Effects of Emigration on Rural Labor Markets

Agha Ali Akram
Yale University

Shyamal Chowdhury
University of Sydney

Ahmed Mushfiq Mobarak
Yale University

May 2017

Preliminary and Incomplete, Do Not Post or Circulate without Authors' Permission

Abstract

Rural to urban migration is integral to scholarship on structural transformation and economic development, but there is little evidence on how out-migration transforms the rural labor market. We offer to subsidize transport costs for 5792 potential seasonal migrants in Bangladesh, randomly varying the proportion of landless agricultural workers across 133 villages induced to move, to generate labor supply shocks of different magnitudes in different villages. We use this variation coupled with a general equilibrium model to document spillover effects on the village labor market. The decision to migrate is a strategic complement: A larger number of simultaneous migration offers in the village increases the likelihood that each individual takes up the offer, and induces those connected to offer recipients to also migrate. The 35% emigration rate in control villages increases to 42% in lower intensity villages, and to 66% with the higher density of offers. This increases the male agricultural wage rate in the village with an elasticity of about 0.2. Migration offers lead to large increases in income earned at the destination, but also increases income earned at home due to the increase in the wage rate and in available work hours. The wage bill for agricultural employers increases, which reduces their profit, with no significant change in yield. There is not much intra-household substitution in labor supply. The primary worker earns more when he returns home from the city during weeks in which many of his village co-residents were induced to move. Although most of the migration income is consumed, there is no systematic effect food prices, suggesting that food markets are better integrated than labor markets across villages. Seasonal migration generates both direct and indirect spillover benefits on the origin economies.

JEL Codes:
Keywords: Seasonal migration, spillovers, general equilibrium, Bangladesh.

Contact: ahmed.mobarak@yale.edu. We thank Innovations for Poverty Action – Bangladesh team for field and implementation support, Givewell.org for financial support, Mohammad Ashraful Haque, for research assistance, and Sam Asher, Abhijit Banerjee, Ben Faber, Andrew Foster, Edward Glaeser, David Lagakos, Gautam Rao, and conference and seminar participants at Australian National University, Oxford University, Harvard University, Stanford University (IGC/SCID conference), Brown University, DIW-Berlin, BREAD conference, and Yale University for comments

1. Introduction

A shift in labor from rural to urban areas has been integral part of the process of economic development, and central to theories of long-run growth and structural transformation (Lewis 1954, Harris and Todaro 1970). Migration marked American agricultural development in the 19th century, and has been a feature of the growth path of virtually every developing country (Taylor and Martin 2001). Understanding the causes and consequences of mobility – both for the migrant, and for the broader rural society – are therefore central to understanding development.

A modern literature links migration to development by carefully documenting that workers are more productive in cities, both within developed (Glaeser and Mare 2001) and developing (Gollin et al 2001) economies.[1] The accompanying empirical literature has largely focused on the benefits of migration to the migrant and his immediate family (e.g. McKenzie et al 2010, Garlick et al 2016). This literature pays little attention to possible spillover effects on the broader rural economy that are surely central to the links between migration and development. Greenwood (1997) theorizes that migration "may deprive source regions of critically needed human capital," but generations of review articles (e.g. Lucas 1997, Foster and Rosenzweig 2008) lament the lack of evidence on these topics. This study attempts to fill that gap by conducting a field experiment in which we randomly vary the fraction of landless households in Bangladeshi villages that are induced to out-migrate temporarily. This generates labor supply shocks of varying magnitudes, and we use those shocks to study spillover effects on the rural economy.

---

[1] This is likely due to the benefits of agglomeration (Combes et al 2010). There is also evidence that cities speed up human capital accumulation, producing growth (and not just level) effects in productivity (Glaeser and Resseger 2010).

While social scientists and policymakers have noted the pervasiveness of rural-urban migration in both developed and developing societies[2], the facts that (a) most of this migration is internal rather than international[3], and (b) that much of the internal rural-urban movement is seasonal and circular in nature, are less well known. The rural-urban wage gap varies within the year due to crop cycles, and seasonal migration is one of the primary methods used by Indians (Banerjee and Duflo 2007) and Bangladeshis (Bryan et al 2014) to diversify income and cope with the seasonal fluctuations in rural labor productivity (Dercon and Krishnan 2000, Paxson 1993). Seasonal migration also appears to be more reactive to policy interventions and to changes in local labor market conditions than permanent migration (Imbert and Papp 2015).

Bryan et al (2014) encourage a sample of 1292 landless households in rural Bangladesh to migrate during the 2008 lean season using conditional transfers to cover the roundtrip travel cost to nearby cities, and show that migration significantly improves the consumption and welfare of induced households. That simple research design can only evaluate the direct effects of migration opportunities on beneficiary households, and does not answer questions about spillover effects on non-beneficiaries. We expand on that design in several ways during the 2014 lean season to study general equilibrium effects on the rural labor market, and provide a more comprehensive evaluation of a program to encourage migration.

First, in addition to randomly assigning migration subsidies to an expanded sample of 5792 poor landless households, our design also randomly varies the *proportion* of the eligible population in the village receiving such offers, because that market-level variation is necessary to track general

---

[2] Long (1991) notes that over 6% of the US population migrates internally within a year, and about 20% of the population of US and Canada move over a 5-year interval. Long-run panel data from India and Bangladesh show that 23 percent of men left the village after 17–20 years (Foster and Rosenzweig 2008).

[3] There were 240 times as many internal migrants in China in 2001 as there were international migrants (Ping 2003), and 4.3 million people migrated internally in the 5 years leading up to the 1999 Vietnam census compared to only 300,000 international migrants (Ahn et al, 2003).

equilibrium effects on wages and prices. Second, we collect data from both households that receive the randomized offers as well as households that do not, to track spillover effects on the migration and labor supply choices of non-beneficiaries. Third, we collect high-frequency data on earnings and hours worked by week, by location, and by individual worker, to create a richer description of the effects of migration including intra-household adjustments in labor supply. Fourth, we collect data from employers in the village to study effects on market wages. Fifth, we collect price data from local shopkeepers to study equilibrium effects on market prices.

We develop a general equilibrium model of the village labor market with endogenous migration to organize our empirical results on migration, labor supply, earnings, wages and prices. While the prior literature has explored whether migration generates indirect benefits through risk sharing (Morten 2015, Munshi and Rosenzweig 2016, Meghir et al. 2016), no study estimates equilibrium effects on the village economy. Scholars have theorized for decades that migration may increase rural poverty and income inequality (Connell 1981), or that it has "the effect of draining away from the rural areas, either temporarily or permanently, some of the strongest, most able, most energetic young men" (Hance 1970), but empirical evidence on these spillover issues is lacking.[4]

This paper contributes more broadly to the burgeoning economics literature on program evaluation by developing an experimental and analytical framework that goes beyond estimation of direct effects on the treated population. Comprehensive evaluation requires consideration of general-equilibrium changes, especially if we are interested in assessing possible effects of programs when they are scaled up (Heckman, 1992; Rodrik, 2008; Acemoglu, 2010). For example, providing

[4] Lipton (1980) counters that the departure of young men would not necessarily lower the productivity or earnings of those left behind. Pritchett (2006) shows using census data that agricultural, coal mining and cotton farming areas of the United States lost 27-37% of its population to emigration between 1930 and 1990, but the population exodus was not accompanied by any large decrease in absolute or relative income. Rempel and Lobdell (1978) informally argue that net remittances are too small to have much effect on enhancing rural productivity, and that remittances are generally consumed not invested. Other scholars (e.g. Ashraf et al 2015) have employed modern research methods to describe remittance behavior and use more rigorously, but have not attempted to tackle effects on the village economy.

skills training to large numbers of beneficiaries (Banerjee *et al.* 2007; Blattman *et al.* 2014) may change skilled wages; providing livestock assets on a large scale (Banerjee et al 2015, Bandiera *et al* 2015) may affect livestock prices. Randomized controlled trials examining aggregate effects of equilibrium price changes induced by programs implemented on a large scale are still rare[5], but our results suggest that these considerations might be important.

We find that migration decisions are strategic complements: a larger number of simultaneous migration subsidy offers in a village increases each household's propensity to migrate. These induced migrants earn much more in nearby cities, but the time spent away does not displace home income. On the contrary, the income that the family earns at home also increases, due to increases in both available works hours and in the equilibrium agricultural wage rate at home. We use individual-specific data to explore whether departure of the migrant induces other household members to supply more labor (Rosenzweig 1988), but find that the increase in home-income is mostly due to the primary worker earning more when he returns home from the city during weeks in which many of his village co-residents are away. There are no changes in food prices in the village, which suggests that food markets are spatially well integrated.

Our results carry several important implications for development theory and policy. First, the increase in the agricultural wage rate that we document implies that rural labor supply is not as elastic as labor surplus models (e.g. Lewis 1954) presumed. Second, the migration behavior we observe suggests that the marginal product of labor in agrarian societies is highly seasonal. Models of rural labor markets should be augmented to account for seasonality, to provide better

[5] One exception is Mobarak and Rosenzweig (2016), who use a general equilibrium model to study labor market effects of rainfall insurance. It is more common for RCTs to track non-market spillovers on the non-treated, including health externalities (Miguel and Kremer 2004), financial transfers (Angelucci and DeGiorgi 2009), and social learning (Kremer and Miguel 2007, Oster and Thornton 2012, Miller and Mobarak 2015). Crepon *et al.* 2012 and Muralidharan and Sundararaman (2013) study aggregate effects in relevant markets, but do not estimate price or (teacher) wage effects. Cortes (2008) is a non-experimental study exploring the price and wage effects of international migration.

descriptions of the links between migration, structural transformation and rural development. Third, our results should encourage policymakers should re-think the various restrictions to internal mobility they have instituted under the guise of rural development policy (Oberai 1983). Anti-migration bias remains rampant in policy circles, with many governments, including China, Indonesia, South Africa, have reacted to migration as if "it were an invasion to repel" (Simmons 1981). Our results on the large direct benefits for the migrant's family, and indirect benefits for non-migrants competing in those same labor markets, suggest that this mode of thinking, and the associated restrictions imposed on migrants' transport, settlement and employment by policymakers, may be misguided. Concerns about emigration increasing rural poverty and inequality appear to be unfounded, at least in our context.

We describe the problem of seasonality and earlier research on seasonal migration in the next section. We develop a framework to organize our analysis of migration decisions and general equilibrium effects in Section 3. We describe the experiment and the data in Section 4, and present empirical results in Section 5.

2. Context

2.1 Seasonality and Seasonal Migration

Globally, approximately 805 million people are food insecure (FAO 2016), of which about 600 million are the rural poor. Estimated conservatively, half of these people—300 million of the world's rural poor—suffer from seasonal hunger (Devereux et al, 2009). This acute seasonal poverty affects rural populations in Northern Bangladesh, the focus of this study, in an annually repeating pattern. In such predominantly agrarian economies, seasonal deprivation often occurs between planting and harvest, while farmers have to wait for the crop to grow. Labor demand and wages are low during this period, and the prices of staples, especially rice, tend to increase. These two facts combine to produce a dire situation: rice consumption drops dramatically during the lean season.[6] The landless poor who supply agricultural labor on others' farms are particularly affected when demand for agricultural labor falls. They constitute around 56% of the population in our sample area, and will be the target of the seasonal migration encouragement intervention that we design.

This annual seasonal famine, locally known as "monga", affect about 50% of Rangpur's 15.8 million inhabitants that live below the poverty line (BBS, 2011). Such seasonality is characteristic of many other agrarian societies: known as the "hungry season" in southern Africa (Beegle et al 2016), and "musim paceklik" in eastern Indonesia (Basu and Wong 2012). Nearby urban and peri-urban areas do not face the same seasonal downturns, and these locations offer low-skilled employment opportunities during that same period (Zug, 2006). This contrast suggests a seasonal labor misallocation, or a spatial mismatch between the location of jobs and the location of people during that particular season.

Inspired by these observation, Bryan et al 2014 conduct a randomized controlled trial to encourage landless households from the Rangpur region facing seasonal deprivation to migrate during the Monga period to nearby cities to find work. They document positive effects of migration on consumption, and then explore why these households were not already migrating. A conditional transfer of about $8.50-$11 (equivalent to the round-trip travel cost by bus) increases the seasonal migration rate in 2008 by 22%, increases consumption amongst the migrant's family members by 757 calories per person per day in 2008 on average (and by 434 calories in 2009), and also induces 9.2% of the treated households to re-migrate the following year.

[6] Figure A.1 uses nationally representative Household Income and Expenditure Survey (HIES) data collected by the Bangladesh Bureau of Statistics to illustrate these facts. Figure A.2 shows the drop in labor hours and earning capacity using a different data source (Khandker and Mahmud 2012)

The fact that these households were not already migrating in spite of these large welfare gains can be explained by a model in which people living very close to the margin of subsistence are unwilling to take on the risk of paying the cost of migration and sending a member away. When a poor household is under the threat of seasonal famine, even a small chance that the costly migration fails to generate income could be catastrophic if the household faces a risk of falling below subsistence. Thus, uninsured risk creates a poverty trap in which the extreme poor fail to take advantage of migration opportunities that turn out to be profitable on average. A conditional transfer can address that constraint and create efficiency gains.

2.2 Potential Spillover Effects of Seasonal Migration

The Bryan et al (2014) experiment and data collection focused only on households that received migration subsidy offers, not the spillover effects on non-beneficiaries, or general equilibrium changes. Consideration of general equilibrium effects requires a fundamentally different, and more complicated, data collection and experimental strategy that we will employ in this study.

The study described in this paper, offers insight on at least two themes that Bryan et al did not cover in their study: they did not set out to measure gains in income from migration, and they did not attempt to understand spillover effects from seasonal migration. First, it is very likely that the gains in consumption and caloric intake measured by Bryan et al are in part driven by income earned by migrants from their work while away. Income also provides a secondary welfare measure for households in the experiment. Thus, our study provides well measured results on income.

More importantly, in this latest round of study we set out to understand what market spillovers an intervention such as this might have. Spillovers, as they relate to the labor market, are especially important to consider as this intervention is considered for mainstreaming into social policy. Bryan et al induced a small fraction of their target populations to move in their experiment. What happens when larger numbers of people begin to migrate, when larger numbers of workers exit a labor market? Questions such as these are critical to understand as incentivized migration is considered for scale as social policy. Non-governmental organizations such as Evidence Action and GiveWell (Evidence Action, 2016) are already advocating for, funding and starting to scale-up seasonal migration based on the work of Bryan et al.

3. Experiment and Data

The experiment aimed to understand the spillover effects of migration. The form of the experiment and the nature of data collection were both critical to understand and capture spillover impacts of migration. The next two sections set out the details of the experiment and the data collection. Figures 1 and 2 provide a visual account of the main features of the experiment and the type and timing of data collection.

3.1 Experiment

3.1.1 Implementer

RDRS, a local NGO with a long history of work in Rangpur and large presence in the region, was chosen as the partner for implementing the intervention. RDRS' engages in a number of poverty alleviation and rural improvement activities, including microfinance. Experience with microfinance is especially useful for the purposes of our experiment since it speaks to RDRS' expertise in handling transfer and recovery of funds from their target populations. The villages in which we conducted our experiment are all within RDRS' catchment.

Innovations for poverty Action in Bangladesh (IPA) was the research partner and were responsible for testing and fielding surveys, collecting, cleaning and maintaining data and ensuring overall research quality. They worked closely to monitor RDRS and ensure that all intervention activity was conducted as protocol dictated.

3.1.2 Location

The experiment was conducted in Lalmonirhat and Munshigonj districts of Rangpur. Within these two districts 133 villages were randomly selected. A previously conducted census suggested that about 57% of the population in these villages was eligible for the intervention and was used to locate eligible households within these 133 villages.

3.1.3 Eligibility

Eligibility was based on two criteria that allowed us to select households that were likely subject to seasonal deprivation. The first criterion related to the amount of land owned. Households that owned less than 0.5 acres of land were eligible for the grant. This criterion offered two advantages in selecting the appropriate set of households. First, land is an important asset in rural Bangladesh and is a concrete measure of the wealth of a household. Second, it is an easily verifiable household selection characteristic. The second criterion used asked households whether they had experienced hunger in the previous lean season, specifically whether the respondent or members of the respondent's household had skipped meals. Together, these two criteria enabled us to select into the appropriate eligible set.

About 57% of households were eligible for the intervention. Based on this, a list of households who were to be provided grants was drawn from a census.

3.1.4 Intervention

The intervention itself was an offer of a cash grant for migration related travel for eligible households. RDRS implemented the experimental interventions during the month of November 2014, with guidance and oversight provided by IPA in Bangladesh.

The procedure was as follows. RDRS staff allocated to the intervention went to designated villages with a list of eligible households. They approached a given household on their list and verified the eligibility criteria (as described above). Then, the household was made an offer of the grant amount, with an explicit statement about the conditionality attached to it i.e. the requirement that a household that accepts the grant must use it toward migration travel expenses.

Once households had understood clearly what was being offered (along with the migration conditionality), they were given guidance on how they could collect the cash grant from their local RDRS office. Specific RDRS offices serve a given set of villages and households. Households that accepted the grant offer were asked to make their way to their local RDRS office to collect the cash grant. Identification information was captured from the household by RDRS staff (e.g. the number of a government issued identification card) for verification upon collection by the member of the household designated for grant collection. As with the previous experiment, described in BCM, migration was carefully and strictly monitored to enforce the migration conditionality of the grant provided.

3.1.4.1. Travel Grant

Households were offered a grant of 1,000 taka ($13.00 USD). The grant amount was enough to cover the cost of a round trip bus ticket for migration with a little left over for a few days of board and lodging. We did consider the possibility of providing bus tickets to migrants but the logistics of contracting with multiple transport companies, coordinating payments and finding flexible means to match transporters to migrants would prove to complex. Previous experience also suggested that people tended to adhere to the migration condition set on the use of grant money and used their grants for migration related travel.

3.1.5 Timing

In terms of timing, we disbursed grants in the late monga season during the month of November, 2014 (see figure 2 for event timing). Each year, the lean season is seen to commence after planting in September lasting till December. The late timing of disbursement was a consequence of political disturbance at the time in Bangladesh. However, despite this, the overall take up was high and migrants were dispatched during the late monga and also through the lesser lean season during spring time, once political disturbance had subsided.

3.1.6 Form of Experiment

Our field trial was conducted in villages that were part of BCM's original sample of 133 villages randomly chosen across the two monga-prone districts of Lalmonirhat and Kurigram. We randomly selected households into the program using an existing list of eligible households, where eligibility was defined as (a) that they owned less than 50 decimals (i.e. 0.5 acres) of land, and (b) that a household and a member was forced to miss meals during the prior (2013) monga season. In October 2014, we allocated the 133 villages into three groups: Control, 10% Intensity and 50% Intensity. These treatments were implemented on the designated number of households in each village in collaboration with RDRS. RDRS has a substantial presence in the targeted villages, providing micro-credit and other services to locals.

We randomly varied the fractions of the eligible population[7] across the 133 villages that were offered this travel grant. Specifically, 38 villages were allocated to control where no grant was provided. Next, 48 villages were allocated to an arm where 10% of the eligible population (a "low-intensity" arm) were offered the migration grant. In this low-intensity arm, 883 households across these 48 villages were offered grants. The final set of 47 villages were allocated to a "high-intensity" arm where 50% of the relevant population was offered this grant. Across these 47 high-intensity villages, 4,881 households were offered grants. A total of 5,792 households were offered grants across the treatment villages.

[7] An eligible household is one that owns less than 0.5 acres of land and has members that were forced to skip meals during the previous monga.

3.2 Data Collection

We conducted three separate rounds of data collection, enabling us to capture a range of experimental impacts (see figure 1 for sample size by experimental cell and figure 2 for the timing of events).

3.2.1 High Frequency Survey: Households

Once the core intervention activity (migration grant distribution) was concluded, we administered a high frequency wage and employment survey across all villages to a total of 2,294 households (we sampled 722 households in the control arm and 1,574 in the treatment arms). The survey instrument asked respondents about labor market outcomes (income, time spent working, location, industry) and a brief set of questions on consumption (essential food and non-food items) and migrant remittances. The survey was administered at high frequency (once every 10 days) for six rounds. The first round commenced 21 days after the intervention was assigned i.e. we started this high frequency data collection on 22nd December, 2014). Moreover, in each round we collected data on households in the village who did not receive offers, in order to study spillover effects and any changes in village wages and employment opportunities when large numbers of people move out. Of the 1,574 households we sampled across treatment arms, we sampled 865 households that were offered and 709 households that did not receive offers. Thus, the sample of households surveyed in the treatment villages included those who were offered the travel grant (offered households) and those who were not offered (non-offered households).

3.2.2 High Frequency Survey: Shopkeepers

At the same time as the high frequency survey for households was being conducted, a high frequency survey for shopkeepers (i.e. grocery store owners) in each of our villages was simultaneously being conducted too. This high frequency shopkeeper survey was a village level price survey of a basket of goods. Specifically, three shopkeepers in each village were asked about the prices of major food items including staple grains and sources of proteins (the same set of food items that were enquired about from households in the high frequency survey). Items enquired about included rice, wheat, pulses, edible oil, meat, fish, eggs, milk, salt and sugar.

3.2.3 Endline Survey

Next, we conducted a detailed endline survey of 3,602 households across the control and treatment villages during April 2015. As with the high frequency survey, households surveyed for the endline in the treatment villages included those households offered a travel grant and those not offered a travel grant. We surveyed 697 households from the control villages, 1,376 households from villages in the 10% intensity arm (of which 814 were offered households and 562 were non-offered) and 1,533 households from villages in the 50% arm (of which 975 were offered households and 558 were non-offered). The number and type, i.e. offered or non-offered, of households surveyed by experimental arm can be found in figure 1. The endline survey collected information on a number of items from households. Core modules focused on collecting detailed information on migration including number of members who migrated, timing of migration events and destinations chosen. The survey also delved into income generated by households (especially from migration), behavior and attitude changes, coping with shocks, credit and savings.

3.2.4 Employer Survey

A final round of data collection involved asking 1,099 employers across all villages on the wages they paid during and right after grant disbursement along with qualitative assessment of the ease of hiring workers. The survey collected information on multiple activities (broadly, agricultural and non-agricultural sectors) for every two-week period starting mid-October through the end of December 2014. The survey was retrospective and relied on the recall of employers. We are confident of high quality recall because employers tend to maintain records for their businesses and survey staff were trained to prompt employers with cues on types and timing of events (e.g. associating the timing of a given employment activity with a significant cultural or other event).

4. Theory

4.1 Offer Intensity and Migration

Our theory characterizes the response of rural labor markets to labor supply shocks (migration). We define a village as the local labor market in which two types of households interact:

a. Landless households that supply labor
b. Landed farmers that hire labor

Our intervention targeted landless households. In any given village, a proportion, x, of landless households was provided a travel grant, B. The proportion that received the grant was experimentally varied. A member of a landless household that receives the grant, B, decides to migrate if the value of migration is greater than wage income from the local labor market,

$$w^m + B - F_I - F_S(x) \geq w(x) \quad (4.1.1)$$

Where, w^m is wage at migration destination, B is the migration subsidy conditional on migration, F_I is the individual specific cost of migration, F_S is the cost of migration that can be shared with other migrants (hence a function of x) and w is the village wage. F_S can be interpreted as sharing risk as well, and both F_S and w can be influenced by x.

And for the remaining $(1-x)$ households (those who did not receive the grant) decide to migrate if,

$$w^m - F_I - F_S(x) \geq w(x) \quad (4.1.2)$$

In the above, we assume that the individual cost of migration is distributed,

$$F_I \sim G(.) \quad (4.1.3)$$

The above set up suggests that for households that receive the grant (x), the probability of migration can be expressed as,

$$\Pr\left(F_I \leq w^m + B - F_S(x) - w(x)\right) = G(w^m + B - F_S(x) - w(x)) \quad (4.1.4)$$

And, similarly for the remaining ($1 - x$) unincentivized households the probability of migration is,

$$\Pr\left(F_I \leq w^m + B - F_S(x) - w(x)\right) = G(w^m + B - F_S(x) - w(x)) \quad (4.1.4)$$

Next, we characterize aggregate migration rate in a village, $M(x)$,

$$\mathrm{M}(x) = x \cdot \mathrm{G}(w^m + B - F_S(x) - w(x)) + (1 - x) \cdot \mathrm{G}(w^m - F_S(x) - w(x)) \quad (4.1.5)$$

Solving for the first derivative of the above expression, we find,

$$M'(x) = [\mathrm{G}(w^m + B) - \mathrm{G}(w^m)] + \left(-\frac{\partial F_S}{\partial x} - \frac{\partial w}{\partial x}\right) Z \quad (4.1.6)$$

Where,

$$Z = xg\left(w^m + B - F_S(x) - w(x)\right) + (1 - x)g\left(w^m - F_S(x) - w(x)\right)$$

For any $B > 1$, the first term on the right-hand side is positive and, for any $x > 0$, $\frac{\partial F_S}{\partial x} < 0$. The next term, $\frac{\partial w}{\partial x}$, depends on the effects of B on inducing migration, and the resultant shift in local labor supply. Z is positive. Hence, if $\frac{\partial w}{\partial x}$ is not significantly large, $M'(x)$, will be positive.

4.2 Income and Wage in Origin Labor Market

Suppose each landless household who has not migrated out has a Cobb-Douglas utility function,

$$U = L^{\alpha} C^{1-\alpha} \quad (4.2.1)$$

Where C denotes consumption goods measured in taka and L are hours of leisure. C is given by,

$$C = wh + V$$

Where h is labor hours supplied within the village, w is wage in the village, V is outside income including income from migration. The time constraint function is given by,

$$1 - h = L$$

The household maximizes expected utility subject to the budget and time constraint,

$$\underset{h}{\text{Max}}\, U = (1-h)^{\alpha}(wh+V)^{1-\alpha} \tag{4.2.2}$$

The FOC condition is,

$$h = 1 - \alpha - \frac{\alpha V}{w} \tag{4.2.3}$$

The labor supply function in this simple setting derived above depends on village wage, *w*, and outside income, V.

Assume that the village has N workers in total. The total working hours (*TW*) that workers are willing to supply is,

$$TW = [\mathrm{N} - \mathrm{M(x)}][1 - \alpha - \frac{\alpha V}{w}] \tag{4.2.4}$$

Assuming that the profit function for the landed farmers in the village is given by,

$$\pi = l^{\beta}k^{(1-\beta)} - wl - rk \tag{4.2.5}$$

Where l is hired labor, w is the prevailing village wage, k are other inputs, and r is the (rental) price of those inputs.

The labor demand of a landed farmer in the village can be expressed as,

$$l = k\left(\frac{\beta}{w}\right)^{\frac{1}{1-\beta}} \tag{4.2.6}$$

Given the fixed number of farmer-employers E within the village, the equilibrium occurs when,

$$[\mathrm{N}-\mathrm{M(x)}]\left[1-\alpha-\frac{\alpha V}{w}\right]=Ek\left(\frac{\beta}{w}\right)^{\frac{1}{1-\beta}} \tag{4.2.7}$$

The FOC is,

$$\frac{\partial w}{\partial x}=-\frac{\frac{\partial F}{\partial x}}{\frac{\partial F}{\partial w}}=\frac{M'(x)}{[\mathrm{N}-\mathrm{M(x)}]\frac{\alpha V}{w^2}+\frac{1}{1-\beta}Ek\left(\frac{1}{w}\right)^{\gamma}} \tag{4.2.8}$$

Where $\gamma=\left(\frac{1}{1-\beta}+1\right)$. Given that $M'(x)>0$, and the denominator is positive, $\frac{\partial w}{\partial x}>0.$

Similarly,

$$\frac{\partial h}{\partial x}=\frac{\partial h}{\partial w}.\frac{\partial w}{\partial x}=\frac{\alpha V}{w^2}\left(\frac{M\prime(x)}{[\mathrm{N}-\mathrm{M(x)}]\frac{\alpha V}{w^2}+\frac{1}{1-\beta}Ek\left(\frac{1}{w}\right)^{\gamma}}\right)=\frac{\alpha VM\prime(x)}{w^2\left([\mathrm{N}-\mathrm{M(x)}]\frac{\alpha V}{w^2}+\frac{1}{1-\beta}Ek\left(\frac{1}{w}\right)^{\gamma}\right)} \tag{4.2.9}$$

By the same logic described above $\frac{\partial h}{\partial x}>0.$

4.3 Goods Market Equilibrium

The price of food may not change in high intensity villages because of a reduction in population and an increase in income. However, we show below that price of food may not change if food market is integrated – so any positive income shock or negative population shock does not influence price. Denote initial income V^0, price p, food quantity Q.

4.3.1 Before Income Increase

We first characterize food price and demand prior to any changes in income (induced by migration episodes). The food demand function can be written as follows,

$$p^d=\frac{V^0}{Q^d} \tag{4.3.1}$$

Food supply function is assumed to be a linear function and can be written as,

$$p^s = aQ^s \quad (4.3.2)$$

Where $a > 0$.

The equilibrium can be obtained by setting the demand and supply functions equal to each other,

$$\frac{V^0}{Q^d} = aQ^s \quad (4.3.3)$$

From which we obtain the equilibrium quantity and price (prior to any increase in household income),

$$Q^{0*} = (\frac{V^0}{a})^{1/2} \quad (4.3.4)$$

And,

$$p^{0*} = (aV^0)^{1/2} \quad (4.3.4)$$

4.3.2 After Income Increases to $\mathbf{V^1}$

Demand function is,

$$Q^{d1} = \frac{V^1}{p} \quad (4.3.5)$$

At price $p = p^{0*}$, the quantity of food demanded is,

$$Q^{d1} = \frac{V^1}{p^{0*}} \quad (4.3.5)$$

Thus, the increased demand for food in local market is,

$$\Delta Q = \frac{V^1}{p^{0*}} - \left(\frac{V^0}{a}\right)^{1/2} \quad (4.3.6)$$

Since the market integrates well and producers respond quickly, more food suppliers enter the market. Food supply increases very quickly and the food supply function shifts to

$$p^{s1} = a\left[Q^{s1} - \frac{V^1}{p^{0*}} + \left(\frac{V^0}{a}\right)^{\frac{1}{2}}\right] \tag{4.3.7}$$

So the equilibrium price when income increases occurs at the point $(p^0, \frac{V^1}{p^{0*}})$, which states that price does not change with increased income.

4.4 Model Implications

To recap, there are three possible channels of spillover impacts implied by the model:

1. The take-up rate of migration offers may vary depending on how many others are simultaneously moving. Results on risk aversion from BCM 2014 suggested that decisions made by those offered travel grants on whether to migrate or not may be complementary i.e. being able to share costs and risks may induce higher take-up of the grant offers.
2. Wages and labor supply in village increases with a larger labor supply shock (this assumes that the village is the relevant labor market).
3. If food markets are not well integrated, local food prices may rise with greater migration income. However, if markets are well integrated food prices will not rise.

5. Results

5.1 Migration

We find strong impacts of the travel grant on people's choice to migrate (see table 1). Specifically, migration rates increased in both the low-intensity and high-intensity villages. We run a pure experimental (intent-to-treat) regression of the form,

$$M_{ivj} = \alpha + \beta_1 Offer\_T1_{ivj} + \beta_2 NonOffer\_T1_{ivj} + \beta_3 Offer\_T2_{ivj} + \beta_4 NonOffer\_T2_{ivj} + \varphi_j + \varepsilon_{ivj} \tag{5.1.1}$$

Where M_{ivj} is a binary variable that indicates that household i in village v in sub-district j sent a migrant between September 2014 and March 2015, and φ_j are sub-district fixed effects. Recall that in treatment villages we sampled households that were offered grants (β_1, β_3) and also those that were not offered grants (β_2, β_4), which is reflected in our regression equation. Table 1 presents results from this specification, along with specifications where the dependent variable is unique number of migrants sent by a household and total number of migration episodes generated by a household.

About one-third of the households in control villages sent a seasonal migrant (34.2%). Households offered a grant in the low-intensity group were 22.6 percentage points more likely to migrate than a household in a village where no grant offers were made. Households in the high-intensity group had a 38.1 percentage point higher propensity to migrate than unincentivized households. This is evidence for an important spillover that our theory suggests – the take-up rate of the migration offer is significantly higher when a larger number of others are simultaneously planning to travel. This positive spillover even extends to those not directly receiving migration offers. Households that did not receive an offer in the high-intensity village had a 7.44 percentage point greater propensity to migrate than households in control villages. High spillover rates underscore existing high demand for migration, as long as the risk is mitigated by friends and family traveling simultaneously. Appendix tables A.1, A.2, A.3 and A.4 show results from alternate specifications and robustness checks on these basic results.

We also explore gross movements of people at the village level. The results presented before are sample proportions. What proportion of the actual village population moved? Table 2 presents results from an estimation of the form,

$$M_{vj} = \alpha + \beta_1 T1_{vj} + \beta_2 T2_{vj} + \varphi_j + \varepsilon_{vj} \quad (5.1.2)$$

Where M_{vj} is either the proportion of the eligible or total village population that migrated[8] and φ_j are sub-district fixed effects. The high-intensity treatment saw a 26.4 percentage point gain in migration among eligible households and a 16 percentage point gain in migration when considering the total village population over a base migration rate of 34%. This is a large movement of people – the total implied movement out of the relevant population is close to 60% in the high-intensity arm.

To recap, we have documented and articulated two major phenomenon related to migration. First, through the design of our intervention which varied the intensity of travel grants offered to eligible households, we were able to demonstrate that as more people are offered grants the individual propensity to migrate increases. This provides further evidence to suggest that the perceived risk associated with migrating is reduced, as was originally hypothesized in BCM 2014. Our high intensity arm saw greater migration, not just among those offered the travel grants but among non-offered spillover households. This implies that people's decision to migrate is likely driven by the risk of the endeavor and that having companions to migrate with reduces this risk. Qualitatively, endline data tell us that 89.8% of migrants traveled with companions (this holds across the arms of the intensity treatment). The majority of migrants band together and travel in groups, presumably reducing the risk of the episode.[9] We also complement this by documenting the large movement of people out of villages i.e. the proportions that moved among eligible and total village

---

[8] The goal is to show gross population movements. In our regression equation, we calculate a village population proportion movement by multiplying sample estimates from table 1 and table 2 with a given village's relevant populations (offered and non-offered).

[9] In brief qualitative interviews, one group of migrants distinctly demonstrated real organization to their travel, having designated one member of the group general caretaker. This caretaker was responsible for some key logistical tasks (such as procuring and cooking food for the group) and as such was not expected to work at the destination. Rather, the group of migrants paid him a salary for his role.

populations. We find that the high intensity arm produces significantly more movement of people than the control. This provides a real sense for the scale of the impact on origin labor markets.

5.2 Income, Labor Supplied and Wages

Next, using detailed information on wage rates, hours worked and total income, both at the origin and at destinations for migrants and non-migrants alike we estimate the impact of the movement of people on household labour market outcomes. We start by presenting results on household income.

First, using data from the endline we show gains in income. We asked our endline respondents the sum total of income generated by migrant work from the beginning of the lean season through to the time of the endline survey. As before, we run a reduced form ITT specification (table 3) and an IV specification (table 4). Pure experimental results indicate a substantial 59% (3,486 taka) gain in migrant generated income among offered households in the low-intensity arm and a near doubling of migrant generated income of 86% (or 5,077 taka) among households offered the grant in the high intensity arm.

Next we run an IV specification, where we instrument the decision to migrate with assignment to treatment (table4). We estimate,

$$Y_{ivj} = \alpha + \beta Migrant_{ivj} + \varphi_j + \varepsilon_{ivj} \quad (5.2.1)$$

Where $Migrant_{ivj}$ is a binary variable that equals 1 if a member of the household migrated at any point during the lean season and Y_{ivj} is a labor market outcome of interest. The choice to migrate is endogenous, therefore we instrument it with the allocation to treatment. The first stage is of the form,

$$Migrant_{ivj} = \lambda + \rho Z_v + \varphi_j + \varepsilon_{ivj} \quad (5.2.2)$$

Where Z_v (the instruments) includes indicators for village level assignment to a treatment arm. We found that the high intensity arm had a better first stage, so our instruments were whether a given household was in the offered or non-offered set within a given high-intensity village (allocation to the offered set within a village was also random). The IV specification shows a strong result with households induced to migrate by the incentive reporting a 14,175 taka increase in income from migrant work (table 4). The large value on this is conceivable, as the period enquired about spans 5 months, which implies a 2,835 taka income gain per month from migrant's employment.

Next, using the high frequency survey conducted right after the travel grant was offered, we present ITT results in table 5(a). Panel (i) presents results using the intensity experiment while panel (ii) presents results using the targeting experiment, and all outcomes are aggregated across the six periods of the high frequency survey. Households in both the high and low intensity treatment villages saw incomes rise, driven by increases in work hours and income outside the village. Households in high-intensity villages saw a substantial increase in overall income by about 19% (1,305 taka) and 10% (698 taka) for offered and non-offered households respectively (over the 60 day duration of the high frequency survey) as compared to control households. The increase is driven by incomes derived outside the village, which itself is driven entirely by an increase in work hours, and are unlikely to be due to any change in wages at the destination. Income generated at the origin does not decline, despite the prime working member(s) being away. This last is something we will return to ahead.

We also run variations to the above specification. First, in table 5(b), we regress employment outcomes captured in the high frequency survey on village level dummies for treatment. This lumps together offered and non-offered households in our sample, which "dilutes" the results somewhat though the sign and magnitude of the effects is essentially the same as in table 5(a). Next, we re-run the same specification but exclude non-offered households and the estimates return to levels estimated for offered households as seen in table 5(a).

The earlier results are reinforced. Households induced to migrate due to the subsidy, have greater income, especially income generated by migrant members, along with an increased number of days worked by migrant members. The estimates from the two sources (i.e. the endline survey and the high frequency survey estimates of income from migration) are somewhat coincident but not exactly. ITT estimate for migrant income gain in 50% arm from endline survey is 5,077 taka (over 22 week recall period or about 231 taka per week), while from the high frequency survey is 1,037 taka (over 6 week recall period or about 173 taka per week). Meanwhile, the IV estimate for migrant income gain from the endline survey is 14,175 taka (or 644 taka per week) and 6,931 taka (or 1,155 taka per week) from the high frequency survey. It should be noted that the high frequency survey targeted period soon after grant disbursement, while the endline enquired about a period starting prior to disbursement and ending two weeks before the final round of the high frequency survey. Additionally, the endline and high frequency samples only partially overlap.

Thus, careful measurement during the high frequency survey and the endline survey both provide real evidence of an increase in the income of households that sent migrants and that this increased income was predominantly a result of migrant employment in the away location. Importantly, and something that becomes apparent from the range of employment outcomes collected at regular intervals in the high frequency survey, this increase in income outside the village was not simply a displacement of income that otherwise would have been earned in the village. Even though prime working members within treated households migrated away and had work activity outside the village, income generated at origin by this household did not decline relative to control households. This is an issue we return to in the next section.

It will be noted, however, that the IV specification shown in table 6 has a weak first stage. This could be a result of migration not having been fully captured by the high frequency survey. The high frequency survey was oriented toward origin outcomes. The concern is that since migration was not explicitly captured by this survey we may not have fully captured the extent of migration in this dataset. Therefore, we combine the endline migration reports with the employment outcomes data from the high frequency survey. The two surveys have a partial overlap in sample i.e. not all those surveyed in the high frequency were subsequently surveyed in the endline. Regardless, we re-run the previous analysis except that the mediating variable for migration is based on reported migration from the endline survey. The results are provided in table 7. We lose precision on many of the estimates as our usable sample has dwindled due to the partial overlap between the high frequency survey and the endline samples, though the results on income and wage rates at origin hold.

We also examine the impact of migration on origin wages using a different data set. We combined village level movements (as documented in table 2) with employer wage reports from the employer wage survey. Table 8 provides ITT results of the impact of treatment on wages reported for the intensity experiment. The results imply a 4% – 7% increase in the agricultural wage (for men) in both experiments. The experiment demonstrates a 5% increase in the agricultural wage across both intensities (specification 5) though the precision on the estimates is low. The agricultural allocation arm of the targeting experiment has a more precise estimate of a 7% increase in the agricultural wage.

Next, we use an IV specification. The estimation is employer level,

$$W_{evj} = \alpha + \beta Migrant_{vj} + \varphi_j + \varepsilon_{evj} \tag{5.2.3}$$

Where $Migrant_{vj}$ is a village level proportion of migration and W_{evj} are wages as reported by employer e. We instrument the village level migration with the village level assignment to treatment,

$$Migrant_{vj} = \lambda + \rho Z_v + \varphi_j + \varepsilon_{vj} \tag{5.2.4}$$

Results from this estimation are reported in table 9. Again, we see evidence of the impact of migration on agricultural wages. We estimate a (male agricultural) wage elasticity of migration of 0.28. Increasing the out-migration rate of the eligible population by 10% through this travel subsidy treatment leads to a rise in wages in the village of 2.8%. The non-agricultural wage does not at all seem elastic with respect to the out-migration rate, potentially because the migrants would otherwise have competed for the agricultural work in the village, but not the non-agricultural jobs.

5.3 Household Labor Supply at Origin

We noted above that treatment households report higher migrant income i.e. income generated by household members while having migrated. Importantly, we also documented above that treatment households' reported income and labor supplied at origin did not decline in comparison to control households. This implies that households in treatment villages are able to compensate for a primary working member being away i.e. that households (in treatment villages) are increasing participation in their origin labor market. Why does labor supplied at origin increase among households that are participating in away labor markets (through migration)? We explore this in what follows.

We first explore whether other members of these households (households that generate a migrant) participate in origin labor markets i.e. members other than the primary working member participate in origin labor markets. We remove the contributions of primary members to labor market outcomes recorded in our high-frequency survey and regress labor market outcomes (a subset of those in table 5(a)) on allocation to treatment (an ITT regression). The results of this are shown in table 10. The results show no increase in labor supplied (or income earned). The results are imprecise but it will be noted that the magnitudes of the coefficients are small.

So, if the non-primary members of a household are not increasing their supply of labor at origin, why has the origin supply of labor by households increased despite the primary working member being away (i.e. participating in away labor markets)? One possibility is that the primary working member of migrant households boosts participation in origin labor markets. Briefly, it could in fact be that the primary working member (who is also a migrant) is going back-and-forth between origin and destination, and, since in the higher intensity villages a larger set of migrants is away at any given point in time, he supplies labor to the origin labor market taking advantage of slack there.

We would ideally like to get experimental estimates of a migrant's earnings and labor supplied at home. For this purpose, we had sampled eligible households not offered grants in treatment villages i.e. a set of households that did not receive grants but were equivalent to those offered grants in treatment villages. By looking at employment outcomes of primary workers in these non-offered households, we could have estimated experimentally identified estimates for primary worker employment outcomes (especially origin income and labor supplied); ITT estimates are shown in table 5(a) in rows that say "10% and not offered" and "50% and not offered". However, as was noted in table 1, non-offered households in treatment villages were also impacted by the offers of travel grants – non-offered households exhibited a 7 percentage point increase in propensity to migrate. This could be why we do not find distinctly higher origin employment outcomes for non-offered households in treatment villages. Therefore, we explore the increase in households' origin income and labor supplied qualitatively.

We start by characterizing the contribution of primary workers to employment outcomes (table 11). The results point to the fact that the primary worker is contributing the bulk of income earned and days worked, both at home and away – about 80% of income at home and days worked at home. How is this possible? One explanation for this is that the primary worker makes multiple trips and not all migrants are away simultaneously. Using data from the endline and high frequency surveys, we quantify these two objects (i.e. extent of being away and extent of simultaneity in migration). The panels of table 12 provide some evidence to support these facts. Panel 12(a) shows how much time a migrant spends away. This is quantified as the number of weeks away from the total weeks enquired about and quite consistently across treatment arms (intensity) the mean proportion of time spent away is about a third. In addition, panel (b), quantifies the mean number of migration episodes undertaken by ever-migrants, indicates that migrants tend to migrate multiple times.

Next, panel 12(c) shows a calculation of the probability that when one ever-migrant (i.e. someone who has migrated during the period of enquiry) is at home another ever-migrant *from his village* is away (this uses the high frequency data). Across intensity treatment arms we see that the probability of this is about 75% - the chance that some other potential migrant is away while a given potential migrant is home is substantial. Coupled together, these facts suggests that migrants move for only part of the season and that migrants may be at their home location when others are away.

Having set up the fact that the primary worker in a household contributes the bulk of income and labor supplied, and mixes time away and at origin, we provide non-experimental estimates of the primary worker's labor market outcomes at-home i.e. income and labor supplied focusing on periods when he is at home (taking advantage of the high frequency surveys); see table 13. The results demonstrate that primary workers income and labor supplied in the treatment arms were significantly greater than control. In fact, it should be noted that the higher intensity arm has larger coefficient estimates than the lower intensity arm.

This goes back to the earlier suggestion that the primary worker is able to benefit from slack at origin labor markets. The primary worker, who is responsible for the bulk of income and labor supplied at origin, benefits from the fact that he is traveling back and forth between origin and destination and, during any given home visit, there is a high probability of other potential migrants being away. Thus, this worker is able to benefit from labor markets that have a reduced labor supply.

The concern with the set of estimates in table 13 is that primary workers are choosing when to return to their home locations i.e. they pick weeks to return to their origins to take advantage of slack in their local labor market (since migrants in, say the 50% intensity villages, may know that many people will be away at any given point in time). Therefore, we compare the "best" week of primary workers across treatments. Here "best" means the one week in the entire set of 6 weeks observed in the high frequency survey that had the highest income (table 14) and that had the highest number of days of labor supplied (table 15). In both these tables of estimates we do not see any difference between control and treatment, since the "best week" in the control and treatment arms are no different. This suggests that primary workers in the treatment arms (especially the high intensity arm) are not selecting into periods of work at origin, since the "best weeks" across treatments are no different. This helps mitigate to some extent the concern of endogeneity bias in the estimates in table 11.

5.4 Goods Market Impacts (Food Prices)

Finally, we show that food prices at origin villages did not shift. Recall that food prices were enquired about from shopkeepers in origin villages in synchrony with the high frequency survey. Table 16 shows ITT results for prices of a basket of staple foods. The results suggest that food markets are integrated as no substantive increase in prices is detected.

6. Conclusion

This paper reports on the effect of a seasonal migration program, including general equilibrium effects. The experiment we conducted varied the proportion of eligible households in a village that were offered a small travel grant. Coupled to this experimental form was a careful data collection exercise that gathered data not only from program households, but those households that were eligible and not offered the grant. Data collection also encompassed the demand-side of the labor market, where we surveyed employers to understand their adjustments.

The design and data collection in our study allowed us to understand better a few things. Varying the number of people in a given village that received a travel grant (a cash transfer conditioned on the recipient migrating) allowed us to examine the travel risk channel as it affects the decision to migrate. We find that the greater are the number of contemporaries of a potential migrant that decide to migrate, the great is the propensity of the potential migrant to actually migrate. This suggests to us that migrants' decision to move is based on their perceived risk of undertaking a trip and that this risk is reduced when they are able to travel with companions. We find evidence of this among those of our sample who were offered travel grants by us and also among those who did not receive grant offers – both groups saw an increased propensity to migrate as the number of contemporary migrants was increased.

Additionally, our experimental design and measurement work allowed us to investigate impacts on origin labor markets (i.e. rural labor markets from which we induced people to migrate). We find that households in the treated arms of the experiment tend to generate a large amount of income from the migrant member's employment away. We find impacts on origin labor markets. Under the assumption that labor markets are fragmented, a large movement away of prime age workers would reduce locally available labor supply, which either increased the wage rate or freed up work opportunities at home for those household members who remained behind. We find that the reduction in local labor supply increases wages by a small margin and that the amount of work days supplied by households at origin does not decrease.

7. References

Acemoglu, Daron (2010). "Theory, General Equilibrium, and Political Economy in Development Economics," Journal of Economic Perspectives 24 (3), 17-32.

Ahn, D., C. Tacoli, and H.X. Thanh (2003). "Migration in Viet Nam: a review of information on current trends and patterns, and their policy implications", paper presented at the Regional Conference on Migration, Development and Pro-Poor Policy Choices in Asia, organized by Bangladesh Refugee and Migratory Movements Research Unit, Bangladesh/ DFID/UK, Dhaka, 22-24 June.

Angelucci, M. and Giacomo De Giorgi (2009). "Indirect Effects of an Aid Program: How do Cash Injections Affect Ineligibles' Consumption?" *American Economic Review* 99(1), 486-508, March.

Ashraf, Nava, Diego Aycinena, Claudia Martínez, and Dean Yang. 2015. "Savings in Transnational Households: A Field Experiment among Migrants from El Salvador." *Review of Economics and Statistics* 97(2): 352-356.

Bandiera, O., R. Burgess, R., N. Das, S. Gulesci, I. Rasul, M. Sulaiman (2016). "Labor Markets and Poverty in Village Economies," *Quarterly Journal of Economics*.

Banerjee, Abhijit & Duflo, Esther. (2007). The Economic Lives of the Poor. *Journal of Economic Perspectives*, 21(1): 141-168.

Banerjee, Abhijit, Esther Duflo, Shawn Cole, Leigh Linden (2007). "Remedying Education: Evidence from Two Randomized Experiments in India." *Quarterly Journal of Economics*, 122(3): 1235-1264.

Banerjee, A., Esther Duflo, Nathanael Goldberg, Dean Karlan, Robert Osei, William Parienté, Jeremy Shapiro, Bram Thuysbaert, C. Udry (2015). "A Multifacited Program Causes Lasting Progress for the Poor: Evidence from Six Countries," *Science*, 348 (6236). 15 May 2015.

Beegle, K., E. Galasso and J. Goldberg (2016). "Direct and Indirect Effects of Malawi`s Public Works Program on Food Security," Working Paper, University of Maryland

Blattman, C., N. Fiala and S. Martinez (2016). "Generating skilled self-employment in developing countries: Experimental evidence from Uganda," *Quarterly Journal of Economics*.

Bryan, G., S. Chowdhury, and M. Mobarak (2014). Underinvestment in a Profitable Technology: The Case of Seasonal Migration in Bangladesh. *Econometrica* 82 (5), 1671-1748.

Bryan, G. and M. Morten (2015). "Economic Development and the Spatial Allocation of Labor: Evidence from Indonesia," Working Paper

Combes, P-P, Duranton, G., Gobillon, L. and Roux, S. (2010). "Estimating Agglomeration Economies with History, Geology, and Worker Effects," Chapter in *Agglomeration Economics*, E. L. Glaeser, editor (p. 15 - 66), University of Chicago Press.

Connell, J. (1981), "Migration, remittances and rural development in the South Pacific", in: G.W. Jones and H.V. Richter, eds., Population mobility and development: Southeast Asia and the Pacific, Development studies monograph no. 27 (Australian National University, Canberra).

Cortes, Patricia. "The Effect of Low-skilled Immigration on U.S. Prices: Evidence from CPI Data". *Journal of Political Economy* 116.3 (2008): 381–422.

Crepon, B., E. Duflo, M. Gurgand, R. Rathelot & Philippe Zamora (2013). "Do Labor Market Policies have Displacement Effects? Evidence from a Clustered Randomized Experiment," The *Quarterly Journal of Economics*, 128(2): 531-580.

Dercon, Stefan & Krishnan, Pramila. (2000). "Vulnerability, Seasonality and Poverty in Ethiopia," *Journal of Development Studies*, 36(6): 25-53.

Devereux, Hauenstein and Vaitla (2009). *Seasons of Hunger: Fighting Cycles of Starvation among the World's Rural Poor*. Pluto Press.

Evidence Action (2016). "Evidence Action and RDRS Bangladesh Announce Partnership on "No Lean Season" to Reduce Seasonal Income Insecurity", press release May 9, 2016. http://www.evidenceaction.org/blog-full/press-release-evidence-action-and-rdrs-bangladesh-announce-partnership-on-no-lean-season-to-reduce-seasonal-income-insecurity accessed August 1, 2016.

Foster, A. and M. Rosenzweig (2008). "Economic Development and the Decline of Agricultural Employment," Chapter 47 in *Handbook of Development Economics*, Volume 4, Elsevier B.V., DOI: 10.1016/S1573-4471(07)04047-8

Food and Agriculture Organization (FAO) (2016), Hunger Portal, http://www.fao.org/hunger/en/, accessed August 1, 2016

Garlick, J., Leibbrandt, M. and Levinsohn, J. (2016). "Individual Migration and Household Incomes," Working Paper, Yale University

Glaeser, E. (2010). "Why Humanity Loves, and Needs, Cities," Economix blog, New York Times, April 13, 2010.

Glaeser, E. and Mare, D. (2001). "Cities and Skills," Journal of Labor Economics, 19 (2): 316-342

Glaeser, E. and M. Resseger (2010). "The Complementarity between Cities and Skills," *Journal of Regional Science*, 50(1): 221 - 244

Greenwood, Michael (1997). "Internal Migration in Developed Countries," Chapter 12 in *Handbook of Population and Family Economics*, M.R. Rosenzweig and O. Stark eds., Elsevier Science B.V., 1997

Hance, W.A. (1970), Population, migration, and urbanization in Africa (Columbia University Press, New York).

Harris, J.R. and M.P. Todaro (1970), "Migration, unemployment and development: a two-sector analysis", American Economic Review 60: 126-142.

Heckman, James J., "Randomization and Social Policy Evaluation," NBER Technical Working Paper Series, July 1991, (107).

Imbert, Clement and John Papp (2015). "Short-term Migration, Rural Public Works and Urban Labor Markets: Evidence from India," Working Paper, University of Warwick.

Jayachandran, Seema, 2006, Selling Labor Low: Wage Responses to Productivity Shocks in Developing Countries, *Journal of Political Economy*, 114, 538-575.

Kaur, Supreet (2015). "Nominal Wage Rigidity in Village Labor Markets," Working Paper, Columbia University.

Kremer, Michael and Edward Miguel (2007). "The Illusion of Sustainability", *Quarterly Journal of Economics*, 2007, 122(3), 1007-1065.

Lewis, W.A. (1954) 'Economic development with unlimited supplies of labor', *Manchester School of Economic and Social Studies*, 22:139-191.

Lipton, M. (1980), "Migration from rural areas of poor countries: the impact on rural productivity and income distribution", *World Development* 8: 1-24.

Long, L.H. (1991), "Residential mobility differences among developed countries", *International Regional Science Review* 14: 133-147.

Lucas, Robert E. B. (1997). "Internal Migration in Developing Countries," Chapter 13 in *Handbook of Population and Family Economics*, M.R. Rosenzweig and O. Stark eds., Elsevier Science B.V., 1997

McKenzie, David and Dean Yang (2012). "Experimental Approaches in Migration Studies", in Carlos Vargas-Silva ed. *Handbook of Research Methods in Migration*. Edward-Elgar.

Meghir, C., A. M. Mobarak, C. Mommaerts and M. Morten (2016). "Seasonal Migration and Risk Sharing in Bangladesh," Working Paper, Yale University

Miller, G. and A. M. Mobarak (2015). "Learning about New Technologies Through Social Networks: Experimental Evidence on Non-Traditional Stoves in Bangladesh," *Marketing Science*, 34 (4): 480-499, July-August 2015

Mobarak, A. M. and M. Rosenzweig (2016). "Risk, Insurance and Wages in General Equilibrium," Working Paper, Yale University

Morten, M. (2015). "Temporary Migration and Endogenous Risk Sharing in Village India," Working Paper, Stanford University

Morten, M. and J. Oliveira (2016). "Paving the Road to Development: Costly Migration and Labor Market Integration", working paper.

Munshi, Kaivan and Mark Rosenzweig. 2016. "Networks and Misallocation: Insurance, Migration, and the Rural-Urban Wage Gap." *American Economic Review*, 106(1): 46-98.

Muralidharan, K. and V. Sundararaman (2013). "The Aggregate Effect of School Choice: Evidence from a Two-Stage Experiment in India," NBER Working Paper 19441.

Oberai, A.S. (1983), "An overview of migration-influencing policies and programmes", in: A.S. Oberai, ed., State policies and internal migration: studies in market and planned economies (Croom Helm, London).

Oster, Emily and Rebecca Thornton. (2012). "Determinants of Technology Adoption: Private Value and Peer Effects in Menstrual Cup Take-Up," *Journal of the European Economic Association*, December.

Paxson, Christina. (1993). Consumption and Income Seasonality in Thailand. *Journal of Political Economy*, 101(1): 39-72.

Ping, H. 2003 "China migration country study", paper presented at the Regional Conference on Migration, Development and Pro-Poor Policy Choices in Asia organized by the Bangladesh Refugee and Migratory Movements Research Unit, Bangladesh/DFID UK, Dhaka, 22-24 June.

Pritchett, L. (2006). *Let their People Come: Breaking the Gridlock on Global Labor Mobility*. Washington, DC: Center for Global Development

Ranis, G. and Fei, J. (1961). "A theory of economic development", *American Economic Review*, 56:533-558.

Rempel, H. and R.A. Lobdell (1978). "The role of urban-to-rural remittances in rural development", *Journal of Development Studies* 14: 324-341.

Rodrik, Dani. (2009). "The New Development Economics: We Shall Experiment, but How Shall We Learn?" in Jessica Cohen and William Easterly, eds., What Works in Development? Thinking Big and Thinking Small, Brookings.

Rosenzweig, M. (1988). "Labor markets in low-income countries," Chapter 15 in *Handbook of Development Economics* (D. Rodrik and M. Rosenzweig, eds.), Volume 1, pp. 713-762.

Simmons, A.B. (1981), "A review and evaluation of attempts to constrain migration to selected urban centres and regions," in *Population distribution policies in development planning*, Population studies no. 75 (Department of International Economic and Social Affairs, United Nations, New York).

Taylor, J. E., & Martin, P. (2001). Human capital: Migration and rural population change. In G. Rausser, & B. Gardner (Eds.), *Handbook of Agricultural Economics* (pp. 458–511). New York: Elsevier.

Zhang, Xiaobo et al. "Rising Wages in Bangladesh." *IFPRI Discussion Paper 01249*, International Food and Policy Research Institute, March (2013): 28.

Taylor, J. E., & Martin, P. (2001). "Human capital: Migration and rural population change," in G. Rausser, & B. Gardner (Eds.), Handbook of agricultural economics (pp. 458–511). New York: Elsevier.

Zug, Sebastian. "Monga-Seasonal Food Insecurity in Bangladesh: Bringing the Information Together." *Journal of Social Studies-Dhaka-* (2006): 1–14.

Figure 1

Experiment: Design and survey sampling details

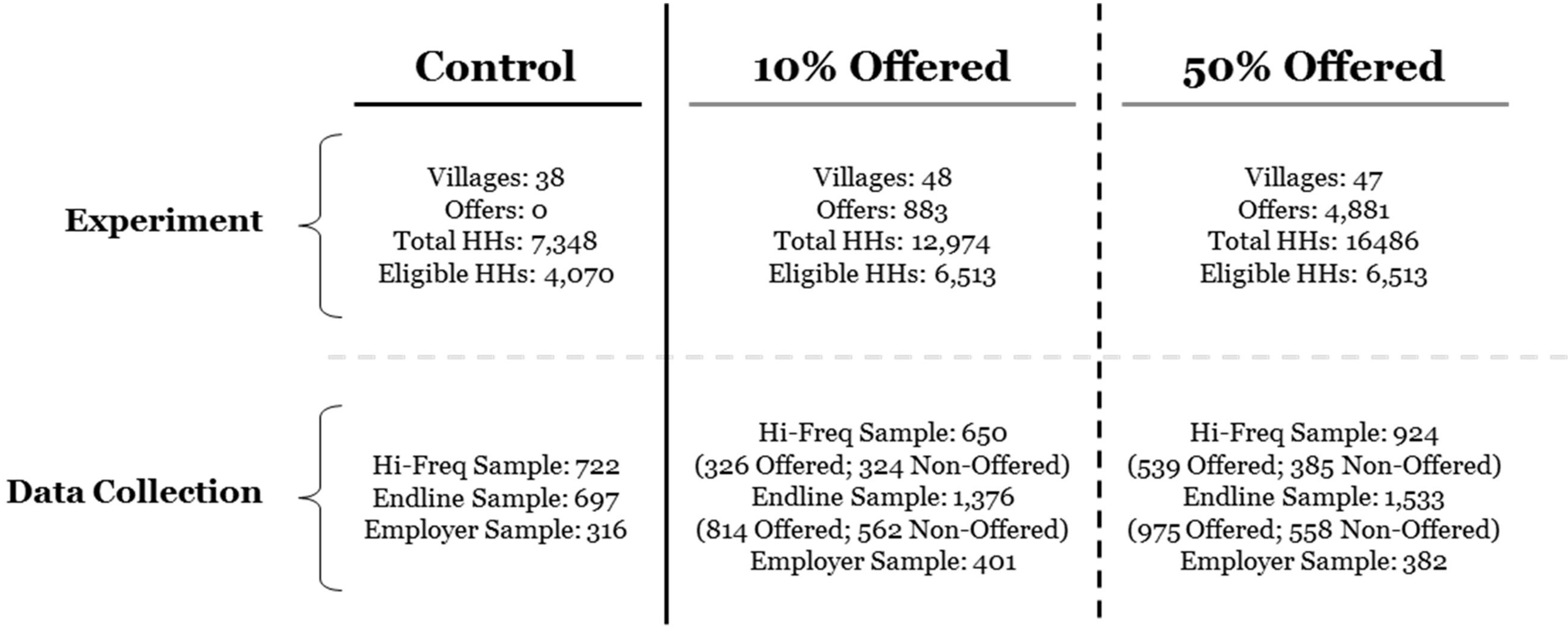

Figure 2

Sequence of events

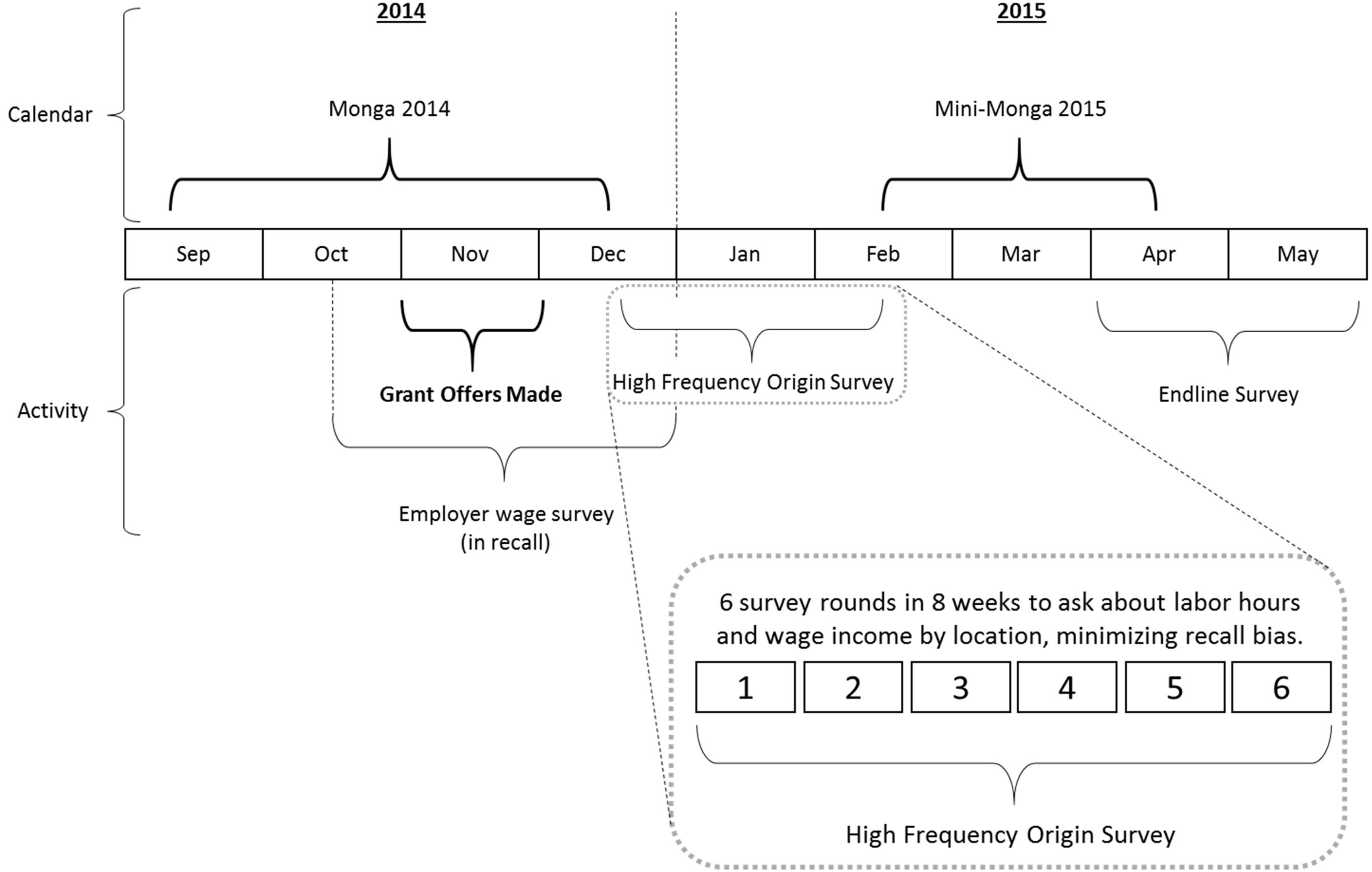

Figure 3

Motivation for theoretical model

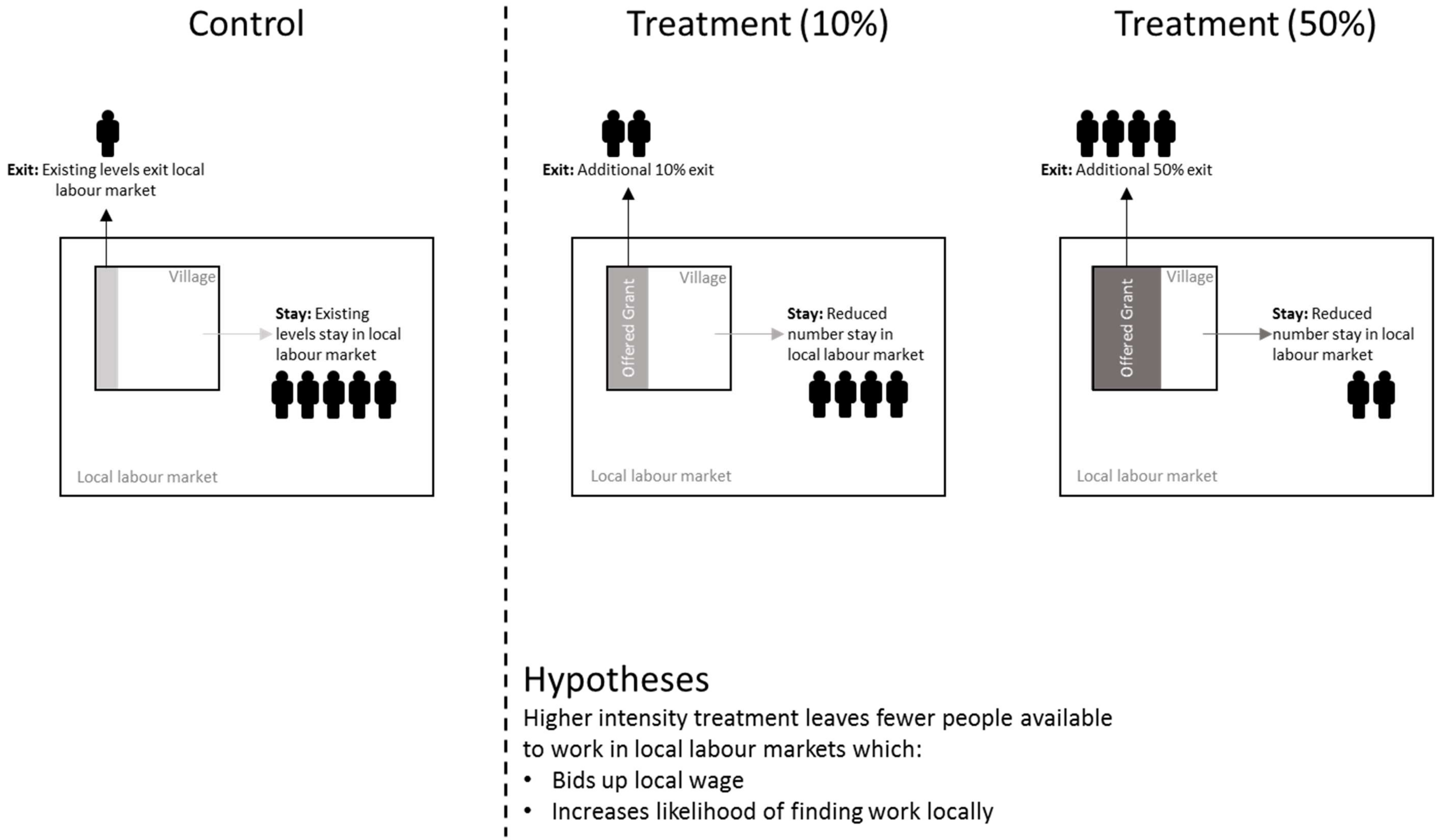

Table 1

Migration as a function of treatments in 2014

VARIABLES	(1) At least one migrant	(2) Number of Migrants	(3) Migration Episodes
10% and offered grant	0.226***	0.240***	0.351***
	(0.0396)	(0.0448)	(0.0721)
10% and not offered grant	0.0410	0.0382	0.0840
	(0.0425)	(0.0488)	(0.0810)
50% and offered grant	0.381***	0.399***	0.591***
	(0.0360)	(0.0410)	(0.0684)
50% and not offered grant	0.0744*	0.0883*	0.0823
	(0.0393)	(0.0468)	(0.0730)
Mean in control	0.342	0.369	0.511
Observations	2,971	2,971	2,971
R-squared	0.138	0.118	0.124
Upazila FE	YES	YES	YES

Robust standard errors clustered at the village level in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 2

Migration as a function of treatments in 2014 – impact on population

VARIABLES	(1) Percent of eligible HHs that migrated	(2) Percent of total HHs that migrated
10% Intensity	0.0881**	0.0821*
	(0.0406)	(0.0427)
50% intensity	0.264***	0.160***
	(0.0429)	(0.0457)
Mean	0.338	0.338
Observations	117	116
R-squared	0.314	0.151
Upazila FE	YES	YES

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 3

ITT results of income and savings from endline survey.

VARIABLES	(1) Migration Income	(2) Savings
1 = 10% and offered grant	3,486***	105.1
	(846.3)	(250.8)
1 = 10% and not offered grant	1,251	-147.3
	(889.7)	(251.1)
1 = 50% and offered grant	5,077***	-99.58
	(903.0)	(243.2)
1 = 50% and not offered grant	1,419*	69.43
	(782.1)	(315.1)
Mean in control	5911.55	2101.69
Observations	3,279	3,600
Upazila FE	YES	YES

Robust standard errors clustered at the village level in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 4

LATE results of income and savings from endline survey.

VARIABLES	(1) Migration Income	(2) Migration Income	(3) Savings	(4) Savings
Atleast one migrant	14,175***	13,206***	-156.8	-69.71
	(2,093)	(1,935)	(814.2)	(495.7)
Observations	3,279	3,279	3,600	3,600
R-squared	0.238	0.235	0.007	0.007
Upazila FE	YES	YES	YES	YES
1st-Stage	10% and 50%	10%_Offered 10%_NonOffered 50%_Offered 50%_NonOffered	10% and 50%	10%_Offered 10%_NonOffered 50%_Offered 50%_NonOffered
Underidentification Test	29.61	54.47	38.21	68.80
Weak identification Test	25.40	35.94	38.07	54.96
Overidentification test	0.18	0.85	0.02	1.53

Robust standard errors clustered at the village level in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 5 (a)

(a) ITT results of employment outcomes from high frequency origin survey.

VARIABLES	(1) Income	(2) Income (Home)	(3) Income (Away)	(4) Income PerCapita (Home)	(5) Days Worked	(6) Days Worked (Home)	(7) Days Worked (Away)	(8) Daily Income	(9) Daily Income (Home)	(10) Food Expend. PerCapita
10% and offered	382.9	213.2	327.3	74.85	1.781	0.991	0.836	4.596	3.943	64.93***
	(317.1)	(236.8)	(319.7)	(61.31)	(1.376)	(1.286)	(1.268)	(3.902)	(3.614)	(23.91)
10% and not offered	70.16	227.2	-120.8	76.67	0.424	0.744	-0.645	4.330	2.979	6.154
	(314.2)	(218.2)	(290.5)	(57.11)	(1.502)	(1.258)	(1.168)	(4.452)	(3.881)	(29.35)
50% and offered	1,222***	190.1	1,072***	60.01	4.819***	0.320	4.477***	10.10***	6.357**	27.67
	(341.8)	(229.3)	(360.3)	(60.08)	(1.574)	(1.251)	(1.530)	(3.534)	(3.046)	(25.23)
50% and not offered	514.9	14.81	529.1	69.68	1.689	0.0203	1.580	3.041	4.429	61.61**
	(330.9)	(256.6)	(334.2)	(69.72)	(1.504)	(1.322)	(1.425)	(3.504)	(3.256)	(25.94)
Mean in control	6853.37	4477.247	2376.13	1136.72	37.01	26.99	10.02	184.63	169.10	1167.20
Observations	2,249	2,271	2,271	2,271	2,251	2,271	2,273	2,232	2,073	2,249
Upazila FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Robust standard errors clustered at the village level in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 5 (b)

(b) ITT results of employment outcomes from high frequency origin survey, using village level treatment dummies including both offered and non-offered households.

VARIABLES	(1) Income	(2) Income (Home)	(3) Income (Away)	(4) Income PerCapita (Home)	(5) Days Worked	(6) Days Worked (Home)	(7) Days Worked (Away)	(8) Daily Income	(9) Daily Income (Home)	(10) Food Expend. PerCapita
10%	225.8	219.9	103.3	75.78	1.102	0.868	0.0957	4.446	3.463	35.28
	(277.7)	(195.3)	(269.3)	(52.79)	(1.213)	(1.104)	(1.079)	(3.816)	(3.371)	(24.54)
50%	927.1***	117.0	845.4***	64.05	3.516**	0.195	3.276**	7.157**	5.553*	41.56*
	(296.6)	(214.4)	(309.2)	(57.26)	(1.364)	(1.141)	(1.351)	(3.108)	(2.856)	(22.54)
Mean in control	6853.37	4477.247	2376.13	1136.72	37.01	26.99	10.02	184.63	169.10	1167.20
Observations	2,249	2,271	2,271	2,271	2,251	2,271	2,273	2,232	2,073	2,249
Offered HHs included	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Non-Offered HHs included	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Upazila FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Robust standard errors clustered at the village level in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 5 (c)

(c) ITT results of employment outcomes from high frequency origin survey, using village level treatment dummies including both offered and non-offered households.

VARIABLES	(1) Income	(2) Income (Home)	(3) Income (Away)	(4) Income PerCapita (Home)	(5) Days Worked	(6) Days Worked (Home)	(7) Days Worked (Away)	(8) Daily Income	(9) Daily Income (Home)	(10) Food Expend. PerCapita
10%	391.1	208.2	347.1	74.21	1.859	1.001	0.995	4.759	3.676	70.24***
	(316.6)	(231.0)	(323.3)	(61.04)	(1.322)	(1.241)	(1.271)	(3.933)	(3.573)	(24.23)
50%	1,244***	155.9	1,112***	55.94	4.718***	0.149	4.620***	10.70***	5.744*	34.77
	(346.6)	(231.2)	(361.8)	(59.78)	(1.611)	(1.265)	(1.559)	(3.357)	(3.029)	(25.45)
Mean in control	6853.37	4477.247	2376.13	1136.72	37.01	26.99	10.02	184.63	169.10	1167.20
Observations	1,550	1,570	1,569	1,568	1,555	1,570	1,573	1,539	1,437	1,552
Offered HHs included	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Non-Offered HHs included	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Upazila FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Robust standard errors clustered at the village level in parentheses

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 6

IV results of employment outcomes from high frequency origin survey.
We instrument Migration with allocation to 50% offered and 50% non-offered.

VARIABLES	(1) Income	(2) Income (Home)	(3) Income (Away)	(4) Income PerCapita (Home)	(5) Days Worked	(6) Days Worked (Home)	(7) Days Worked (Away)	(8) Daily Income	(9) Daily Income (Home)	(10) Food Expend. PerCapita
(max) Migrated	10,028***	2,792	6,931***	774.9	36.66***	8.279	29.94***	87.61***	61.27*	255.1
	(3,117)	(2,373)	(1,836)	(637.2)	(12.78)	(11.12)	(7.318)	(32.92)	(35.16)	(218.9)
Observations	1,552	1,573	1,568	1,555	1,551	1,574	1,568	1,542	1,438	1,560
Upazila FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Period	ALL	ALL	ALL	ALL	ALL	ALL	ALL	ALL	ALL	ALL
Underidentification	7.21	7.93	7.93	8.39	7.60	7.80	8.29	6.47	6.73	8.17
Weak Identification	3.97	4.41	4.44	4.74	4.26	4.33	4.66	3.52	3.67	4.61
Over Identification test	0.05	0.00	0.47	0.60	0.00	0.01	0.03	0.00	0.67	3.86

Robust standard errors clustered at the village level in parentheses
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 7

IV results of employment outcomes from high frequency origin survey with migration result merged in from endline survey.
We instrument Migration with allocation to 50% offered and 50% non-offered.

VARIABLES	(1) Income	(2) Income (Home)	(3) Income (Away)	(4) Income PerCapita (Home)	(5) Days Worked	(6) Days Worked (Home)	(7) Days Worked (Away)	(8) Daily Income	(9) Daily Income (Home)	(10) Food Expend. PerCapita
(max) Migrated	3,113*	1,652	1,915	400.5	10.95	7.781	12.23	35.16**	25.63*	112.4
	(1,869)	(1,457)	(1,772)	(369.0)	(8.322)	(8.395)	(7.509)	(16.19)	(14.92)	(118.4)
Observations	981	1,002	997	989	984	1,003	1,001	974	927	991
Upazila FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Period	ALL	ALL	ALL	ALL	ALL	ALL	ALL	ALL	ALL	ALL
Underidentification	16.72	17.02	16.68	16.94	16.99	16.46	17.20	16.31	16.88	16.75
Weak Identification	14.99	15.55	14.92	15.32	16.28	14.91	16.13	14.57	14.90	15.19
Over Identification test	1.53	0.07	0.52	0.72	0.67	0.00	0.38	0.43	0.98	2.89

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 8

ITT results of wage outcomes from retrospective employer wage survey.

VARIABLES	(1) Male wage (all)	(2) Male wage (ag)	(3) Male wage (non-ag)	(4) Ln(Male wage) (all)	(5) Ln(Male wage) (ag)	(6) Ln(Male wage) (non-ag)
10%	10.36*	10.17*	7.224	0.0506**	0.0499*	0.0367
	(5.672)	(5.848)	(7.008)	(0.0241)	(0.0254)	(0.0281)
50%	5.452	10.01	-1.157	0.0353	0.0519*	0.0101
	(5.919)	(6.170)	(7.586)	(0.0257)	(0.0269)	(0.0313)
Mean	248.54	238.20	269.08	5.49	5.45	5.57
Observations	885	609	450	885	609	450
R-squared	0.385	0.581	0.264	0.395	0.595	0.285
Upazila FE	YES	YES	YES	YES	YES	YES

Robust standard errors clustered at the village level in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 9

IV results of wage outcomes from retrospective employer wage survey.

VARIABLES	(1) Male wage (all)	(2) Male wage (ag)	(3) Male wage (non-ag)	(4) Ln(Male wage) (all)	(5) Ln(Male wage) (ag)	(6) Ln(Male wage) (non-ag)
Proportion Eligible Migrated	31.19	56.37*	-3.497	0.192	0.281**	0.0610
	(29.96)	(31.17)	(41.13)	(0.135)	(0.141)	(0.174)
Observations	502	351	252	502	351	252
1st-Stage	50% Intensity	50% Intensity	50% Intensity	50% Intensity	50% Intensity	50% Intensity
Underidentification Test	23.87	25.11	17.95	23.87	25.11	17.95
Weak identification Test	40.05	43.98	24.77	40.05	43.98	24.77
Period	ALL	ALL	ALL	ALL	ALL	ALL
Upazila FE	YES	YES	YES	YES	YES	YES

Robust standard errors clustered at the village level in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 10

ITT results of employment outcomes from high frequency origin survey, restricting only to contributions made by non-primary workers.

VARIABLES	(1) Income	(2) Income (Home)	(3) Income (Away)	(4) Days Worked	(5) Days Worked (Home)	(6) Days Worked (Away)	(7) Daily Income	(8) Daily Income (Home)	(9) Daily Income (Away)
10%	-71.52	32.28	-110.2	-0.350	0.144	-0.954	-1.458	-3.489	38.28***
	(185.5)	(92.65)	(134.7)	(1.030)	(0.786)	(0.621)	(8.122)	(7.297)	(11.06)
50%	222.1	8.370	173.9	0.553	-0.0321	0.460	-2.236	-4.575	5.366
	(201.3)	(83.62)	(158.6)	(0.958)	(0.583)	(0.735)	(7.558)	(6.458)	(7.321)
Mean in control	2,179.93	885.93	1,294.00	12.45	6.99	5.46	156.77	127.39	244.86
Observations	2,122	2,120	2,119	2,120	2,122	2,120	1,061	903	362
Upazila FE	YES	YES	YES	YES	YES	YES	YES	YES	YES

Robust standard errors clustered at the village level in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 11

Proportion of contribution to employment outcomes made by primary workers (note especially highlighted cells).

Variable	Control	10% Intensity	50% Intensity
Income	0.78	0.84	0.81
Income (Home)	0.82	0.84	0.84
Income (Away)	0.57	0.72	0.69
Days Worked	0.75	0.81	0.79
Days Worked (Home)	0.79	0.80	0.81
Days Worked (Away)	0.57	0.72	0.68
Daily Income	0.78	0.81	0.80
DailyIncome (Home)	0.82	0.84	0.84
DailyIncome (Away)	0.88	0.92	0.91

Table 12

(a) Migrant spends some of his time away (using endline data).

Arm	Proportion of Time Away	SD
Control	0.33	0.19
10%	0.32	0.19
50%	0.32	0.18

(b) Migrant is not exclusively away – makes multiple trips (using endline data).

Arm	Number of Episodes	SD
Control	1.49	0.94
10%	1.55	0.81
50%	1.56	0.84

(c) Probability that when one ever-migrant is home, another ever-migrant is away (using high frequency data).

Full-sample	Control	10%	50%
0.738	0.752	0.762	0.747

Table 13

ITT results of employment outcomes from high frequency origin survey, restricting only to contributions made by primary workers while at home.

VARIABLES	(1) Income (Home)	(2) Days Worked (Home)	(3) Daily Income (Home)
10%	55.69	0.231*	2.107
	(33.73)	(0.128)	(3.274)
50%	97.07***	0.349***	2.350
	(33.38)	(0.133)	(2.967)
Mean in control	604.13	3.37	181.49
Observations	9,730	9,730	8,310
Upazila FE	YES	YES	YES

Robust standard errors clustered at the village level in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 14

ITT results of employment outcomes from high frequency origin survey, restricting only to contributions made by primary workers in their "best week" while at home. "Best week" is defined as week with highest income.

VARIABLES	(1) Income (Home)	(2) Days Worked (Home)	(3) Daily Income (Home)
10%	75.23	0.254*	1.753
	(75.86)	(0.138)	(9.251)
50%	129.2	0.151	3.504
	(83.39)	(0.146)	(7.312)
Mean in control	1125.62	5.55	207.39
Observations	1,986	1,986	1,898
Upazila FE	YES	YES	YES

Robust standard errors clustered at the village level in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 15

ITT results of employment outcomes from high frequency origin survey, restricting only to contributions made by primary workers in their "best week" while at home. "Best week" is defined as week with most days worked.

VARIABLES	(1) Income (Home)	(2) Days Worked (Home)	(3) Daily Income (Home)
10%	45.30	0.175	2.202
	(46.01)	(0.131)	(4.586)
50%	65.58	0.0841	9.911*
	(46.20)	(0.141)	(5.078)
Mean in control	1088.76	5.77	187.56
Observations	1,986	1,986	1,902
Upazila FE	YES	YES	YES

Robust standard errors clustered at the village level in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 16

ITT results of impacts on local food prices.

VARIABLES	(1) Rice (kg)	(2) Flour (kg)	(3) Pulses (kg)	(4) Edible oil (liter)	(5) Fish (kg)	(6) Meat (kg)	(7) Egg (per egg)	(8) Milk (liter)	(9) Salt (kg)	(10) Sugar (kg)
10%	-0.257**	0.0677	-0.323	-0.140	0.213	0.627	0.0116	0.863*	0.123	-0.391**
	(0.104)	(0.205)	(0.798)	(0.601)	(3.278)	(1.777)	(0.228)	(0.445)	(0.0976)	(0.155)
50%	-0.171*	-0.238	-0.191	0.911	9.258*	1.692	-0.106	-0.0355	0.0243	0.0451
	(0.0978)	(0.199)	(0.720)	(0.688)	(4.922)	(2.024)	(0.147)	(0.457)	(0.0955)	(0.148)
Mean in control	31.62	33.37	101.32	110.86	210.16	114.08	8.66	39.63	10.73	46.49
Observations	2,374	2,374	2,374	2,374	2,374	2,374	2,374	2,374	2,374	2,374
Upazila FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Robust standard errors clustered at the village level in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Figure A.1

Seasonal dip in farm sector labor supplied by households as compared to non-farm sector (Khandker and Mahmud, 2012).

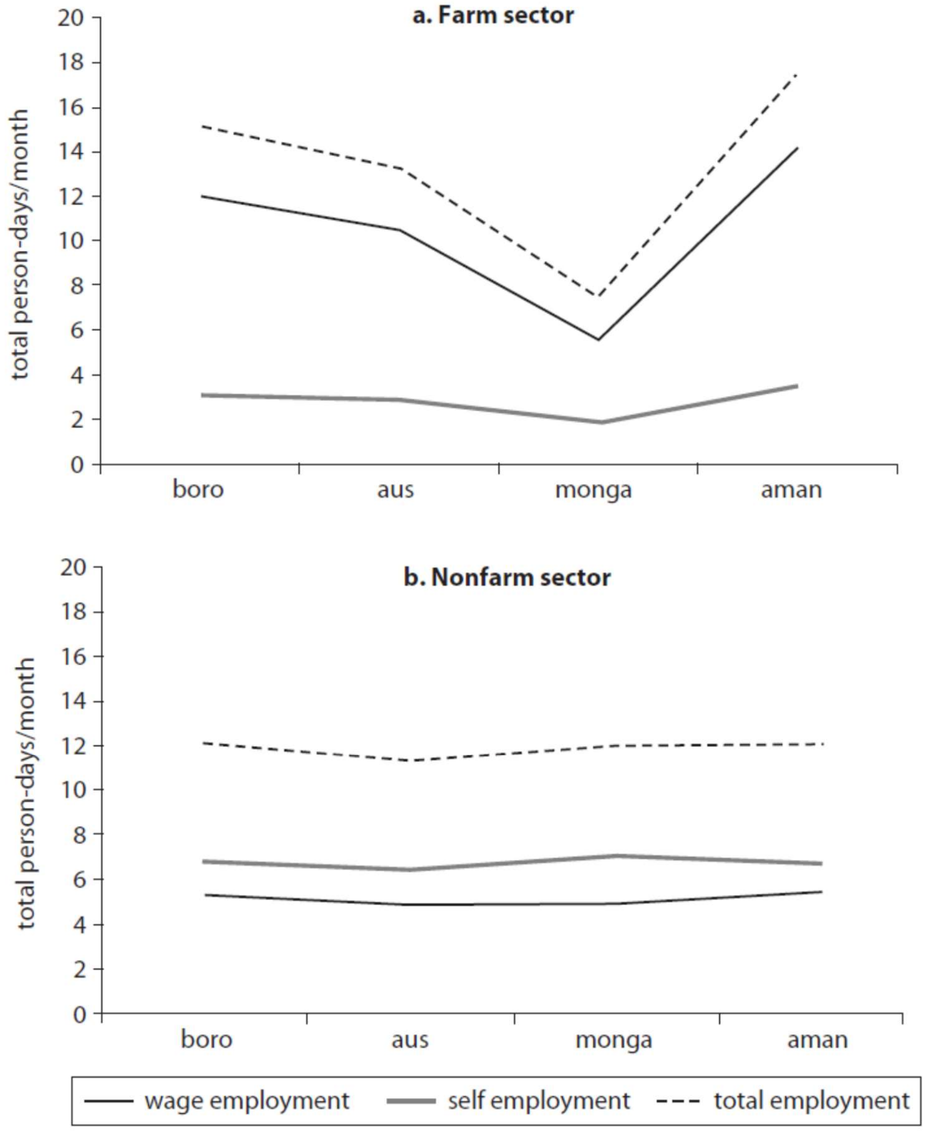

Figure A.2

Households spend less money overall but spend more on food during the lean season in the last three months of the year. In addition, the figures illustrate that this increased expenditure is due to a rise in the price of rice (rather than a rise in quantity), and that quantity of rice consumed in fact falls.

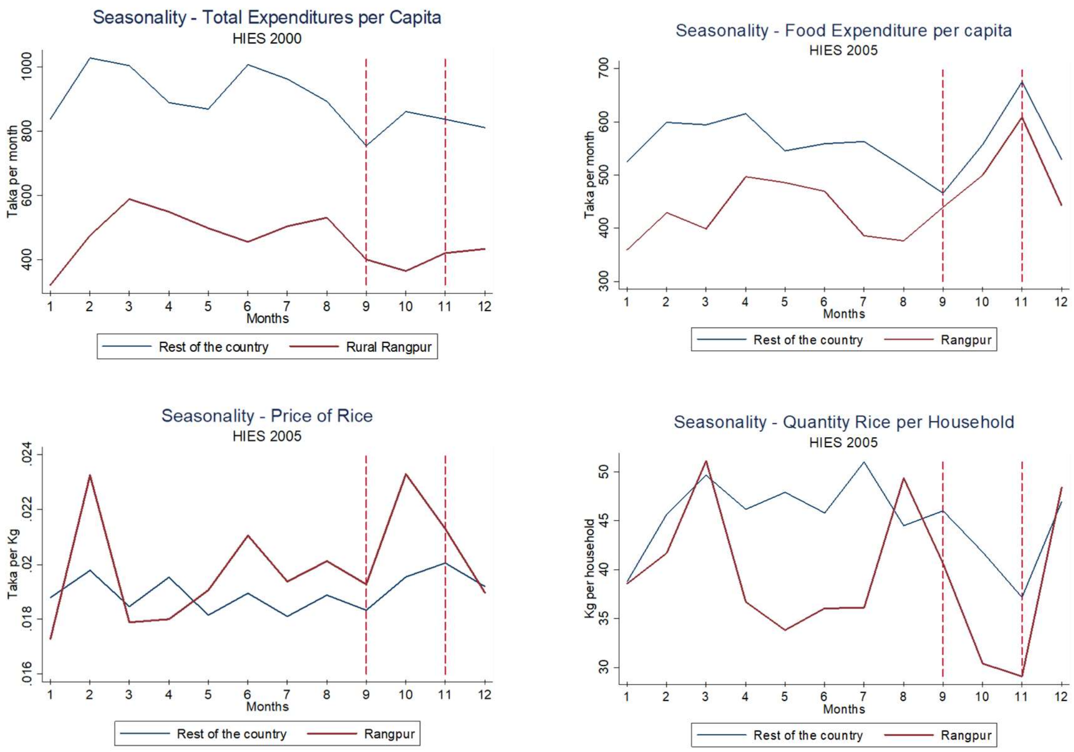

Table A.1

Alternate reduced form of intensity treatment impacts on migration from endline survey.
At least one migrant over survey period

VARIABLES	(1) Atleast one migrant	(2) Atleast one migrant	(3) Atleast one migrant	(4) Atleast one migrant	(5) Atleast one migrant	(6) Atleast one migrant	(7) Atleast one migrant	(8) Atleast one migrant
10% and offered grant				0.245***				0.226***
				(0.0444)				(0.0396)
10% and not offered grant				0.0580				0.0410
				(0.0452)				(0.0425)
50% and offered grant				0.433***				0.381***
				(0.0395)				(0.0360)
50% and not offered grant				0.115**				0.0744*
				(0.0444)				(0.0393)
10% Intensity	0.167***	0.245***	0.0580		0.147***	0.228***	0.0392	
	(0.0407)	(0.0444)	(0.0452)		(0.0360)	(0.0398)	(0.0405)	
50% intensity	0.296***	0.433***	0.115**		0.245***	0.388***	0.0577	
	(0.0389)	(0.0395)	(0.0444)		(0.0337)	(0.0364)	(0.0388)	
Mean	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34
Observations	2,971	2,005	1,661	2,971	2,971	2,005	1,661	2,971
R-squared	0.052	0.132	0.010	0.105	0.089	0.164	0.063	0.138
Upazila FE	NO	NO	NO	NO	YES	YES	YES	YES
Sample Includes: HHs offered grant	YES	YES	NO	YES	YES	YES	NO	YES
Sample Includes: HHs not offered grant	YES	NO	YES	YES	YES	NO	YES	YES
F-Test T10_NonOff = T50_NonOff				3.36				1.81

Robust standard errors clustered at the village level in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table A.2

Total migrants over survey period

VARIABLES	(1) Number of Migrants	(2) Number of Migrants	(3) Number of Migrants	(4) Number of Migrants	(5) Number of Migrants	(6) Number of Migrants	(7) Number of Migrants	(8) Number of Migrants
10% and offered grant				0.257***				0.240***
				(0.0490)				(0.0448)
10% and not offered grant				0.0542				0.0382
				(0.0517)				(0.0488)
50% and offered grant				0.454***				0.399***
				(0.0442)				(0.0410)
50% and not offered grant				0.130**				0.0883*
				(0.0509)				(0.0468)
10% Intensity	0.172***	0.257***	0.0542		0.154***	0.243***	0.0361	
	(0.0454)	(0.0490)	(0.0517)		(0.0411)	(0.0453)	(0.0468)	
50% intensity	0.315***	0.454***	0.130**		0.262***	0.409***	0.0687	
	(0.0433)	(0.0442)	(0.0509)		(0.0386)	(0.0419)	(0.0470)	
Mean	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37
Observations	2,971	2,005	1,661	2,971	2,971	2,005	1,661	2,971
R-squared	0.046	0.111	0.010	0.089	0.078	0.139	0.058	0.118
Upazila FE	NO	NO	NO	NO	YES	YES	YES	YES
Sample Includes: HHs offered grant	YES	YES	NO	YES	YES	YES	NO	YES
Sample Includes: HHs not offered grant	YES	NO	YES	YES	YES	NO	YES	YES
F-Test T10_NonOff = T50_NonOff				3.25				1.78

Robust standard errors clustered at the village level in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table A.3

Total migration episodes over survey period

VARIABLES	(1) Number of Migrants	(2) Number of Migrants	(3) Number of Migrants	(4) Number of Migrants	(5) Number of Migrants	(6) Number of Migrants	(7) Number of Migrants	(8) Number of Migrants
10% and offered grant				0.392***				0.351***
				(0.0870)				(0.0721)
10% and not offered grant				0.124				0.0840
				(0.0947)				(0.0810)
50% and offered grant				0.728***				0.591***
				(0.0799)				(0.0684)
50% and not offered grant				0.192**				0.0823
				(0.0869)				(0.0730)
10% Intensity	0.280***	0.392***	0.124		0.237***	0.358***	0.0835	
	(0.0818)	(0.0870)	(0.0947)		(0.0653)	(0.0717)	(0.0758)	
50% intensity	0.498***	0.728***	0.192**		0.366***	0.611***	0.0598	
	(0.0767)	(0.0799)	(0.0869)		(0.0621)	(0.0684)	(0.0752)	
Mean	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51
Observations	2,971	2,005	1,661	2,971	2,971	2,005	1,661	2,971
R-squared	0.037	0.091	0.008	0.072	0.092	0.140	0.078	0.124
Upazila FE	NO	NO	NO	NO	YES	YES	YES	YES
Sample Includes: HHs offered grant	YES	YES	NO	YES	YES	YES	NO	YES
Sample Includes: HHs not offered grant	YES	NO	YES	YES	YES	NO	YES	YES
F-Test T10_NonOff = T50_NonOff				2.57				0.90

Robust standard errors clustered at the village level in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table A.4

Robustness checks on migration results – previous period treatment status (intensity experiment).

VARIABLES	(1) Migrated	(2) Migrated	(3) Migrated	(4) Migrated	(5) Migrated	(6) Migrated	(7) Migrated	(8) Migrated
10% and offered grant	0.264***		0.263***	0.270***	0.264***		0.270***	0.271***
	(0.0421)		(0.0498)	(0.0964)	(0.0421)		(0.0449)	(0.0971)
10% and not offered grant	0.0504		0.0494	0.0320	0.0504		0.0533	0.0491
	(0.0430)		(0.0465)	(0.0481)	(0.0430)		(0.0436)	(0.0436)
50% and offered grant	0.426***		0.425***	0.435***	0.426***		0.426***	0.436***
	(0.0359)		(0.0362)	(0.0360)	(0.0359)		(0.0358)	(0.0373)
50% and not offered grant	0.122***		0.121***	0.109**	0.122***		0.123***	0.121***
	(0.0436)		(0.0451)	(0.0454)	(0.0436)		(0.0437)	(0.0434)
HH received credit or info treatment in 2013		0.0441*	0.00178	0.0317				
		(0.0264)	(0.0256)	(0.0331)				
T10_Offered x ReceivedIncentive2013				-0.0377				
				(0.101)				
T50_Offered x ReceivedIncentive2013				-0.0671				
				(0.0469)				
HH received incentive over any previous year						-0.00338	-0.00854	0.00398
						(0.0242)	(0.0225)	(0.0269)
T10_Offered x EverReceivedIncentive								-0.0100
								(0.0984)
T50_Offered x EverReceivedIncentive								-0.0394
								(0.0434)
Constant	0.342***	0.526***	0.342***	0.342***	0.342***	0.546***	0.345***	0.341***
	(0.0295)	(0.0226)	(0.0295)	(0.0295)	(0.0295)	(0.0224)	(0.0305)	(0.0312)
Observations	3,600	3,600	3,600	3,600	3,600	3,600	3,600	3,600
R-squared	0.108	0.002	0.108	0.109	0.108	0.000	0.108	0.109

Robust standard errors clustered at the village level in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table A.5

IV using total population movement (wages) from retrospective wage survey.

VARIABLES	(1) Male wage (all)	(3) Male wage (ag)	(5) Male wage (non-ag)	(7) Ln(Male wage) (all)	(9) Ln(Male wage) (ag)	(11) Ln(Male wage) (non-ag)
Proportion Total Migrated	46.42	76.09	-0.409	0.289	0.390*	0.114
	(48.48)	(50.00)	(68.18)	(0.222)	(0.229)	(0.294)
Observations	492	346	245	492	346	245
1st-Stage	50% Intensity	50% Intensity	50% Intensity	50% Intensity	50% Intensity	50% Intensity
Underidentification Test	12.76	13.63	9.24	12.76	13.63	9.24
Weak identification Test	15.61	16.87	9.40	15.61	16.87	9.40
Period	ALL	ALL	ALL	ALL	ALL	ALL
Upazila FE	YES	YES	YES	YES	YES	YES

Robust standard errors clustered at the village level in parentheses

*** p<0.01, ** p<0.05, * p<0.1