find the point estimates using nearest neighbor matching are slightly lower than OLS and above those produced from the IV model (Table 8, row 2). Again, regardless of the level of trimming, coefficients are largely stable and large. Given the consistency of OLS, IV, and matching coefficients for both per capita consumption and income, it seems that we can largely attribute consumption and income gains to migration. Given that the OLS model with initial household fixed effects is the easiest model to work with, as we examine heterogeneous effects among different groups we choose to use that model.

Heterogeneous Effects and Robustness

We next examine whether the magnitude of the migration impact varies by migrant characteristics which are associated with the returns to human capital and the transferability of migrant skills. We obtain estimates using the ordinary least squares model. The small sample of migrants renders the estimation of precise heterogeneous effects of migration using the instrumental variables approach difficult. Despite this limitation, the results in the previous section indicate that the OLS estimates are informative, as we can interpret the estimates as a lower (upper) bound of the true migration impact on consumption (income) per capita.

[24] The advantage of nearest neighbor matching (also known as covariate matching) over propensity score matching is that it does not, explicitly or implicitly, weight certain control variables more than others. The main drawback is the so-called curse of dimensionality, which does not affect the results here. Furthermore, analytical standard errors can be computed for the nearest neighbor matching estimator, whereas authors who use propensity score matching and matching methods other than nearest neighbor largely rely on bootstrapped standard errors; it is not analytically known whether bootstrapped errors are unbiased estimates of the standard error in matching applications other than nearest neighbor, for which they are known to be incorrect (Abadie and Imbens, 2008).

We first compare the effects of moving out of the village accounting for the gender of the migrant. The estimates presented in Table 9 suggest female migrants experience a lower improvement in welfare than male migrants. The differences in the migration effects by gender manifest in both consumption and the returns to labor migration, as indicated by the Chi-squared statistics which test for the statistical differences in the coefficients presented in the models using the consumption (p-value=0.06) and income (p-value=0.00) outcomes. The income finding is consistent with the gendered wage differentials corroborated in the literature.

We next allow for migration effects on welfare to vary by migrant destination. We compare the effects of migrants who moved to a rural versus an urban woreda (where urban is defined as having a population greater than 50,000). Differentiating the migration effects by destination poses additional challenges in identification, because you might expect the magnitude of selection among urban migrants to be greater than that of rural migrants since the barriers to urban migration are greater and requires additional financial or network support to overcome. For example, in the case of getting an urban registration card, which allows you access to services and formal employment, you must establish residence through homeownership or a formal endorsement from your landlord. Therefore, it would not be surprising given the potential for greater positive selection among urban migrants to see a larger effect. In our case, the positive selection is either countervailed by a negative return to urban migration or for the case of non-existent selection the returns to rural and urban migration are otherwise equivalent, since we cannot identify a statistically, significant different effect based on the migrant's final destination according to the Chi-squared statistics testing for the difference in the migration coefficients.

We next examine how the transferability of skills might affect the returns to migration by further controlling for the gains to education over the five-year period, and the gains to education interacted by mobility (Table 9, columns 3 and 6). Adding these additional controls to the model raises the migration returns on per capita consumption, and lowers the migration returns on per capita income. However, in both models, these additional parameters are not statistically significant. It is unclear why the gains to education parameters are not statistically significant when using income as a measure of welfare. It is important to note that the signs and magnitudes of the coefficients are the same irrespective of how welfare is defined. It is possible that the lack of robustness is coming from the loss of information due to the high frequency of missing education variables over the two rounds, and the lack of variation of educational gains within the sample of migrants.

An alternative explanation for the lack of clarity in the results is that the income returns to education are somewhat limited especially in rural labor markets. Recent work in China provides evidence of why individuals might enter the migrant labor market at an earlier age rather than obtain a higher level of education; the opportunity cost of staying in school is high (de Brauw and Giles, 2005). It is possible that a more informative measure of skill transferability is one that documents the occupational shift an individual undergoes over the five-year period and its interaction with migration. This should be especially more revealing in our sample, as a substantial fragment of migrants move for schooling and then by the year of the tracking survey have entered different labor markets. We categorize occupational shifts by whether the individual was a student, obtained an agricultural or non-agricultural occupation in both rounds. We present the results from the specifications that include the occupational shift variables and their interactions with migration in Table 10. We present two versions of the model. The first differentiates between moving from an agricultural to a non-agricultural occupation over the two rounds. The second further differentiates the students from non-students who move into the non-agricultural sector.

The estimates provided in Table 10 suggest a few interesting results. First, we find that controlling for occupational shifts slightly reduces the effect of migration. The returns are still substantial. Second, we find that the returns for students who move and enter the non-agricultural labor market are somewhat lower than the returns of others that move and switch into the non-agricultural labor market, which is consistent with the fact that students are younger and therefore have less experience. Third, the returns on consumption per capita are not consistent with the returns on per capita income. We find that students who move and enter the non-agricultural labor market experience greater growth in consumption per capita than non-students with the same changes in mobility and occupation. This is also consistent with differences in the life cycle status of the students and non-students, where non-students are more likely to have their own families to support. Even though the subsample of non-student migrants which moves into the non-agricultural sector have greater income returns, they also have greater expenses and higher costs of living which may render the net effect of the occupational shift itself zero.

One of the limitations in the model that incorporates occupational shifts and their interactions with migration is that not only is the selection into migration unaccounted for as in the previous models discussed, but the selection into different labor markets also poses additional bias on the parameter estimates. Consider the sample of students who move into the nonagricultural sector. The migrant students are more educated and therefore we might expect the parameter estimates in the OLS model to be positively biased. Therefore, it is difficult to identify whether the

positive results from occupation shifts are attributable to additional selection posed by the type of migrants and their selection into the labor market or the benefits of skill transferability. We therefore use the model that incorporates the occupational shifts as a robustness check to observe how the additional controls affect the migration impact estimate rather than declare a reliable estimate on the returns to mobility interacted with shifts in occupation. It appears that including these additional controls in the regression still produces substantial welfare gains to migration.

Conclusion

In this paper, we use a five-year panel of individuals to identify the benefits of moving out of rural villages. The unique feature of this panel is that we track a set of migrants who left the village, and so we are able to better measure the gains to migration than most studies. Our results are even larger than gains found to mobility in Tanzania (Beegle, De Weerdt, and Dercon, 2011) and robust to various specifications and outcomes. We find a lower (upper) bound of 284 (613) percent improvement in consumption (income). Consumption (income) effects are magnified (reduced) when using instrumental variables and reduced (magnified) when using nearest neighbor matching. Even if there are price differentials between destinations and the source villages that we do not account for, it is not possible that the differentials are as large as the gains to migration we find, particularly as most migrants move to other rural areas. Accounting for combinations of occupational changes over the time period and movement reduces the lower and upper bound estimates, however, the gains are still substantial.

That said, in descriptive analysis we do not find differences between subjective measures of welfare among migrants and household heads, measured in the final survey. We find few differences between the answers among migrants and household heads. Though not causal by any means, it is notable that migrants do not necessarily perceive their lives as any better than household heads who have stayed in the village. This result could be due to the fact that migrants have a different frame of reference; someone who lives in a village might agree differently "I am satisfied with life" given the alternatives within the village than someone who has seen a lot more of the world.

These findings provide significant scope for future work. First, given the welfare benefits from migration, it is crucial to identify the major migration barriers from a socio-economic perspective and through direct evaluation of policies (e.g., urban registration requirements). Second, since welfare measures and poverty indexes are sensitive to price inflation which is rampant in African countries especially during the period of study, using alternative welfare measures such as, the

Alkire-Foster index, to measure additional dimensions of welfare, such as quality of life, is potentially important (Alkire and Foster, 2011).

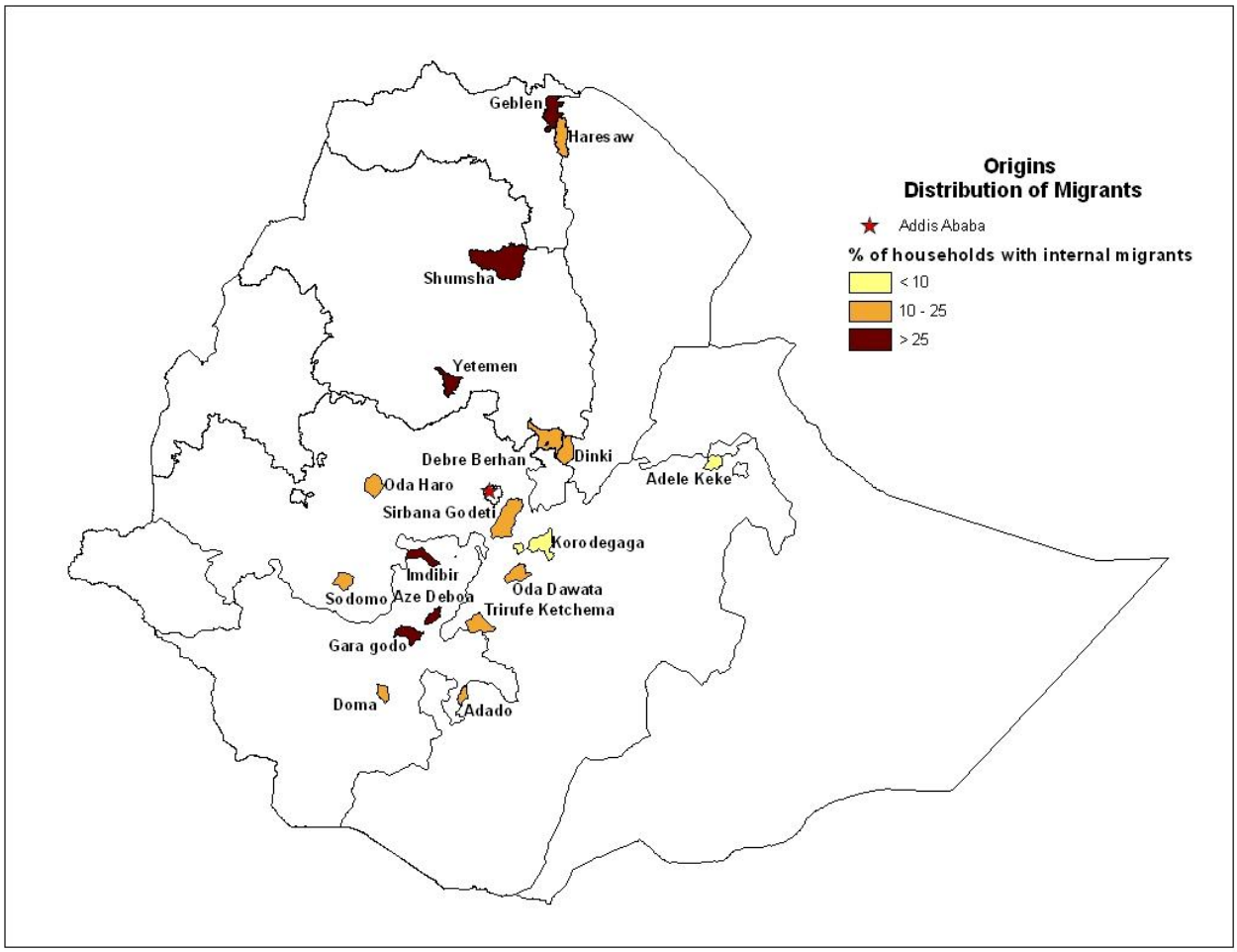
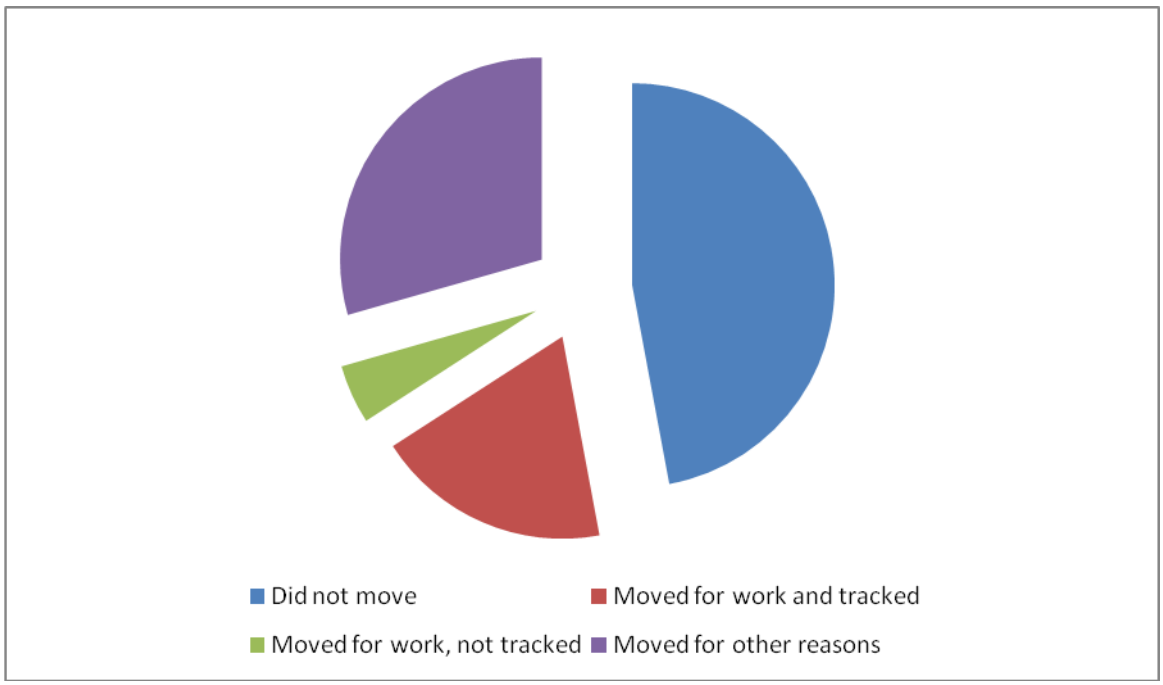


Figure 1. Map of ERHS Villages and Migration Prevalence by Village, Ethiopia



Note: Relative size of groups is meant only as illustrative as the size of the "Did not move" group is unknown.

Figure 2. Structure of Sample, Individuals who considered moving between ERHS Rounds 6 and 7, ERHS and Migrant Tracking Survey

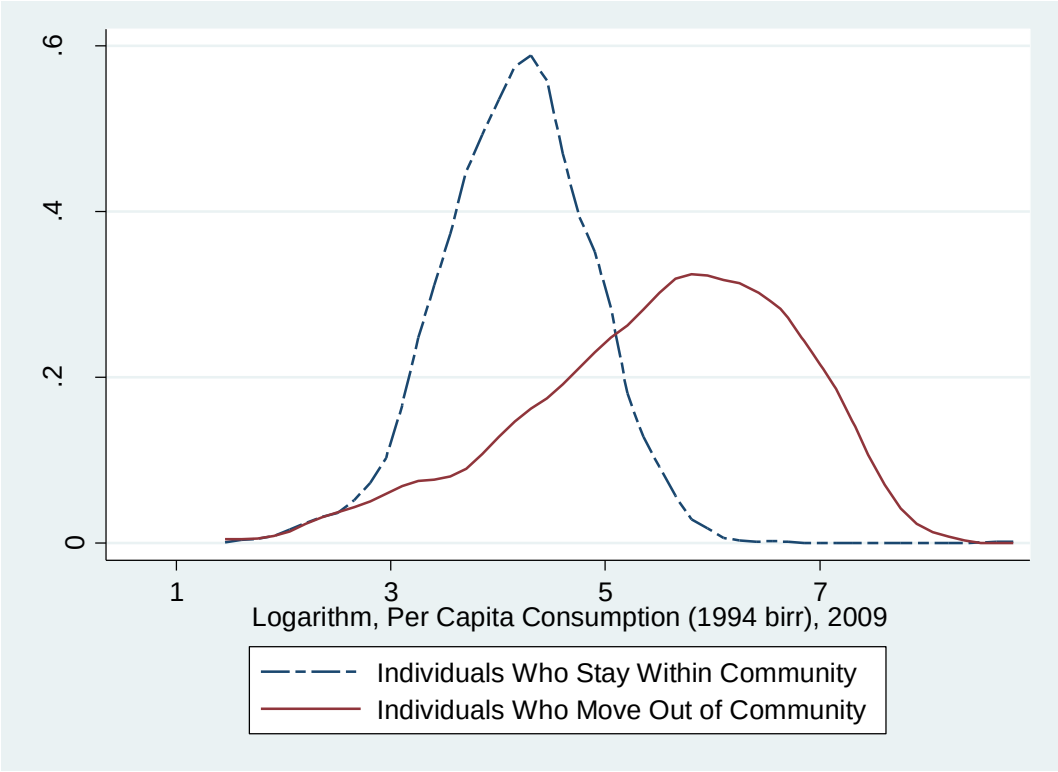


Figure 3. Per Capita Consumption (in 1994 birr), 2009, by whether Individuals Stayed or Moved between 2004/5 and 2009, ERHS Villages

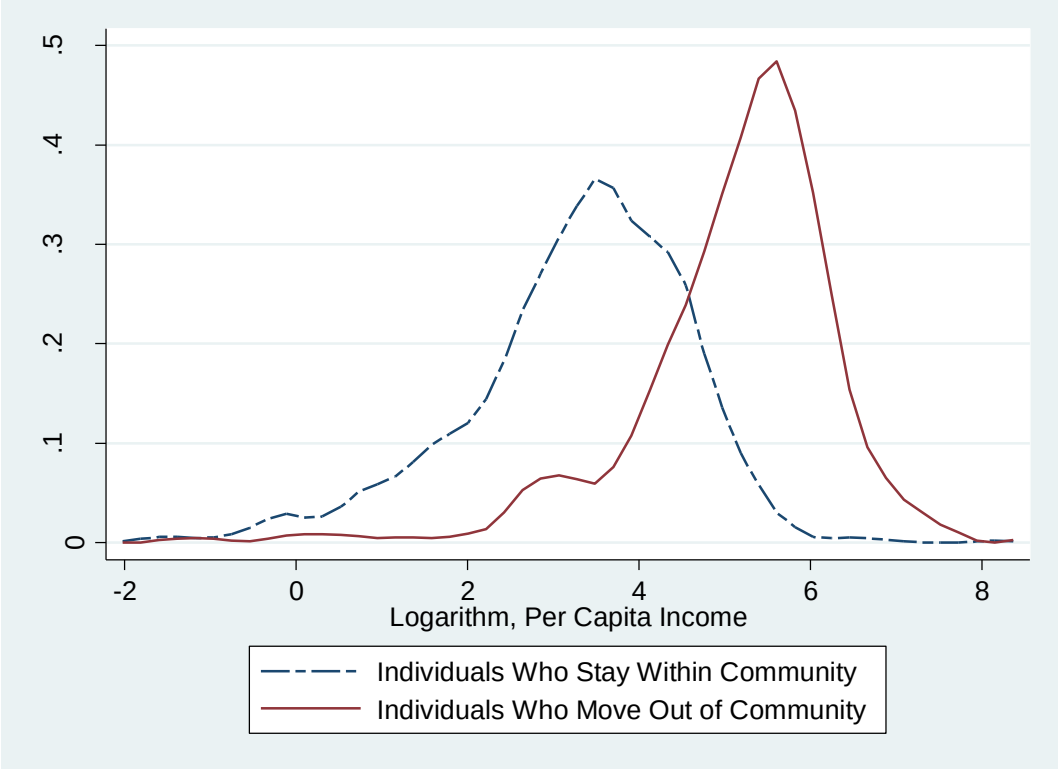


Figure 4. Per Capita Income (in 1994 birr), 2009, by whether Individuals Stayed or Moved between 2004/5 and 2009, ERHS Villages

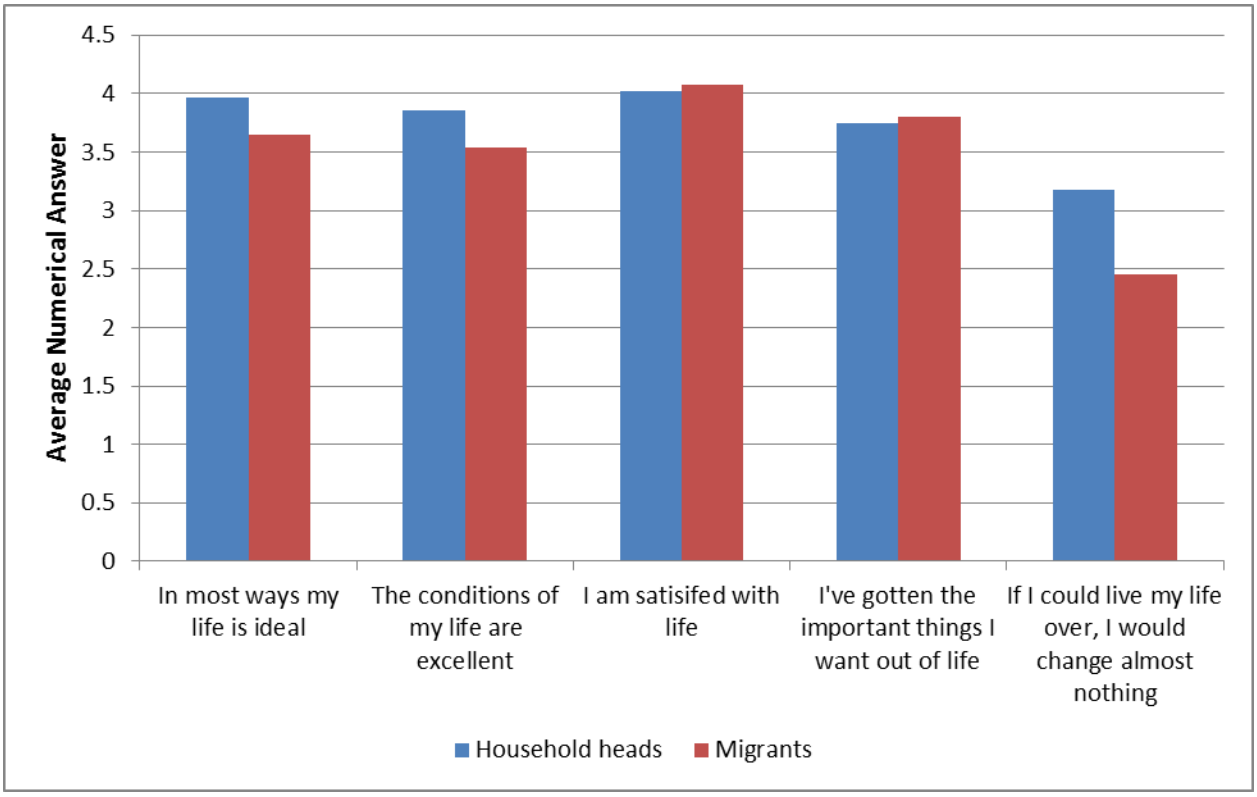


Figure 5. Average Answers to Ordinal Subjective Welfare Questions, Household Heads and Migrants, Ethiopia, 2009

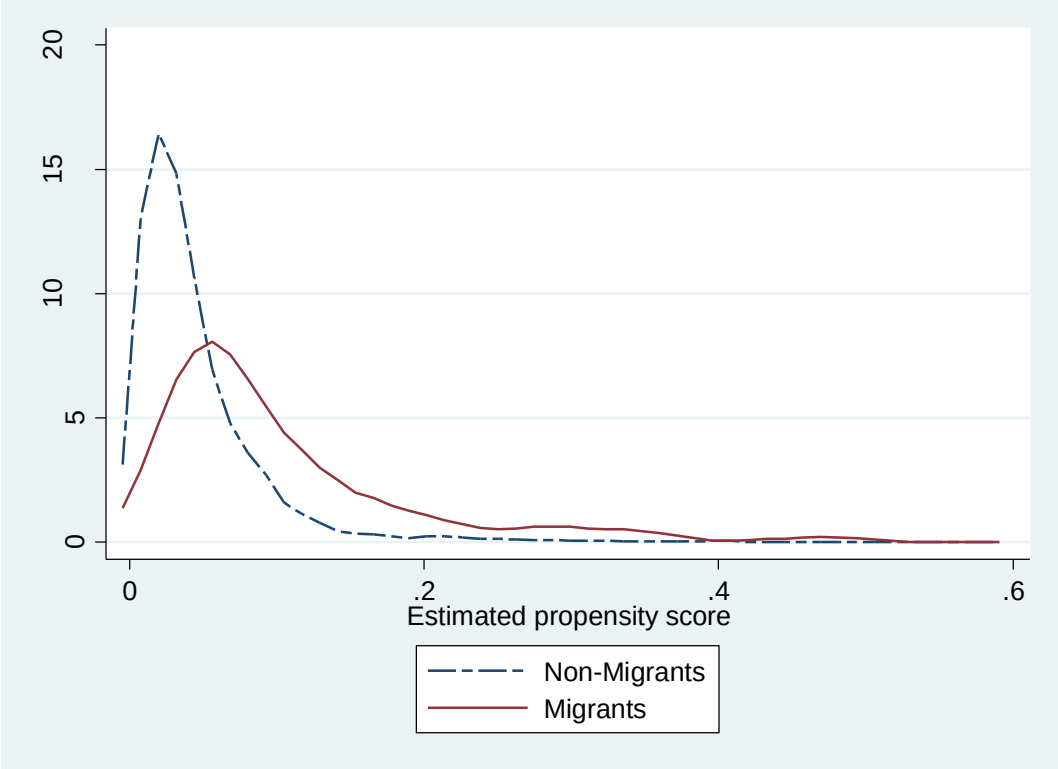


Figure 6. Estimated Density of Propensity to Migrate, ERHS and Migrant Tracking Study, by Tracked Migrant Status in 2009

Table 1: Average Monthly Consumption Per Capita, by Mobility, Ethiopia Rural Household Survey, 2004/5 and 2009

	Average, 2004-5	Average, 2009	Change, 2004-5 to 2009	p-value, difference in means	Number of Obs.
Total consumption per capita (1994 Birr)					
Full Sample	71.47	102.27	30.81		6215
Individuals stayed in village	71.46	85.26	13.80		5912
Individuals moved out of village	71.66	434.31	362.66	0.00	303
Individuals moved to rural area	73.66	392.44	318.78	0.00	199
Individuals moved to urban area	67.81	514.43	446.62	0.00	104
Food consumption per capita (1994 Birr)					
Full Sample	67.41	67.55	0.15		6215
Individuals stayed in village	67.39	67.14	-0.26		5912
Individuals moved out of village	67.70	75.71	8.00	0.41	303
Individuals moved to rural area	69.50	56.01	-13.49	0.28	199
Individuals moved to urban area	64.27	113.40	49.13	0.00	104
Non-food consumption per capita (1994 Birr)					
Full Sample	4.06	31.74	27.68		6215
Individuals stayed in village	4.06	14.15	10.09		5912
Individuals moved out of village	3.95	374.80	370.85	0.00	303
Individuals moved to rural area	4.17	350.87	346.70	0.00	199
Individuals moved to urban area	3.54	420.59	417.04	0.00	104
Consumption poverty headcount (%)					
Full Sample	0.47	0.34	-0.13		6215
Individuals stayed in village	0.47	0.35	-0.12		5912
Individuals moved out of village	0.47	0.13	-0.35	0.00	303
Individuals moved to rural area	0.45	0.15	-0.30	0.00	199
Individuals moved to urban area	0.51	0.08	-0.43	0.00	104

Notes: Consumption figures are reported in 1994 birr; the poverty line in 1994 birr is approximately 50 birr per capita. p-values report whether the change in averages for specific groups of movers is statistically different than the change among individuals who stayed in the village.

Source: ERHS and Migrant Tracking Survey.

Table 2. Average Monthly Income Per Capita, by Mobility, Ethiopia Rural Household Survey, 2004/5 and 2009

	Average, 2004-5	Average, 2009	Change, 2004-5 to 2009	p-value, difference in means	Number of Obs.
Total income per capita					
Full Sample	30.70	61.13	30.44		6171
Individuals stayed in village	30.86	49.67	18.81		5899
Individuals moved out of village	27.21	309.74	282.53	0.00	272
Individuals moved to rural area	22.91	331.20	308.29	0.00	177
Individuals moved to urban area	35.23	269.76	234.52	0.00	95
Crop income per capita					
Full Sample	15.81	28.15	12.34		6171
Individuals stayed in village	16.02	28.57	12.55		5899
Individuals moved out of village	11.42	19.15	7.73	0.51	272
Individuals moved to rural area	11.78	25.69	13.91	0.88	177
Individuals moved to urban area	10.75	6.98	-3.78	0.18	95
Wage income per capita					
Full Sample	2.74	15.68	12.94		6171
Individuals stayed in village	2.73	5.41	2.68		5899
Individuals moved out of village	2.98	238.46	235.48	0.00	272
Individuals moved to rural area	2.76	242.75	239.98	0.00	177
Individuals moved to urban area	3.38	230.47	227.09	0.00	95
Transfer income per capita					
Full Sample	3.74	4.76	1.02		6171
Individuals stayed in village	3.65	4.58	0.93		5899
Individuals moved out of village	5.85	8.70	2.85	0.21	272
Individuals moved to rural area	3.75	7.98	4.23	0.07	177
Individuals moved to urban area	9.77	10.05	0.28	0.79	95
Self employment income per capita					
Full Sample	8.40	12.54	4.14		6171
Individuals stayed in village	8.46	11.12	2.65		5899
Individuals moved out of village	6.96	43.43	36.46	0.00	272
Individuals moved to rural area	4.62	54.79	50.17	0.00	177
Individuals moved to urban area	11.33	22.26	10.93	0.20	95

Notes: p-values report whether the change in averages for specific groups of movers is statistically different than the change among individuals who stayed in the village. Monthly income per capita expressed in 1994 birr.
Source: ERHS and Migrant Tracking Survey.

Table 3. Changes in per Capita Consumption, by Occupational Mobility, ERHS, 2004-5 and 2009

	Change in Consumption		
	Stayed in village	Moved out of village	p-value, Difference in Average Change
Stay in agriculture	-2.85	150.50	<0.01
	(948)	(22)	
Move out of agriculture into non-agriculture	-15.74	325.12	<0.01
	(181)	(35)	
Stay in non-agriculture	3.71	339.82	<0.01
	(991)	(74)	
Move out of non-agriculture into agriculture	6.86	222.24	<0.01
	(210)	(8)	
Stay student	7.60		
	(784)		
Student moves to agriculture	18.55	170.93	<0.01
	(177)	(9)	
Student moves to non-agriculture	-15.48	455.72	<0.01
	(106)	(127)	
Moves out of agriculture to become student	18.99		
	(123)		
Movest ouf of non-agriculture to become student	-1.63		
	(85)		

Notes: Number of observations in group in parentheses below average change. No change for individuals who moved out of the village implies that no individuals fit that category.
Source: ERHS and Migrant Tracking Survey.

Table 4. Subjective Happiness Measures, by Mobility, Ethiopia, 2009

Subjective Happiness Statement Sample or Subsample	Proportion Agreeing, 2009	p-value, difference in proportion	Number of Obs.
Taken all together, these days I am very happy			
Full Sample	0.16		1774
Individuals stayed in village	0.16		1461
Individuals moved out of village	0.17	0.64	313
Individuals moved to rural area	0.17	0.48	206
Individuals moved to urban area	0.15	0.87	107
My food consumption over the past month was more than adequate for my needs			
Full Sample	0.06		1771
Individuals stayed in village	0.06		1459
Individuals moved out of village	0.06	0.66	312
Individuals moved to rural area	0.05	0.54	206
Individuals moved to urban area	0.07	0.95	106
Concerning my housing, it was more than adequate for my needs			
Full Sample	0.08		1770
Individuals stayed in village	0.08		1459
Individuals moved out of village	0.08	0.98	311
Individuals moved to rural area	0.08	0.77	206
Individuals moved to urban area	0.07	0.71	105
Concerning my health care, it was more than adequate for my needs			
Full Sample	0.09		1770
Individuals stayed in village	0.08		1459
Individuals moved out of village	0.13	0.01	311
Individuals moved to rural area	0.12	0.05	205
Individuals moved to urban area	0.14	0.03	106
In general, I would describe myself as doing well, able to meet my needs by my own efforts and making some extra			
Full Sample	0.09		1740
Individuals stayed in village	0.08		1436
Individuals moved out of village	0.13	0.00	313
Individuals moved to rural area	0.11	0.12	206
Individuals moved to urban area	0.18	0.00	107
I am a lot richer compared to my father at about the same age			
Full Sample	0.06		1678
Individuals stayed in village	0.07		1422
Individuals moved out of village	0.05	0.34	256
Individuals moved to rural area	0.03	0.05	172
Individuals moved to urban area	0.10	0.32	84

Notes: p-values report whether proportions for specific groups of movers are statistically different than the proportion agreeing among individuals who stayed in the village.
Source: ERHS and Migrant Tracking Survey.

Table 5. Impacts of Migration on Change in Consumption per Capita, Ethiopia, ERHS and Migrant Tracking Survey

	(1)	(2)	(3)
Migrant	1.284***	1.255***	1.346***
	(0.110)	(0.109)	(0.107)
Male	-0.001	-0.020	-0.000
	(0.018)	(0.021)	(0.009)
Aged 5 to 15	0.208***	0.195***	-0.020
	(0.064)	(0.066)	(0.023)
Aged 16 to 25	0.212***	0.182***	-0.004
	(0.059)	(0.062)	(0.023)
Aged 26 to 35	0.187***	0.160**	-0.024
	(0.065)	(0.065)	(0.026)
Aged 36 to 45	0.186***	0.176***	-0.017
	(0.066)	(0.064)	(0.022)
Aged 46 to 55	0.152**	0.155**	-0.017
	(0.069)	(0.070)	(0.025)
Aged 56 to 65	0.123	0.125	-0.020
	(0.085)	(0.085)	(0.028)
Education less than 8 years		0.064	0.034***
		(0.052)	(0.010)
Education between 8 and 12 years		0.137	0.115***
		(0.089)	(0.037)
Education is 12 years		0.319***	0.065
		(0.116)	(0.065)
Initial household fixed effect?	no	no	yes
Observations	6,133	6,054	5,959
R-squared	0.080	0.083	0.464

Notes: Standard errors clustered at the village level in parentheses. ***- indicates significance at the 1 percent level; **- indicates significance at the 5 percent level; *- indicates significance at the 10 percent level.
Source: ERHS and the Migrant Tracking Survey.

Table 6. Impacts of Migration on Change in Income per Capita, Ethiopia, ERHS and Migrant Tracking Survey

	(1)	(2)	(3)
Migrant	2.044***	1.989***	1.964***
	(0.138)	(0.140)	(0.149)
Male	0.006	-0.029	0.002
	(0.033)	(0.037)	(0.011)
Aged 5 to 15	0.034	-0.032	0.007
	(0.123)	(0.132)	(0.026)
Aged 16 to 25	0.099	0.000	0.007
	(0.114)	(0.123)	(0.026)
Aged 26 to 35	-0.101	-0.181	-0.012
	(0.115)	(0.124)	(0.027)
Aged 36 to 45	0.037	-0.020	-0.003
	(0.127)	(0.131)	(0.030)
Aged 46 to 55	-0.020	-0.048	0.015
	(0.133)	(0.137)	(0.026)
Aged 56 to 65	-0.146	-0.170	-0.007
	(0.119)	(0.118)	(0.027)
Education less than 8 years		0.122*	0.037***
		(0.062)	(0.013)
Education between 8 and 12 years		0.388***	0.120***
		(0.118)	(0.034)
Education is 12 years		0.446***	0.034
		(0.153)	(0.082)
Initial household fixed effect?	no	no	yes
Observations	5,505	5,434	5,341
R-squared	0.095	0.100	0.578

Notes: Standard errors clustered at the village level in parentheses. ***- indicates significance at the 1 percent level; **- indicates significance at the 5 percent level; *- indicates significance at the 10 percent level.
Source: ERHS and the Migrant Tracking Survey.

Table 7. Impacts of Migration on Change in Consumption and Income per Capita, Estimated with Instrumental Variables techniques, Ethiopia, ERHS and Migrant Tracking Survey

	Consumption		Income	
Explanatory Variables	(1)	(2)	(3)	(4)
Migrant	1.729***	1.963***	2.163***	1.479**
	(0.142)	(0.314)	(0.201)	(0.743)
Male		-0.006		0.008
		(0.010)		(0.011)
Aged 5 to 15		-0.050*		0.035
		(0.030)		(0.043)
Aged 16 to 25		-0.068*		0.054
		(0.037)		(0.067)
Aged 26 to 35		-0.063**		0.024
		(0.030)		(0.049)
Aged 36 to 45		-0.028		0.012
		(0.026)		(0.027)
Aged 46 to 55		-0.019		0.025
		(0.030)		(0.026)
Aged 56 to 65		-0.034		0.006
		(0.031)		(0.029)
Education less than 8 years		0.028**		0.043**
		(0.011)		(0.017)
Education between 8 and 12 years		0.058		0.157**
		(0.043)		(0.073)
Education is 12 years		-0.086		0.150
		(0.112)		(0.185)
Observations	5,971	5,801	5,348	5,209
Kleibergen-Paap F statistic (weak instruments)	35.78	17.65	27.24	7.61
Hansen J Statistic (overidentification; p-value)	5.06 (0.08)	2.03 (0.36)	1.25 (0.54)	1.84 (0.40)
R-squared	0.423	0.370	0.571	0.544

Notes: All equations are estimated using instrumental variables; first stage results can be found in Appendix Table A.2. Standard errors clustered at the village level in parentheses. *- indicates significance at the 1 percent level; **- indicates significance at the 5 percent level; ***- indicates significance at the 10 percent level. All Kleibergen-Paap F statistics significant at the 1 percent level or better.

Source: ERHS and the Migrant Tracking Survey.

Table 8. Nearest Neighbor Matching Estimates of the Impact of Migration on Per Capita Consumption and Income, Ethiopia

	Full Sample (1)	Propensity Score Between 0.01 and 0.5 (2)	Propensity Score Between 0.01 and 0.2 (3)	Propensity Score Between 0.02 and 0.2 (4)
Per capita consumption	1.30	1.34	1.30	1.32
	(0.09)	(0.09)	(0.10)	(0.10)
Number of Obs.	5,781	5,012	4,877	4,047
Per capita income	1.84	1.84	1.86	1.85
	(0.11)	(0.12)	(0.13)	(0.13)
Number of Obs.	5,199	4,533	4,408	3,657

Notes: Standard errors in parentheses. All estimates are significant at below the 0.01 level.
Source: ERHS and Migrant Tracking Survey.

Table 9. Impacts of Migration on Change in Consumption and Income per Capita Conditional on Migrant Characteristics, Estimated with Ordinary Least Squares, Ethiopia, ERHS and Migrant Tracking Survey

	Consumption			Income		
	(1)	(2)	(3)	(4)	(5)	(6)
Male migrant	1.459***			2.152***		
	(0.129)			(0.164)		
Female migrant	1.166***			1.620***		
	(0.133)			(0.179)		
Rural migrant		1.245***			1.965***	
		(0.124)			(0.188)	
Urban migrant		1.529***			1.963***	
		(0.174)			(0.203)	
Migrant			1.423***			1.871***
			(0.163)			(0.240)
Migrant*Gains to education			0.004			0.044
			(0.036)			(0.042)
Chi-squared test:						
Male=Female (p-value)	0.06			0.00		
Chi-squared test:						
Rural=Urban (p-value)		0.15			0.99	
Observations	5959	5959	2929	5341	5341	2668
R-squared	0.469	0.469	0.528	0.589	0.578	0.556

Source: ERHS and the Migrant Tracking Survey.

Table 10. Impacts of Occupational Change, Migration, and the Interactions thereof on Change in Consumption and Income per Capita, Estimated with Ordinary Least Squares, Ethiopia, ERHS and Migrant Tracking Survey

	Consumption		Income	
Explanatory Variables	(1)	(2)	(3)	(4)
Migrant	1.406***	1.314***	1.985***	1.885***
	(0.132)	(0.178)	(0.185)	(0.267)
Move out of agriculture into non-agriculture	-0.016	-0.019	0.008	0.005
	(0.030)	(0.030)	(0.028)	(0.029)
Student moves to non-agriculture		-0.039*		-0.051*
		(0.021)		(0.028)
Migrant*Move out of agriculture into non-agriculture	-0.094	0.004	0.175	0.284
	(0.261)	(0.310)	(0.321)	(0.377)
Migrant*Student moves to non-agriculture		0.214		0.237
		(0.194)		(0.266)
90% Confidence Interval				
Migrant+Migrant*Move out of agriculture into agriculture	[0.88, 1.75]	[0.88, 1.76]		[1.62, 2.71]
90% Confidence Interval				
Migrant+Migrant*Student moves to non-agriculture		[1.28, 1.77]	[1.62, 2.70]	[1.82, 2.42]
Observations	3,593	3,593	3,298	3,298
R-squared	0.484	0.486	0.581	0.582

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Appendix Table A.1. Destinations of International Migrants, ERHS Tracking Survey

Destination	Number of Migrants
Saudi Arabia	50
Sudan	15
Dubai/United Arab Emirates	14
South Africa	2
Somalia	1
Djibouti	1
Bahrain	1
United States	1

Appendix Table A.2. Descriptive Statistics for Variables Included in Regressions, ERHS and Migrant Tracking Survey

	N	Mean	Standard Deviation
Change in (logged) monthly consumption per capita	6214	0.30	1.01
Change in (logged) monthly income per capita	5569	0.44	1.45
Moved out of community	6461	0.05	0.21
Individual baseline characteristics (2004-5)			
Male	6374	0.50	0.50
Some primary education	6372	0.49	0.50
Completed primary education	6372	0.06	0.24
Completed secondary education	6372	0.02	0.13
Age 5-15 years	6457	0.28	0.45
Age 16-25 years	6457	0.27	0.44
Age 26-35 years	6457	0.14	0.35
Age 36-45 years	6457	0.12	0.33
Age 46-55 years	6457	0.08	0.27
Age 56-65 years	6457	0.06	0.24
Baseline excluded instruments			
Head or spouse	6455	0.40	0.49
Head's ethnicty is Tigrayan*Age 5-15	6269	0.03	0.16
Head's ethnicity is Gamo*Age 5-15	6269	0.01	0.08

Appendix Table A.3. First Stage Regressions, Relationship Between Migration and Proposed Instruments, Ethiopia

Variable	(1)	(2)	(3)	(4)
Male		0.005		0.011*
		(0.006)		(0.006)
Aged 5 to 15		0.004		0.015
		(0.017)		(0.016)
Aged 16 to 25		0.052***		0.056***
		(0.016)		(0.016)
Aged 26 to 35		0.036**		0.049***
		(0.017)		(0.017)
Aged 36 to 45		0.012		0.020
		(0.013)		(0.013)
Aged 46 to 55		0.001		0.012
		(0.014)		(0.015)
Aged 56 to 65		0.018		0.023
		(0.014)		(0.014)
Education less than 8 years		0.013**		0.013**
		(0.006)		(0.006)
Education between 8 and 12 years		0.087***		0.085***
		(0.022)		(0.021)
Education is 12 years		0.242***		0.233***
		(0.059)		(0.064)
Head or spouse	-0.068***	-0.047***	-0.061***	-0.040***
	(0.007)	(0.011)	(0.007)	(0.011)
Head is of Tigray ethnicity*Age 5-15 years	-0.099***	-0.060***	-0.088***	-0.048***
	(0.013)	(0.012)	(0.020)	(0.018)
Head is of Gamo ethnicity*Age 5-15 years	-0.130***	-0.093**	-0.149***	-0.120**
	(0.035)	(0.036)	(0.053)	(0.054)
Observations	5,971	5,801	5,348	5,209
R-squared	0.03	0.07	0.03	0.06
F statistic, Instruments	35.78	17.65	27.24	7.61

Notes: Columns correspond to IV estimates in Table 7. Standard errors clustered at the village level in parentheses. *- indicates significance at the 1 percent level; **- indicates significance at the 5 percent level; ***- indicates significance at the 10 percent level.
Source: ERHS and Migrant Tracking Survey.

Appendix Table A.4. Probit Underlying Propensity Scores Used to Ascertain Appropriateness Of Matching Methods For Estimating Impact of Migration on Consumption, Ethiopia

Explanatory Variable	Estimated Marginal Effect
Age of Individual (/10)	0.018 (0.010)*
Age, squared (/100)	-0.004 (0.002)**
Gender (1=Male)	0.014 (0.005)***
Education less than 8 years	0.010 (0.005)**
Education between 8 and 12 years	0.085 (0.022)***
Education is 12 years	0.236 (0.070)***
Age of Household Head (/10)	0.007 (0.002)***
Years of Education, Household Head	-0.010 (0.003)*
Log, Land per capita, Household	-0.010 (0.003)***
Tropical Livestock Units Owned	-0.0002 (0.001)
Number of Sons, Head	-0.001 (0.001)
Number of Daughters, Head	0.001 (0.002)

Notes: Standard errors clustered at the village level in parentheses. Estimates are reported as marginal effects, evaluated at the mean of the independent variable when variable is continuous. . *- indicates significance at the 1 percent level; **- indicates significance at the 5 percent level; ***- indicates significance at the 10 percent level.
Source: ERHS and Migrant Tracking Survey.