Migration, Youth, and Agricultural Productivity in Ethiopia

Alan de Brauw*

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Abstract: This paper explores the relationship between migration and agricultural productivity in Ethiopia. Given that there are fairly significant returns to either rural-urban or international migration for labor in Ethiopia, it could be that credit constraints hindering migration start-up are an unexplored constraint against migration. The paper primarily uses the Ethiopia Rural Household Survey panel and a migrant listing exercise completed after the 2009 survey round to explore whether past agricultural productivity (e.g. in 2004) explains later migration. Using standard regression techniques, it finds that among young migrants, there appears to be a positive, significant relationship between productivity and households sending out a migrant. This relationship holds even when proxies for credit are included in the model; the effect appears to, in fact, be stronger among households who are less endowed with land. However, the magnitude of this effect is small. The paper also considers feedback effects from migration to later agricultural productivity; this correlation is weaker suggesting that migration does not have negative productivity impacts.

* Alan de Brauw is a Senior Research Fellow, Markets, Trade, and Institutions Division, International Food Policy Research Institute, 2033 K Street, NW Washington, DC 20006 USA, phone: + 1 202 862 5698, e-mail:a.debrauw@cgiar.org. I thank Jill Bernstein for excellent research assistance without which this paper would not be possible, as well as Yisehac Yohannes for providing some help with the data. Ruth Vargas Hill, Daniel Ali, and Forhad Shilpi all provided comments that improved the paper. I thank the World Bank for funding the writing of the paper; all errors are my own. The data used in the paper have been made available by the Economics Department, Addis Ababa University, the Centre for the Study of African Economies, University of Oxford and the International Food Policy Research Institute. Funding for data collection was provided by the Economic and Social Research Council (ESRC), the Swedish International Development Agency (SIDA) and the United States Agency for International Development (USAID); the preparation of the public release version of these data was supported, in part, by the World Bank. AAU, CSAE, IFPRI, ESRC, SIDA, USAID and the World Bank are not responsible for any errors in these data or for their use or interpretation.

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1. Introduction

Migration is an inherent part of the economic development process. Potential labor migrants in particular consider leaving home in order to earn higher returns to their labor. Standard models of migration predict that migrants move due to wage gaps between rural and urban areas (Lewis, 1954; Harris and Todaro, 1970). A recent empirical literature backs up the theory. In many countries, there are substantial gaps in returns to labor in agriculture versus other sectors of the economy (McMillan and Rodrik, 2013; Gollin, Lagakos, and Waugh, 2014), implying that there is potentially significant pressure in many countries for additional rural-urban migration to take place, for returns to labor to equilibrate between rural and urban sectors. Internationally, returns to specific types of human capital are even more imbalanced. Evidence demonstrates that migrants can significantly increase the returns to their human capital simply by migrating internationally (e.g. Rosenzweig 2010; Clemens 2011; McKenzie, Gibson and Stillman, 2010).

Given the clear returns to either internal or international labor migration, one might ask why migration rates are not actually higher. Initially considering internal migration, one might consider several potential barriers. First, implicit or explicit policy barriers might hinder migration. For example, in China the *hukou* system explicitly limited movement from rural to urban areas (e.g. Fan, 2008). Other policies, such as those related to land tenure, can also create implicit barriers (e.g. Yang, 1997; de Brauw and Mueller, 2012). Governments concerned about food security, which coincide with countries vulnerable to macroeconomic shocks, can implement policies that foster agricultural production to the detriment of worker movement. Young (2013) suggests that rural-urban distortions in capital and technology endowments drive low skilled workers to rural areas and high skilled workers to urban areas.

Alternatively, constraints affecting households potential migrants may also hinder either rural-urban or may lack information about employment in distant areas, leading to wage gaps. Two potentially important constraints relate to information and capital, and both derive from the fact that migration is at the very least initially costly. Potential migrants may lack information about the types of employment available in urban areas, particularly if migrant networks do not reach them. Uncertainty about potential returns to labor could lead to perceptions of migration as too risky (Bryan, Chowdhury, and Mobarak, 2014). In sub-Saharan Africa, such uncertainty may be exacerbated, as most urban opportunities are in the informal sector (Fox and Gaal, 2008). Capital, in the form of credit or liquidity constraints, may be a further constraint. Migration implies the movement from one place to another, which implies both costs of transportation and a place to live when away from the source household. Without a source of capital for these start-up costs and in the absence of capital, potential migrants might not be able to move.

This paper indirectly studies constraints to migration faced by rural household members from a relatively unique perspective. Specifically, the paper primarily investigates the relationship between migration and agricultural productivity in Ethiopia. Ethiopia is an interesting case study as a relatively large proportion of the population continues to live in rural areas, even for its per capita GDP (e.g. Taylor and Martin, 2001). Further, using the same data set used in this paper, de Brauw, Mueller and Woldehanna (2014) show that returns to labor in rural-urban migration are quite high (110 percent, relative to not migrating), whether migration is to rural or urban areas. Though de Brauw and Mueller (2012) show that land tenure appears to be a constraint to migrating in Ethiopia, the magnitude of such effects are quite small. Consequently, it does not seem that land tenure rights could hinder migration enough to drive the returns found in the former paper. Given relatively low migration rates, other constraints to migration may bind in Ethiopia.

The relationship between migration and agricultural productivity may be particularly interesting in agrarian settings for the following reasons. Agriculture is the primary source of rural household income, and so proceeds from agricultural production are the main source of liquidity for the household. If households in general face constraints against investing in migration, one would expect migration to be more likely to occur from more productive households. Alternatively, if less productive households send out migrants, one would infer that credit constraints are not an issue; and in fact higher productivity households find that retaining the labor of potential migrants locally would be more productive. With an appropriate data set, one could potentially differentiate between these two hypotheses.

This paper uses unique data from Ethiopia to at least indirectly test whether liquidity constraints affect migration in Ethiopia. The paper uses the Ethiopia Rural Household Survey (ERHS) to measure agricultural productivity, which was conducted seven times between 1994 and 2009 in the same peasant associations (PAs), which are amalgamations of natural villages.[1] A migrant tracking survey was conducted after the 2009 survey round, which focused on learning about migrants from the households located in the 2004 or 2009 survey rounds. The migrant tracking survey consisted of a migrant listing exercise that took place in the ERHS villages and a survey among tracked migrants. The migrant listing exercise can be used to investigate all labor migrants from households, even if the labor migrants could not be located in the tracking survey.

In this paper, I concentrate on understanding whether agricultural productivity is influenced by migration by individuals aged 25 and under, rather than among all adult migrants. There are several good reasons to focus on younger individuals. First, such individuals are in the process of making decisions about when to finish their schooling, when to get married (and to

[1] The ERHS panel actually originated in 1989 in six PAs; the sample was expanded to 15 PAs in 1994, and in the 2004 and 2009 rounds three additional PAs were enumerated. This paper uses the expanded set of 18 PAs.

whom), and what type of work to do after their schooling is completed. So their decisions to migrate for work are of particular economic interest; they are also less likely to migrate with children or the remainder of their family. Second, in Ethiopia most on- and off-farm work is manual labor intensive, and individuals under 25 are typically considered among the most productive manual laborers. So the loss of such workers from households might be expected to have the largest productivity effects in the agricultural context.

To meet the objective of the paper, it proceeds as follows. The next section describes the data in more detail, and includes some descriptive information about migrants enumerated through the listing exercise. The third section describes the conceptual framework in a bit more detail. The fourth section first describes measures of agricultural productivity in the ERHS, and then provides descriptive statistics relating migration and agricultural productivity. The fifth section examines partial correlations between various measures of migration and agricultural productivity using a regression framework, including a discussion of potential threats from unobservables. The sixth section concludes with a discussion of potential avenues for additional work.

2 Data

To begin discussing migration and agricultural productivity, it is first worthwhile to better introduce the data sets used in analysis. The paper uses the ERHS panel combined with data from a migrant listing exercise and tracking survey conducted among migrants from the ERHS households and villages in late 2009. The migrant tracking survey was specifically designed to track migrants who were more likely to be employed and therefore more likely to remit money back to the household. This section first describes both the ERHS and the relevant components of the migrant tracking study, and then describes how the matching sample of households and migrants used in this paper was constructed.

2.1. Ethiopian Rural Household Survey

The ERHS is a unique, longitudinal household dataset collected by Addis Ababa University, the University of Oxford, and the International Food Policy Research Institute. It followed households from fifteen administrative villages from 1994 to 2009, which largely reflect the diversity of farming systems in Ethiopia. Three additional administrative villages were added to the sixth round in 2004, and those villages were surveyed in early 2005. The 2009 round then included all eighteen villages. The survey includes modules, among others, on household characteristics, agriculture and livestock, agricultural shocks, food consumption, and health, among others. The ERHS has primarily been used to study aspects of risk and poverty dynamics in Ethiopia (for example, Dercon, Hoddinott, and Woldehanna 2007; Fafchamps, Kebede, and Quisumbing 2009; Kadiyala et al. 2009). This paper primarily focuses on the latest two rounds of the panel, which occurred in 2004/05 and 2009, using data from the expanded 18 village sample.

2.2 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 enumerated in that round; this component is called the migrant listing exercise. 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 listing exercise 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. Of the 1,612 households in the 2004/05 survey, 1,595 households were identified in the listing exercise.

The focus of the migrant tracking study was to learn about migration and remittance behavior in Ethiopia over the five year period between 2004 and 2009. Therefore, the listing exercise respondent was asked several detailed questions to restrict the sample of migrants to those who likely migrated for the purpose of employment rather than, for example, marriage. Households were initially asked 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 over the past five years, and were not present at the time of the tracking survey. To further filter the sample, household heads were asked to specify the reason each migrant left the household. Based on these responses, the tracking sample was restricted 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. Among those who were selected for tracking, some basic information about individuals and detailed information about how to find the individual at the destination was collected. Enumeration teams were instructed only to follow family members of the household head, since relatives are more likely to send remittances. When the entire household had moved out of the village, the entire household was followed if community leaders reported the household had left primarily for economic reasons.

Based on the tracking protocol, 470 total migrants were eligible to be tracked; of those, 294 migrants were under 25 years old and form the focus of this paper (Table 1). Migrants were slightly more likely to be male than female (53.4 percent of migrants are male). Just under 20 percent of emigrants were overseas at the time of the tracking survey; the most common destinations were in the Middle East, and international migrants were more likely to be female

than male. This finding is consistent with young women being recruited from Ethiopia for domestic work in the Middle East. Among internal migrants, somewhat surprisingly rural destinations were more likely than urban destinations; of the 237 internal migrants, 54 percent went to rural destinations.[2] Rural-rural migrants tended to find work on large farms or plantations as hired laborers. Among rural-urban migrants, more than half reside in Addis Ababa, which is not surprising as it is by far the largest city in Ethiopia. In sum, migrant destinations from the ERHS villages are quite diverse.

3 Conceptual Framework

Understanding the role of migration in economic development has long been a focus of the development literature (Lewis, 1954; Fei and Ranis, 1964). Whereas initial theories effectively suggested that migration took place primarily so that migrants could obtain higher returns to their human capital, more recent theory suggests that migration may also arise as part of a household strategy to overcome other constraints (Lucas and Stark, 1985). Such constraints can include credit constraints, liquidity constraints, or a lack of insurance against risk. In such an environment, household participation in migration arises so that it can make investments in its farm or non-farm income generating activities. In either case, consistent with persistent, higher returns to human capital outside of agriculture (e.g. Gollin, 2014), migration should be poverty reducing both through increased returns to labor for the migrant and through investment in production by the source household.

Though migration should be poverty reducing, its relationship with agricultural production at the household level may be complex. Succinctly, the migrant leaving may cause a lost labor

[2] Five migrants moved to destinations that could not be found and could not be retrospectively classified as either rural or urban.

effect on agricultural productivity, while remittances may have the opposite effect by helping households overcome constraints on production.[3] Yet agricultural production or productivity may also affect migration. Specifically, households must be able to overcome any upfront costs to migration before migrants can be sent out. For internal migration, such costs include the actual transportation costs to the destination, plus initial costs of finding a place to live and any costs related to a job search. For international migration, costs also include visas and passports, which can be substantial (McKenzie, 2007).

If credit constraints bind, before households can send out a migrant they must have enough income or savings to support the initial migrant. Considering households engaging in agricultural production, lower productivity households may be constrained against sending out migrants, while higher productivity households would be able to do so. Alternatively, if credit constraints did not bind, there should not be a relationship between previous agricultural productivity and later migration. Further, these are not the only constraints that might hinder migration; for example, if households traditionally produce labor intensive crops, then in the absence of local labor markets farm households producing those crops would be less likely to send out migrants, at least during key parts of the agricultural season.

Finally, other factors can play a role in determining household participation in migration. Households may rear livestock for income, they may run non-agricultural businesses, they might work locally for wages, or they might do a combination of all of those activities. All of these activities could lead to additional migrant opportunity for household members, since they could all affect the credit constraint. Yet they could also affect the labor constraint; for example, if the

[3] As this is an empirical question, several papers have explored the effects of migration on agricultural production or productivity (e.g. Rozelle, Taylor and de Brauw, 1999; McCarthy et al., 2009; Miluka et al., 2010 ; Damon, 2010; de Brauw, 2010).

individual within a household who would best candidate for migration worked off-farm for a wage or managed the household's non-agricultural business, the individual would likely not migrate.

From the perspective of confounding activities, Ethiopia is a good place to study whether migration and agricultural productivity have the link hypothesized above. Among smallholders, local off-farm opportunities are limited. Consequently, agricultural production takes on a prominent role in household income generation. Additionally, the low migration rates for employment suggest that constraints of some type hinder migration, given substantial returns found from the ERHS households. De Brauw, Mueller and Woldehanna (2014) find that the returns to migration in terms of consumption are between 83 and 113 percent, only considering migrants who could be tracked.[4] Without constraints on migration, one would expect much higher migration rates.

4 Measures of Migration and Agricultural Productivity

4.1. Migration at the Household Level

To better understand the interaction between agricultural productivity and migration, in the primary analysis we must aggregate migration up to the household level, since agricultural production statistics cannot be disaggregated easily by household member; it would be nearly impossible to attribute production to specific household members. The 294 young migrants come from a total of 240 households that are included in this study. Since 1577 households could be identified in both the 2004/5 and 2009 survey rounds in total, the other 1337 households are

[4] Based on the literature, one would expect returns to international migration to be even higher (e.g. Clemens, 2011).

labelled as non-migrant households.[5] In descriptive work, migrant households are initially disaggregated by destination, but in regressions they are all treated as migrant households together.

As a first exploration of migrants and the conditions in source households, I aggregate migration by individuals under 25 up to the household level, and examine the relationship between source household well-being and migration (Appendix Table 1). In 2004, households that migrants would later leave appear to have more livestock, though not necessarily oxen. Yet they are more likely to be classified as poor by consumption expenditures, and they have less land than other households on average. In 2009, migrant households continue to appear to have more livestock and perhaps slightly more oxen, yet their consumption levels are slightly lower than non-migrant households as do per capita landholdings. In particular, households that rural migrants left appear to be even poorer than the average reported by Dercon et al. (2012).[6] In sum, overall household wealth does not appear to play a large role in migration.

4.2. Measuring Agricultural Productivity

The next question is how to measure agricultural productivity. As the ERHS was originally designed to include villages in all of the cropping systems present in Ethiopia, measurement of productivity is a real challenge, since one needs to find a measure that can incorporate all of the production types and varying crops at once. To demonstrate how much production decisions vary, we show the proportion of households growing each of the nine major crops in the data set (seven

[5] It should be noted that the households classified as "non-migrant households" did not send out a migrant under 25 years old that fit the tracking criteria. Therefore this category includes both households that only sent out a migrant over 25 years old or individuals who may have left these households for other reasons, such as marriage. Removing such households from analysis would create a selection bias that would be difficult to model; without modeling this bias, all regression results in the paper are robust to the removal of households that only sent out migrants over 25 years old.

[6] A major reason for the apparent large increase between the 2004/5 and 2009 poverty rates in the whole sample was that a sizeable share of households were near the poverty rate in 2004/5 and rapid inflation between rounds left such households on the other side of the line by 2009 (Dercon Hoddinott, and Woldehanna, 2012).

staples, plus coffee and chat; Figure 1). It is somewhat remarkable that no single crop is grown by half of the sample in either 2004/5 or 2009; six different grains plus enset are grown by between roughly 20 and 40 percent of the sample. Coffee is grown by around 22 percent of the sample and chat by only 7 percent in 2004/5, but that percentage rose to 13 percent by 2009. Clearly, the variety of cropping decisions made by households is both heterogeneous over space and involves a relatively large number of crops.

Moreover, different crops will have different average yields under similar conditions, so using yields to measure productivity is almost certainly inadequate. For example, teff yields are quite low relative to maize yields (e.g. Vandercasteele et al., 2013). Moreover, households may grow more than one of the nine crops, and may apportion better land to one crop or the other based on preferences, income maximization, or a combination thereof, if the household cannot separate production and consumption decisions.

One potential measure of productivity would be the gross value of all crops grown by the household. This measure is constructed by measuring the quantity of each crop grown and then multiplying by some price, and then the value of all crops produced by each household are summed. Ideally, the price would be the price for which the household perceived it could sell its output at planting time, since decisions would have been made about how much land (and of what quality) to allocate to various crops. A next best would be the producer price received, but not all households sell crops, so neither of these are generally available. To compute this quantity, then, prices are derived from median sales prices at the village level, then if not available at the regional level.

As an alternative measure, for each PA we measured the most commonly grown crop by tabulating the proportion of households growing all major grain crops by PA. In all 18 PAs, an obvious main crop can be identified, although in a few PAs (Sirbana Godeti, Gara Godo) there are clearly two main crops. Within each PA, the household level yield for that crop was normalized; that is, the average PA level yield for the primary crop was subtracted from the household yield and divided by the PA level standard deviation. Among households growing the main grain crop in the PA, this variable then gives a measure of the relative productivity level for the main staple.

4.3. Migration and Agricultural Productivity: Descriptive Statistics

To initially explore productivity by household migration status, we initially measure average reported yields for the four most commonly grown staple crops (Table 2). The means, which are all conditional on growing the crop, provide no discernable pattern. While average yields for maize were higher among migrant households in 2004/5 than among non-migrant households, average yields among migrant households were lower for white teff and about the same as among non-migrant households for barley and wheat. Since different crops are grown in different places, it could be that accounting for location could yield more consistent patterns; however, if one did control for location the averages would then reflect selection into growing these crops as well.

Recall that from the perspective of 2004/5, migration occurs in the future, so the relationship between average yields by migration status is asking whether higher or lower agricultural productivity leads to migration in the future. One might also ask whether migration affects future production. If it does, such differences are also perhaps masked by locational differences. Yields among migrant households in 2009, after the migrant has left, are lower for

barley and wheat relative to non-migrant households. For white teff and maize, yields are higher among migrant households than non-migrant households. Nonetheless, given that migration rates can be spatially heterogeneous, as cropping patterns are, these averages on their own may not be particularly meaningful.

Consequently, we next aggregate up revenue for those nine major crops, and measure differences in average total revenues. In 2004/5, migrant households had slightly higher overall revenue than non-migrant households (1705 birr versus 1607 birr); however, the difference is not statistically significant. By 2009, the value of migrant household production actually jumps relative to the value of non-migrant household production (2589 birr versus 2138 birr); whereas average differences are larger, they are not quite statistically significant.[7] Nonetheless, as with cropping patterns these averages may mask significant differences over space. Moreover, they do not account for differential land size; as migrant households have slightly less land (on a per capita basis), they may in fact be more productive with the land they own. However, if credit constraints are the issue hindering migration then the total value of production should matter more than the value on a per hectare or per capita basis.

As such, we next take the logarithm of the value of production in 2004/5, and regress it on a full set of PA dummies. We then take the residuals from this regression, and plot kernel densities of the residuals by migration status (Figure 2). Once the PA averages are removed, the distribution of the value of agricultural production appears to be shifted slightly over to the right among migrant households. In other words, households that migrants leave in the future appear to have slightly

[7] The 2009 figures are deflated to 2009 using the internally consistent food price index for consumption; they are not deflated back to 1994 as consumption figures in the paper are, though there was not significant inflation between 1994 and 2004. The advantage to using this index is that it accounts for spatial differences in inflation; however, a disadvantage is that producer prices may have evolved differently than consumer prices over that time period.

higher value of agricultural production than non-migrant households, though it may be that these differences are too subtle to find in a regression framework.

Whereas overall agricultural productivity is certainly of interest, we might also be interested in the value of production per unit of land. We next repeat the above graph controlling for the household land holdings (Figure 3). We find a similar pattern; future migrant households appear to be slightly more productive in terms of the value generated from their crops, as the density of residuals again is shifted slightly to the right. So migrant households are more productive with their land, in terms of the gross value of agricultural output. Interestingly, if this procedure is repeated with the value of agricultural production per capita instead of per hectare, the difference disappears and the densities almost overlap one another (not shown). So households with more available labor and less land may be the ones sending out migrants.

Last, we examine the normalized value of staple productivity among households growing the main staple in the village, by migrant status (Figure 4). Whereas on average migrant households have a normalized value that is 0.09 standard deviations higher than non-migrant households, the distributions substantially overlap, with the exception of a large bump in the distribution among migrant households between 1.5 and 2 standard deviations from the average yield. Compared with the distribution of the gross value of agricultural output, there is less of a chance of finding a significant relationship in a multivariate framework with this variable, as the "bump" is not likely to be predicted with a migrant household indicator variable.

5 Empirical Model and Results

In this section, we first examine whether there are correlations between migration as a future outcome and agricultural productivity, measured in 2004/5, when we control for additional

household level variables. We then turn around the relationship and look for correlations between migration and agricultural productivity in 2009. In either case, we can only control for observables, and unobservables could of course affect any findings. Further, no obvious instruments exist that would help purge the estimates of endogeneity.[8] Consequently, we discuss the likely direction of the impact of unobservables on results at the end of each subsection.

5.1. Agricultural productivity and Future Migration

We examine the relationship between migration and agricultural productivity in the following framework:

$$M_{ivt} = \alpha + \beta A_{ivt-1} + \varphi X_{ivt-1} + \delta_v + u_{ivt} \quad (1)$$

where *M* is an indicator variable for migrant households, *A* is the agricultural productivity measure, *X* is a vector of observable household level characteristics that might influence migration and agricultural productivity, and *u* is a mean zero error term. The regression includes the important variable δ, which is a PA level fixed effect and accounts for both observed and unobserved factors over time. Finally, note that the migration variable is measured at time *t* but the agricultural productivity measure and household characteristics are measured at time *t-1*. The idea here is to look at how past characteristics (e.g. those measured in 2004/5) influence migration between survey rounds.[9] If we find that the coefficient on A is significantly different from zero, we can interpret it to mean that there is a correlation between M and A, holding X and δ constant. One

[8] We did attempt to instrument the agricultural productivity measure with rainfall shocks, defined as the normalized difference in rainfall during the Meher season at the woreda level, interacted with landholdings per capita at the household level. The instrument was not significant in the first stage once we controlled for PA level fixed effects, suggesting that the PA level fixed effects may account for a lot of the important variation in performance.
[9] Migration could have also occurred between the 2009 round of the ERHS and the Migrant Tracking Survey. However, we find that any such migration is minimal.

cannot make the assumption that the relationship is causal, since the value of agricultural production is not random across households. Although the interpretation is not causal, we do explore how some proxies for possible unobservables that would affect the relationship between agricultural productivity and future migration.

To begin analysis, the migration indicator is regressed on the logarithm of the total value of production, including only PA level fixed effects in the regression (Table 3, column 1). Without any other control variables, we estimate a coefficient of 0.028 on the logarithm of the value of agricultural production, and it is significant at the five percent level. The implication is that if there is a relationship between migration and agricultural productivity, it is relatively small; a 10 percent increase in production holding prices constant would imply roughly a 0.3 percentage point increase in the probability of a household sending out a migrant.

We successively add variables measuring household wealth (column 2), characteristics of the household head (column 3), and the number of sons and daughters the household head has in 2004-5 (column 4). To measure wealth, we include the number of tropical livestock units owned in 2004-5; an indicator for households with consumption below the poverty line, and the logarithm of hectares per capita. The coefficient estimate on the value of agricultural production slightly increases to 0.034; whereas households below the poverty line are more likely to send out a migrant, households with more land per capita are less likely to send out a migrant. When households have more land, the implicit value of labor on the farm is higher, implying the perceived returns to migration are lower.

We next add indicator variables for whether or not the household head is a member of a minority within the PA, whether the head is literate, whether the head's main employment is in

agriculture, and the head's age (column 3). Again, these variables do not change the magnitude of the coefficient on the value of agricultural production much; it decreases to 0.032, remaining statistically significant at the 5 percent level. We then add the number of sons and daughters of the household head (column 4). These variables affect the coefficient on agricultural productivity; it drops to 0.026, yet remains significant at the 5 percent level. The number of adult sons has a strong, positive correlation with the migration variable. The results are all consistent with a story of credit constraints binding against sending out additional migrants. However, the magnitude of the partial correlation is relatively small, similar to the finding of de Brauw and Mueller (2012) that land rights restrictions have a small, negative impact on migration.

Given the positive result, in the final column (column 5) the young migrant variable is replaced by a variable measuring whether the household includes a young domestic migrant; in other words, international migrants are removed from the variable definition (Table 12, column 5). The results are robust to this definition change, although the coefficient magnitude drops somewhat to 0.018; it remains significant at the 5 percent level. The decrease suggests that households with higher agricultural productivity were better able to send out international migrants relative to domestic migrants, though the former cannot be estimated reliably given the small sample of international migrants. Nonetheless, the relationship between agricultural productivity and either type of future migration is positive and statistically different from zero.

To consider the alternative measure of agricultural productivity, we next use the normalized yield of the main staple crop in the village as the dependent variable (Table 4). Consistent with the descriptive findings, when we regress the migration indicator variable on the normalized staple crop yield and PA level fixed effects alone (column 1), we estimate a coefficient of 0.014; it is significant at the 10 percent level. Sequentially adding wealth variables (column 2),

characteristics of the head (column 3), and demographics (column 4), the estimates drop enough to become no different from zero, statistically, though they remain positive. When limited to domestic migrants, the coefficient is similar, suggesting there are no yield differences for staple crops between households that later sent out domestic or international migrants. The interpretation of the positive coefficient is that credit constraints likely at least weakly bind on migration, hindering households from supporting the start-up costs of migration. To counter this finding, an unobservable would have to exist that is positively related to both the value of agricultural production and future migration, and would refute this finding. Such unobservables might be, in fact, related to the accessibility of credit.

Two direct credit indicators exist in the ERHS. Households were asked if they had any outstanding loans; household heads were also asked whether they could borrow 100 birr in an emergency. These two variables are sequentially added to the specification in column (4) of Table 3 (Table 5). The variable measuring measuring whether or not the household had a loan in the past 12 months does not affect migration, nor the relationship between migration and the value of agricultural production (column 2). However, the emergency variable is positively correlated with migration; households able to obtain 100 birr in an emergency are more likely to be able to send out a migrant (column 3). Nonetheless, this finding does not eliminate the positive and statistically significant association between migration and the value of agricultural production. Therefore it appears that credit constraints do affect migration, and that agricultural productivity appears to be a method of relaxing those constraints, even if the effect is small.

An alternative potential threat are various shocks to agricultural production. A story could be that households that were exposed to a shock in the agricultural season prior to the 2004/5 season would be more likely to be bound by credit constraints and therefore unable to send out

migrants, confounding the coefficient estimate on the value of agricultural production. We found that the most common shocks reported in the year previous to the survey were either weather or pest shocks, or price shocks, which are again sequentially added to the model (Table 5, columns 4 and 5). Again, the main result is robust to the inclusion of either of these variables.

Heterogeneity

An important source of heterogeneity is likely related to household landholdings per capita, since households with more land on a per capita basis might have higher marginal returns to labor, and hence would be less likely to send out migrants. On the other hand, households with less land per capita might be more constrained, and would benefit from migration. To investigate heterogeneity along the land gradient, I split the sample at the median land per capita holdings in each PA, and re-estimate equation (1) using both the households with above median and below median landholdings.

These regressions show that the correlation between agricultural productivity and migration come from the lower half of the land distribution (Table 6). The coefficient estimate on the log value of agricultural production is 0.40, suggesting that a ten percent increase in agricultural revenue would lead to a 0.4 percentage point increase in the likelihood of migration. The coefficient estimate among households above the median are negative and statistically no different from zero. The results are robust to including the emergency credit variable (columns 3 and 4); though the coefficient estimate on agricultural production is marginally lower among the households below the median (0.035). These results are consistent with the idea that migrants in Ethiopia are more likely to come from households with lower internal returns to labor.

5.2 Post-Migration Agricultural Productivity

If we assume that agricultural productivity has an impact on future migration, a following question would be whether or not migration then has a feedback effect on agricultural productivity after migration occurs. As noted earlier, this question has been studied in the literature, though not in Ethiopia. To do so, I simply specify a regression:

$$A_{ivt} = \alpha + \beta M_{ivt} + \varphi X_{ivt-1} + \theta W_{ivt} + \delta_v + u_{ivt} \quad (2)$$

which differs from equation (1) in that the value of agricultural production A is the dependent variable and is now contemporaneously measured with migration, and wealth variables W are separated from the remainder of the observables as they are also contemporaneously measured. Since the most interesting results above suggested a stronger relationship among young migrants, we estimate separate regressions for households with any migrant and households with young migrants.

Without any control variables other than PA level fixed effects, there appears to be a positive and statistically significant relationship between the value of agricultural production and migration (Table 7, column 1).[10] Migrant households would appear to be 0.18 log points more productive in 2009 than non-migrant households. Recall, this variable is not measured on a per capita basis, so the migrant leaving makes the household potentially even more productive agriculturally. However, once we add contemporaneous wealth characteristics (column 2), the coefficient drops substantially to 0.144 and is only significant at the 10 percent level; further adding characteristics of the head (column 3) does not change the statistical significance or the magnitude much, but adding the number of adult sons and daughters of the head reduces the coefficient further to 0.114 (column 4), and it is no longer significantly different from zero. The

[10] In this table, all explanatory variables other than the migrant variable are measured in 2009, unlike the other regressions in which they were measured in 2004/5.

adult sons and daughters are both significant and positive, suggesting that available labor is important to increasing the value of agricultural production. Once some observables are included in the regression beyond just PA level indicators, the statistical significance of the initial coefficient disappears.

These results are quite positive, as they demonstrate that households are not negatively affected by migration in the longer term, after making the decision to send out a migrant. Given that the evidence suggests if anything a positive correlation between agricultural productivity in 2009 and the choice to send out migrants between 2004 and 2009, this finding is somewhat important, given that one would have expected a negative direct effect of migration. A positive effect could occur through remittances, but other research has found that remittance probabilities are relatively low in this sample (de Brauw, Mueller, and Woldehanna, 2013). Therefore it appears that households that migrants leave are able to shift resources on the intensive margin in order to maintain at least the same level of productivity. Alternatively, migrants may not have been productive agricultural workers prior to leaving.

6 Conclusion

This paper explores the role of agricultural productivity in explaining whether migrants are sent out by households. The paper first advances a hypothesis for this linkage, namely that in this context the link between the productivity level and future migration decisions most likely is derived through credit constraints, since households with higher productivity would be better able to self-finance migration.

To test this hypothesis, the paper uses a migrant tracking survey that followed migrants from the ERHS panel survey conducted most recently in 2009. It finds that when households sent

migrants out in the future (e.g. after the 2004/5 round), the households had been more productive in 2004/5. However, the relationship is only robust to the inclusion of observables among migrants aged 25 years or below. Among the entire sample, the magnitude of the relationship is relatively small- a 10 percent increase in productivity would only lead to a 0.26 percentage point increase in the likelihood of sending out another migrant. The magnitude increases when only households that have landholdings below the PA level median are included in the main specifications, implying that households with less land (and presumably lower returns to agricultural labor) benefit more from migration than households with more land, and higher inherent returns to agricultural labor. Coefficient estimates in the paper are robust to the inclusion of proxies for unobservables that might have affected the relationship, such as the ability to receive an emergency loan.

The paper finally measures the relationship between agricultural productivity in 2009 and migration beforehand. Given low remittance rates observed in the migrant tracking data, one might expect that production would have decreased due to a lost labor effect. However, there is an unconditional increase in production among migrant sending households relative to non-migrant households, though once observables are controlled for, the increase is no longer statistically significant. Given that unobservables are likely positively correlated with both variables in this relationship, it does not appear likely that claims can be made about a strong impact of migration on productivity. Nonetheless, it is interesting that there is no lost labor effect on agricultural productivity, at least as defined here, from migration.

From a policy perspective, these findings suggest the following. Programs that might be designed to encourage younger people to find employment away from home are likely to be attractive to the relatively poor, and may attract labor from relatively productive households,

holding other things constant. In fact, from the perspective of agriculture, these results suggest that programs that might help younger rural residents find employment outside the village might only do good; such programs would not likely affect agricultural productivity at present. Further, if remittances could be fostered, agricultural productivity would have a good chance of being increased through migration. For example, mobile phones have revolutionized communication and transfers in several sub-Saharan African countries; making mobile phones more available to farmers could create new possible remittance channels to enhance productivity on the farm through increased input use.

References

Clemens M.A. (2011). "Economics and Emigration: Trillion-Dollar Bills on the Sidewalk?" *Journal of Economic Perspectives* 25: 83-106.

Damon, A. (2010). "Agricultural Land Use and Asset Accumulation in Migrant Households: The Case of El Salvador," *Journal of Development Studies* 46(1): 162-189.

de Brauw, A. (2010). "Seasonal Migration and Agricultural Production in Vietnam," *Journal of Development Studies* 46(1): 114-139.

de Brauw, Alan and Valerie Mueller (2012). Do Limitations in Land Rights Transferability Influence Low Mobility Rates in Ethiopia?" *Journal of African Economies*. 21(4): 548-579.

de Brauw, Alan, Valerie Mueller, and Tassew Woldehanna, 2013, "Motives to Remit: Evidence from Tracked Internal Migrants in Ethiopia," *World Development* 50: 13-23.

de Brauw, A., V. Mueller, and T. Woldehanna (2014). "Does Internal Migration Improve Overall Well-Being in Ethiopia?" IFPRI Ethiopia Strategy Support Program working paper #55.

Dercon, S. (2004). "Growth and Shocks: Evidence from Rural Ethiopia," *Journal of Development Economics*, 74(2), 304-329.

Dercon, S., and L. Christiaensen (2007). "Consumption risk, Technology Adoption and Poverty Traps: Evidence from Ethiopia," CSAE Working Paper Series 2007-06, Centre for the Study of African Economies, University of Oxford.

Dercon S., J. Hoddinott, and T. Woldehanna (2007). *Growth and Poverty in Rural Ethiopia: Evidence from 15 Communities 1994–2004.* Background Paper for the Chronic Poverty Report 2008/09. Manchester, UK: Chronic Poverty Research Centre.

Dercon, S., J. Hoddinott, and T. Woldehanna (2012). "Growth and Chronic Poverty: Evoidence from Rural Communities in Ethiopia," *Journal of Development Studies* 48(2): 238-253.

Dercon, S., and P. Krishnan (2000). "In Sickness and in Health: Risk Sharing within Households in Rural Ethiopia," *Journal of Political Economy*, 108(4), 688-727.

Fafchamps, M., B. Kebede, and A. Quisumbing (2009). "Intrahousehold Welfare in Rural Ethiopia." *Oxford Bulletin of Economics and Statistics* 71 (4): 567–599.

Fan, C. Cindy (2008). *China on the Move: Migration, the State, and the Household.* London and New York, NY: Routledge.

Fei J.C.H., Ranis G. (1964). *Development of the Labor Surplus Economy : Theory and Policies*. R. D. Irwin: Homewood, Ill.

Fox, L. and M. Gaal (2008). *Working Out of Poverty*, The World Bank, Washington DC.

Gollin, Douglas, David Lagakos, and Michael Waugh (2014). "The Agricultural Productivity Gap." *Quarterly Journal of Economics* 129(2).

Harris, J., and M. Todaro (1970). "Migration, Unemployment, and Development: A Two-Sector Analysis," *American Economic Review*, 60, 126-142.

Kadiyala, S., A. Quisumbing, B. Rogers, and P. Webb (2009). "The Impact of Prime Age Adult Mortality on Child Survival and Growth in Rural Ethiopia." *World Development* 37(6): 1116-1128.

Lewis, W. Arthur (1954). "Economic Development with Unlimited Supplies of Labour," *The Manchester School* 22(2): 139-191.

Lucas, Robert E.B., and Oded Stark (1985). "The New Economics of Labor Migration," *American Economic Review Papers and Proceedings* 75(2): 173-178.

McCarthy, Nancy, Gero Carletto, Talip Kilic, and Benjamin Davis (2009). "Assessing the Impact of Massive Out-Migration on Albanian Agriculture," *European Journal of Development Research* 21(3): 448-470.

McKenzie, D. (2007). "Paper Walls are Easier to Tear Down: Passport Costs and Legal Barriers to Migration," *World Development* 35(11): 2026-2039.

McKenzie, D., S. Stillman, and J. Gibson (2010). "How Important is Selection? Experimental vs. Non-Experimental Measures of the Income Gains from Migration," *Journal of the European Economic Association* 8(4): 913-945.

McMillan, Margaret, and Dani Rodrik (2012). "Globalization, Structural Change, and Productivity Growth," IFPRI Discussion Paper no. 1160.

Miluka, Juna, Gero Carletto, Benjamin Davis, and Alberto Zezza (2010). "The Vanishing Farms? The Impact of International Migration on Albanian Family Farming," *Journal of Development Studies* 46(1): 140-161.

Rosenzweig, Mark (2010). "Global Wage Inequality and the International Flow of Migrants," Yale University Economic Growth Center Discussion Paper no. 983.

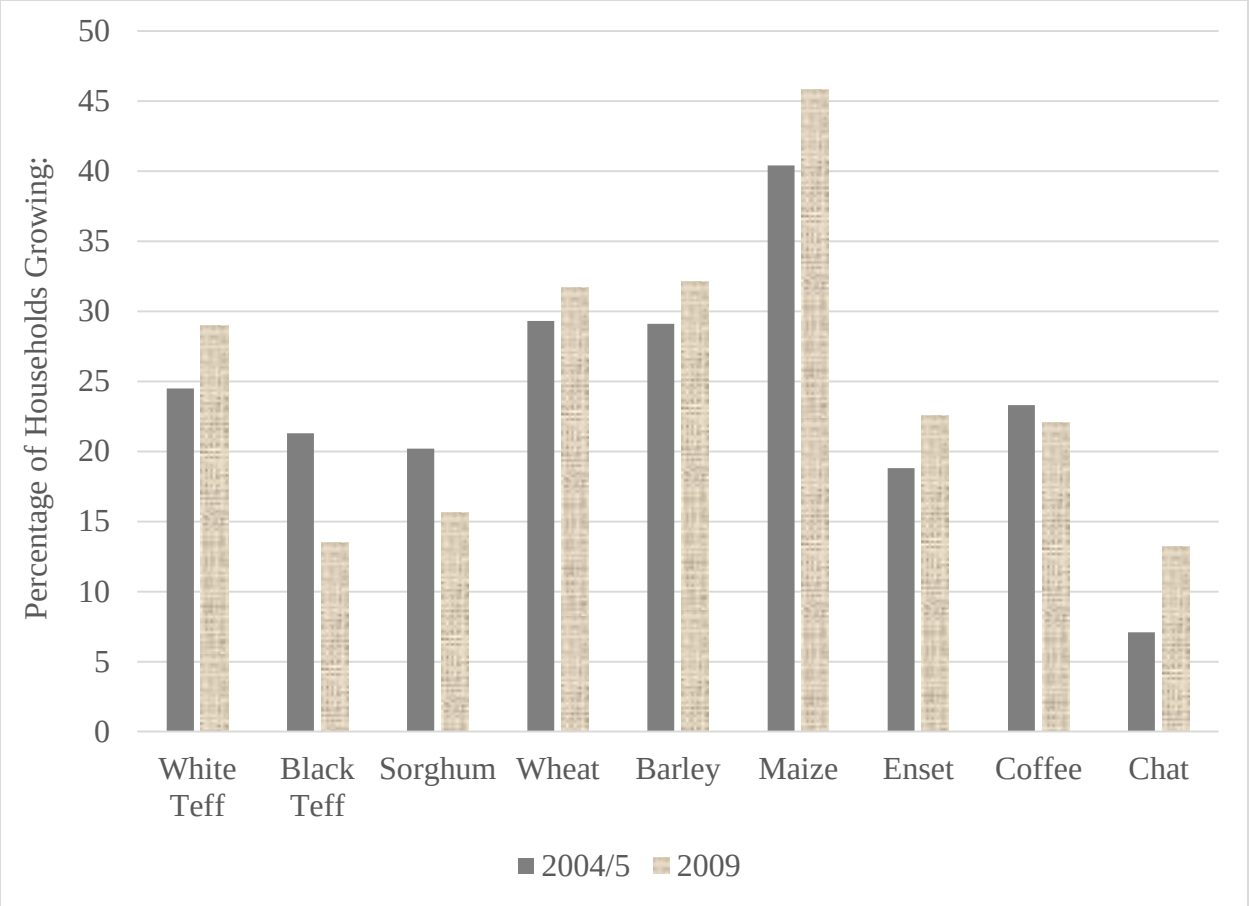
Rozelle, S., J. E. Taylor, and A. de Brauw (1999). "Migration, Remittances, and Agricultural Productivity in China." *American Economic Review Papers and Proceedings* 89 (2): 287–291.

Taylor, J. Edward, and Philip Martin (2001). "Human Capital: Migration and Rural Population Change," in B. Gardner and G. Rausser, eds., Handbook of Agricultural Economics, Volume I. Amsterdam: Elsevier, pp. 457-511.

Vandercasteele, Joachim, Mekdim Dereje, Bart Minten, and Alemayehu Seyoum Taffesse (2013). "The Impact of the Promotion of Row Planting on Farmers' Teff Yields in Ethiopia," IFPRI Ethiopia Strategy Support Program working paper no. 60.

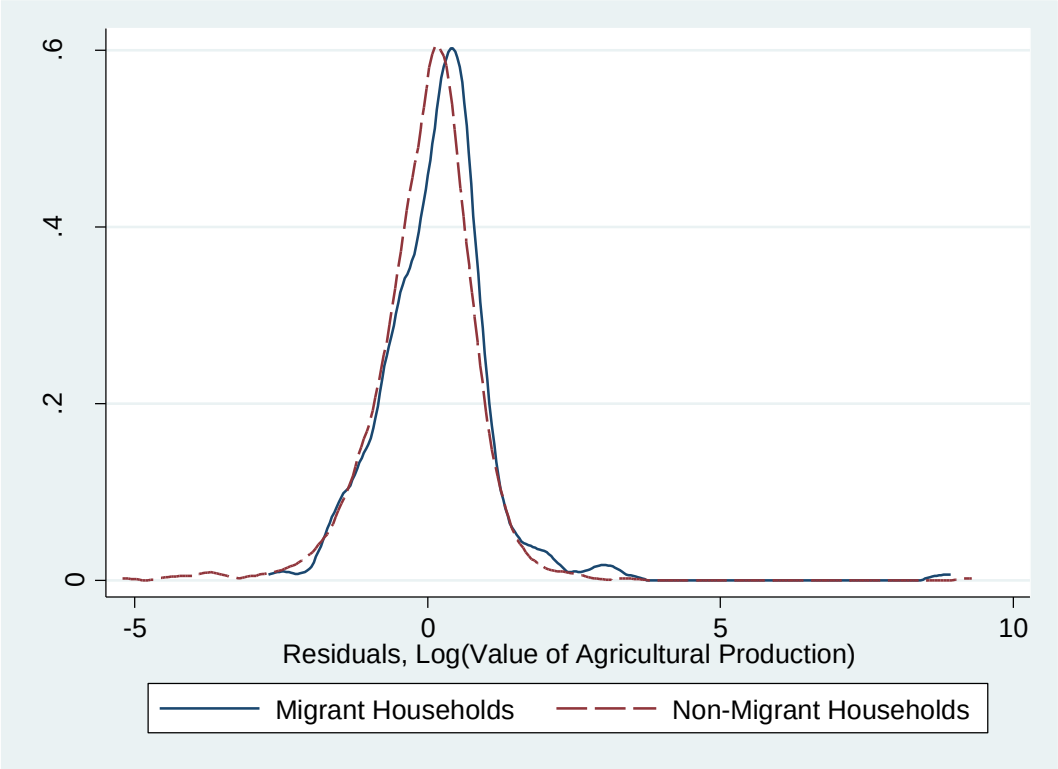
Yang, D. T. (1997). "China's Land Arrangements and Rural Labour Mobility," *China Economic Review*, 8(2), 101-115.

Young, Alwyn (2013). "Inequality, the Rural-Urban Gap, and Migration." *Quarterly Journal of Economics* 128: 1727-1785.

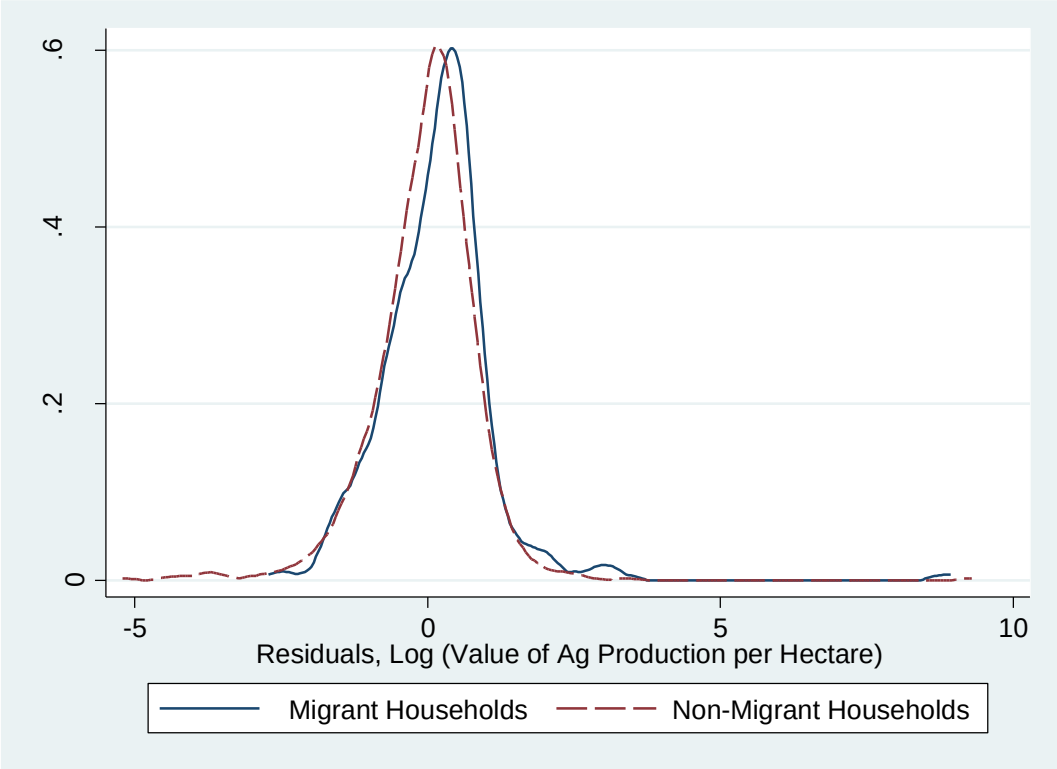


Source: ERHS 2004/5 and 2009

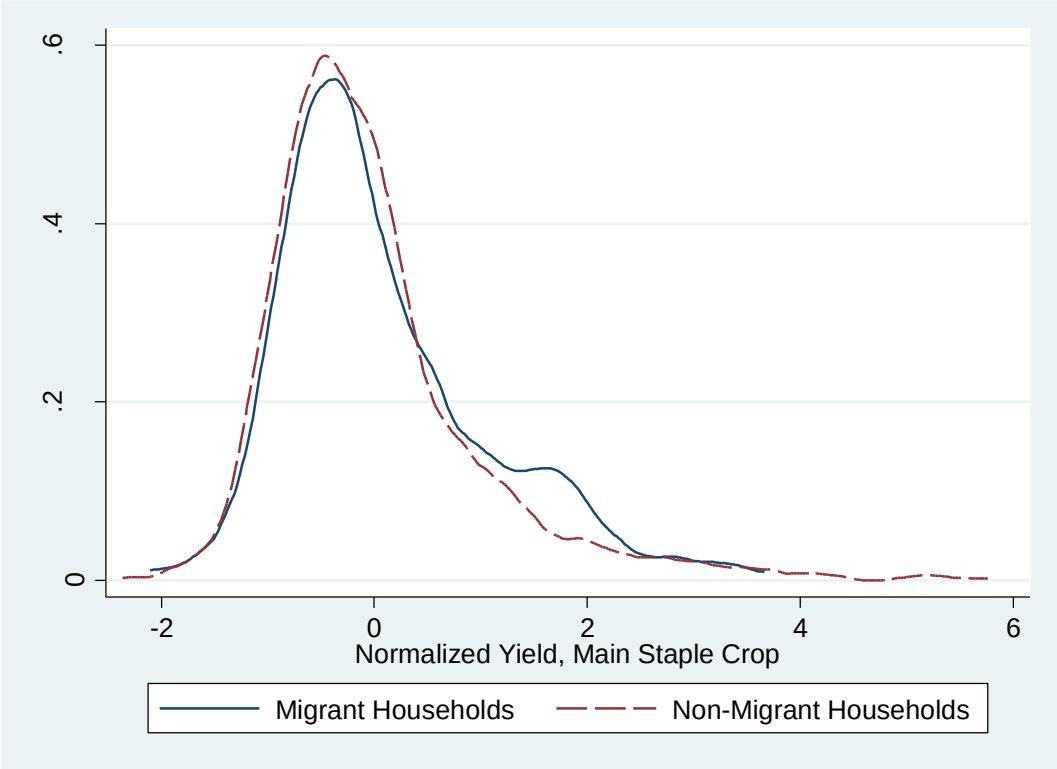
Figure 1. Prevalence of Staple and Major Cash Crop Production, ERHS Households, 2004/5 and 2009



Source: ERHS, 2004/5 and Migrant Tracking Survey
Figure 2. Distribution of Value of Agricultural Production, Removing PA Level Fixed Effects, by Migration Status



Source: ERHS 2004/5 and Migrant Tracking Survey.
Figure 3. Distribution of Value of Agricultural Production per Hectare, Removing PA Level Fixed Effects, by Migration Status



Source: ERHS 2004/5 and Migrant Tracking Survey.
Figure 4. Distribution of Normalized Yield of Major Staple Crop, by Migration Status

Table 1. Migrants under 25 years old found in ERHS Migrant Listing Exercise, 2009

	Migrants under 25 years old		
Destination	Males	Females	Total
Middle East	17	24	41
Other International	4	12	16
Urban Migrants	61	42	103
of Which, Addis Ababa	34	21	55
Of Which, Other Urban Area	27	21	48
Rural	71	58	129
Destination unknown	4	1	5
Total	157	137	294

Source: Migrant Tracking Survey.

Table 2. Average yield of four most common staple crops (kg/ha), migrant and non-migrant households, Ethiopia Rural Household Survey, 2004/5 and 2009

	Migrant households	Non-migrant households
Maize		
2004	1310	1180
	(1180)	(979)
2009	1720	1640
	(2360)	(2260)
Barley		
2004	855	823
	(623)	(654)
2009	948	1070
	(1180)	(961)
Wheat		
2004	1260	1230
	(896)	(924)
2009	1160	1260
	(902)	(855)
White Teff		
2004	673	792
	(473)	(577)
2009	735	673
	(584)	(499)

Note: Standard deviations are in parentheses. To remove outliers, any values above the 99th percentile were top coded at the 99th percentile value.
Source: ERHS 2004/5 and 2009; ERHS Migrant Tracking Survey.

Table 3. Regressions Explaining Partial Correlation Between Youth Migration and Value of Agricultural Production, ERHS Villages, 2004/5 and 2009

	(1)	(2)	(3)	(4)	(5)
Logarithm, Value of Agricultural Production, 2004	0.028**	0.034**	0.032**	0.026**	0.018**
	(0.009)	(0.010)	(0.011)	(0.011)	(0.009)
TLUs owned		0.004	0.004	0.001	0.001
		(0.003)	(0.004)	(0.004)	(0.003)
Household below poverty line		0.048**	0.044***	0.037	0.023
		(0.024)	(0.024)	(0.023)	(0.021)
Logarithm, Hectares per capita		-0.047**	-0.051**	-0.043**	-0.041**
		(0.010)	(0.011)	(0.011)	(0.010)
Head is a minority within PA? (1=yes)			0.001	0.003	0.018
			(0.031)	(0.031)	(0.026)
Head is literate? (1=yes)			-0.002	0.006	-0.019
			(0.024)	(0.023)	(0.023)
Head, age (in years)			0.002**	0.002**	0.001
			(0.001)	(0.001)	(0.001)
Head works in agriculture? (1=yes)			0.023	0.026	0.024
			(0.023)	(0.023)	(0.021)
Number of adult sons, head				0.036**	0.042**
				(0.015)	(0.014)
Number of adult daughters, head				0.025	0.008
				(0.016)	(0.014)
Number of observations	1,486	1,467	1,418	1,418	1,418

Notes: Young migrants defined as migrants 25 years old or under. Column 5 redefines migrants as domestic migrants only. PA fixed effects included in all regressions. Standard errors clustered at the neighborhood level in parentheses. *-indicates significance at the 10 percent level; **-indicates significance at the 5 percent level.
Source: ERHS 2004/5 and Migrant Listing Exercise.

Table 4. Regressions Explaining Partial Correlation Between Youth Migration and Normalized Yield of Main Staple Crop, ERHS Villages, 2004/5 and 2009

	(1)	(2)	(3)	(4)	(5)
Normalized yield of major staple crop, 2004	0.014***	0.011	0.012	0.011	0.013
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
TLUs owned		0.009**	0.008**	0.004	0.003
		(0.004)	(0.004)	(0.004)	(0.003)
Household below poverty line		0.053**	0.051**	0.044***	0.026
		(0.025)	(0.025)	(0.024)	(0.020)
Logarithm, Hectares per capita		-0.036**	-0.041**	-0.033**	-0.034**
		(0.010)	(0.011)	(0.010)	(0.010)
Head is a minority within PA? (1=yes)			-0.022	-0.019	-0.001
			(0.033)	(0.032)	(0.026)
Head is literate? (1=yes)			0.003	0.013	-0.015
			(0.022)	(0.021)	(0.020)
Head, age (in years)			0.003**	0.002**	0.001***
			(0.001)	(0.001)	(0.001)
Head works in agriculture? (1=yes)			0.031	0.033	0.032
			(0.024)	(0.023)	(0.021)
Number of adult sons, head				0.043**	0.048**
				(0.014)	(0.014)
Number of adult daughters, head				0.032**	0.013
				(0.016)	(0.014)
Number of observations	1,356	1,329	1,286	1,286	1,286

Notes: Young migrants defined as migrants 25 years old or under. Column 5 redefines migrants as domestic migrants only. PA fixed effects included in all regressions. Standard errors clustered at the neighborhood level in parentheses. *-indicates significance at the 10 percent level; **-indicates significance at the 5 percent level.
Source: ERHS 2004/5 and Migrant Listing Exercise.

Table 5. Assessing Robustness of Correlation between Youth Migration and Logarithm, Value of Agricultural Production

	(1)	(2)	(3)	(4)	(5)
Log of Value of Agricultural Production, 2004	0.026**	0.026**	0.022**	0.026**	0.026**
	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)
Had a loan in previous 12 months? (1=yes)		0.017			
		(0.019)			
Can borrow 100 birr? (1=yes)			0.044**		
			(0.021)		
Household reported weather or pest shock				-0.018	
				(0.028)	
Household reported price shock					-0.021
					(0.036)
Number of obs.	1418	1413	1411	1418	1417

Notes: All variables in column (4) of Table 4 included in regressions but not reported here; column (1) replicates column (4) exactly. PA fixed effects included in all regressions. Young migrants defined as migrants 25 years old or under. Standard errors clustered at the neighborhood level in parentheses. *-indicates significance at the 10 percent level; **-indicates significance at the 5 percent level.

Source: ERHS 2004/5 and Migrant Listing Exercise.

Table 6. Regressions Explaining Partial Correlation Between Youth Migration and Value of Agricultural Production, by Above or Below Median Landholdings for PA, ERHS Villages, 2004/5 and 2009

	Below Median (1)	Above Median (2)	Below Median (3)	Above Median (4)
Logarithm, Value of Agricultural Production, 2004	0.040**	0.013	0.035**	0.011
	(0.015)	(0.019)	(0.016)	(0.019)
TLUs owned	-0.004	0.002	-0.006	0.002
	(0.006)	(0.004)	(0.006)	(0.004)
Household below poverty line	0.018	0.056	0.025	0.058***
	(0.031)	(0.034)	(0.032)	(0.035)
Logarithm, Hectares per capita	-0.051**	-0.036	-0.050**	-0.036
	(0.015)	(0.026)	(0.015)	(0.026)
Head is a minority within PA? (1=yes)	0.025	0.003	0.028	0.002
	(0.053)	(0.042)	(0.053)	(0.042)
Head is literate? (1=yes)	0.044	-0.044	0.042	-0.044
	(0.033)	(0.033)	(0.034)	(0.034)
Head, age (in years)	0.003**	0.000	0.003**	0.000
	(0.001)	(0.001)	(0.001)	(0.001)
Head works in agriculture? (1=yes)	0.006	0.051**	0.004	0.052**
	(0.038)	(0.026)	(0.038)	(0.026)
Number of adult sons, head	0.026	0.046**	0.026	0.045**
	(0.018)	(0.021)	(0.018)	(0.021)
Number of adult daughters, head	0.014	0.030	0.015	0.030
	(0.022)	(0.025)	(0.022)	(0.025)
Can Obtain 100 birr?			0.063**	0.012
			(0.032)	(0.029)
Number of Obs.	751	667	748	663

Notes: PA fixed effects included in all regressions. Standard errors clustered at the neighborhood level in parentheses. *-indicates significance at the 10 percent level; **-indicates significance at the 5 percent level.
Source: ERHS 2004/5 and Migrant Listing Exercise.

Table 7. Partial Correlation between Logarithm, Value of Agricultural Production, and Migration of Young Household Member, ERHS, 2009

	(1)	(2)	(3)	(4)
Young Migrant in Household? (1=yes)	0.182*	0.144*	0.147*	0.114
	(0.094)	(0.084)	(0.086)	(0.084)
TLUs, 2009		0.087**	0.081**	0.077**
		(0.007)	(0.007)	(0.007)
Household is below poverty line		-0.023	-0.033	-0.031
		(0.054)	(0.055)	(0.055)
Log, Hectares per capita		0.223**	0.259**	0.265**
		(0.037)	(0.038)	(0.039)
Head is a minority within PA? (1=yes)			-0.151*	-0.141
			(0.087)	(0.089)
Head is literate? (1=yes)			0.188**	0.206**
			(0.061)	(0.059)
Head, age (in years)			-0.004**	-0.006**
			(0.002)	(0.002)
Head works in agriculture? (1=yes)			0.241**	0.246**
			(0.060)	(0.059)
Number of adult sons, head				0.106**
				(0.030)
Number of adult daughters, head				0.067**
				(0.030)
Number of observations	1,353	1,353	1,315	1,315

Notes: Young migrants defined as migrants 25 years old or under. PA fixed effects included in all regressions. Standard errors clustered at the neighborhood level in parentheses. *-indicates significance at the 10 percent level; **-indicates significance at the 5 percent level.
Source: ERHS 2009 and Migrant Listing Exercise.

Appendix Table A1. Household Level Wealth Characteristics, by Migration Status of Youth, 2004/5 and 2009

	International Migrants	Urban Migrants	Rural Migrants	No Migrants
2004/5 Round				
Tropical livestock units (TLUs)	3.20	3.71	3.30	3.04
	(2.42)	(3.51)	(3.07)	(3.28)
Average # of Oxen owned	1.16	1.09	1.01	1.01
	(1.11)	(1.42)	(1.12)	(1.53)
Real consumption per adult equivalent	74.9	107.1	102.3	107.0
	(76.8)	(118.9)	(108.0)	(109.6)
Landholdings in Hectares per Capita	0.28	0.22	0.27	0.36
	(0.37)	(0.23)	(0.26)	(0.37)
Household classified as poor	0.63	0.45	0.42	0.38
2009 Round				
TLUs	5.63	5.49	4.99	5.06
	(5.78)	(5.43)	(4.81)	(5.70)
Average # of Oxen owned	1.18	1.15	1.13	1.05
	(1.16)	(1.61)	(1.31)	(1.33)
Real consumption per adult equivalent	76.7	82.7	72.1	83.6
	(67.6)	(69.9)	(57.1)	(289.4)
Landholdings in Hectares per Capita	0.32	0.36	0.35	0.41
	(0.34)	(0.28)	(0.27)	(0.36)
Household classified as poor	0.45	0.44	0.59	0.51
Number of Observations	51	84	105	1337

Notes: For continuous variables, standard deviations in parentheses. When more than one category of migrant, households are classified as international first, then urban, then rural. Households are classified as poor when their per capita income is less than 50 birr per month, deflated to 1994 using a Laspeyres price index. The landholdings variable has been topcoded; all values above the 99th percentile of the distribution were set at the 99th percentile to reduce the influence of outliers.

Source: ERHS 2004/5 and 2009, and 2009 Migrant Listing Exercise.