Seasonal Migration and Effectiveness of Micro-credit in Lean period: Evidence from Bangladesh

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Abstract

Seasonal migration of labor in the autumn lean period is an important livelihood strategy for a large number of poor people in Northern Bangladesh. The nature of such migration differs from that of permanent internal migration in many respects. The present study intends to identify the characteristics of the seasonal migrants and to quantify the effects of the factors influencing such migration decisions. By using a binary response econometric model, the study finds that seasonal unemployment, education, farm occupation and some personal characteristics of the individuals like age, sex, prior migration experience and the presence of kinsmen at the place of destination have profound effects on the seasonal migration decision. Also this study finds evidence that temporary internal migration is a significantly better strategy to handle seasonal hardship in the lean period.

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1 Introduction

In the standard rural-urban internal migration literature, researchers mainly talk about the permanent internal migration and its economical, social and demographical significance. Surprisingly, only a handful of research have discussed about the temporary internal migration which is known as "Seasonal Migration", "Circular Migration", "Oscillatory Migration" or "Temporary Migration" in the literature. The nature of such migration differs from that of permanent internal migration in many ways. During the period of seasonal shocks, mainly in the agriculture sector, people move to near by cities or towns for a short period of time to maintain their current living standards as there is limited or no agri-based labor demands in the villages. These shocks can occur due to agriculture cycle or natural disaster like draught, flood, cyclone, climate change, river erosion, etc. Thus such migration is an important livelihood option for the poor rural people.

If such case of seasonal shocks occur, a person will prefer temporary over the permanent move because such decision offers an opportunity to combine the village based existence with the urban opportunities. In the face of village-based highly seasonal labor demand, migrants find the urban informal sector an relatively easy and rational strategy to cope up with the seasonal shocks. As mentioned in the seminal paper on circular migration in Indonesia, Hugo (1982) stated that during such migration, migrants (mainly men) move without their families since supporting a family in the village is cost-efficient. Thus the migrant, being the only mover from the family, can put up with minimum standard of living with less comfortable life style in the urban area to save some earnings and send those savings back to the village.

However, lack of job security and risk of being unemployed in the complex urban informal sector create a reverse tendency for the migrants towards the village. Also migrating only for a temporary period is not a easy decision for the poor people as the life in the city is more difficult than what they have in the village. But the most important factor, which leads to a temporary move rather than a permanent one, is the reversal of the urban-rural wage differential that occurs during the peak labor demand season in the agricultural sector. These factors along with strong family and village ties drive these migrants to reduce the risk by keeping both rural and urban options
open.

To test such interesting phenomenon of temporary labor movement due to seasonal shocks, I took the case of Northern Bangladesh. Seasonal migration of labor in the Autumn lean period is an important livelihood strategy for a large number of poor people in Northern Bangladesh. We choose the district Kurigram of Northern Bangladesh because of some distinct features. Kurigram is mainly an agri-based, natural disaster prone and severely poverty-stricken area of Bangladesh. Moreover, due to agricultural cycle, after the plantation of the Aman in September-October, farmers have very little work to do in the farms. As a result, every year a large number of agricultural workers become jobless and decide to migrate temporarily. Mostly such migrants get work in the urban informal sector and work as a day laborer. Though urban standard of living is bare minimum for the migrants, they prefer this option than staying in village and suffer with hunger and poverty. Migrants usually move alone and send their savings back home which help their family to survive during the lean period. After the shock gets over, these people again come back to their origin, specially during the harvesting time and work again in the agricultural sector.

For the purpose of the study, there is a need to have a proper large scale sample survey data of the migrants. Unfortunately, the country level national surveys systematically exclude these temporary movement of labor. Due to this fact, household sample at the place of origin has been collected to get the clear picture of this phenomenon. The data of this study has been collected from a cross-sectional survey from the northern part of Bangladesh. The survey was conducted in January 2006 by the Economics and Social Sciences Research Group (ESSRG) of BRAC University.

The aim of this paper is to find what leads to such migration, especially when urban life is not exactly pleasant for the migrants. Also to evaluate the characteristics of the seasonal migrants and to quantify the effects of the

---

1 Rural life of Bangladesh very much evolves around the agricultural cycle and our study area is not an exception. As a consequence of this cycle, two major seasonal deficits occur, one in late September to early November and the other is in late March to early May. With the widespread expansion of Boro cultivation, the incidence of the early summer lean period has significantly declined. However, the Autumn lean season coming after the plantation of the Aman crop still affects nearly all parts of the country, specially the northern part of Bangladesh. In local terms, this lean season is called Monga or Mora Karthik (Rahman and Hossain, 1991).

2 In more than 80% of the farms in the study area only one (Aman paddy) or two crops (Aman and Boro paddy) are produced annually.
factors influencing the migration decision. One compelling feature of the survey area is the existence of numerous Non-Government Organizations (Hereafter NGOs) who work in that part of the country to improve the livelihood of the poor people and also provides access to the informal credit market through micro-credit scheme. Hence, a natural extension easily leads us to test the effectiveness of these micro-credit programs specially in the time of lean period hardship. This study investigates if access to micro-credit and migration are two strategies to tackle seasonal shocks. Also the study will address if these strategies are complimentary or alternative to deal with lean period hardship. The present study, however, is quite important, in the sense that only a couple of initiative has yet been taken to quantify the factors affecting seasonal migration decision. We found that seasonal migration decision of labor has significant characteristics, which are systematically different from the patterns of internal migration. Hence, such study will enrich the existing literature in this field.

The rest of the paper is organized as follows: Section II presents the data analysis and Section III presents the hypotheses of the study. Then Section IV summarizes the econometric modeling. Section V identifies some significant characteristics of the seasonal migrants and in Section VI we model seasonal migration with the prior access to micro-credit facilities. In Section VII we conclude the analysis.

2 Seasonal Migration

2.1 What is Seasonal Migration

The terminology of seasonal migration probably first appeared in the seminal paper of Walter Elkan (Elkan 1967) where he observed circular migration pattern of labor in East Africa and explained it as "Combined with the familiar pattern of migration, all in one direction, there is another and important movement back to the countryside." However, according to Deshingkar and Start (2003), the formal definition of such migration eloquented in 1970s by J. M. Nelson (1976) where the author elucidated such phenomenon of labor as "sojourners" and raised interest about the causes and consequences of temporary city-ward migration in the developing countries. According to Nelson, major proportion of rural to urban migration in Africa and part of Asia is temporary in nature. Also, Zelinsky (1971) defined such migration
Seasonal migration of labor has been studied within many disciplines other than in the Economics. Disciplines like Demography, Anthropology, Sociology have mention of such movement of labor way before it appeared in Economics. Consequently, the terminology used to describe such phenomenon varied a lot like return migration, wage-labor migration, transhumance, etc. to name a few. Moreover, scholars have found the evidence of such phenomenon in many regions, mostly in the developing countries of Africa, Asia and South America. In addition, geographers has noticed such observable fact of labor movement even in the early 1920s. As mentioned in Chapman and Prothero (1983), *"The concept of circulation as the beneficial integration of distinct places or communities dates form the 1920s mainly characterizes the work of human geographers and originated with the French led by Vidal de la Blache (1845-1918). Among French geographers, circulation refers to the reciprocal flow not only of people but also of ideas, goods, services and sociocultural influences (de la Blache, 1926: 349-445; Sorre, 1961: Part IV)"*. Chapman and Prothero (1983) has a comprehensive study on this literature. Also, Nelson (1976) has a detail discussion on the causes and consequences of such migration.

### 2.2 Reasons for Seasonal Migration

Evidence in different countries suggest that such temporary mobility of labor from rural to urban areas has some important socio-economic implications. Other than social issues like family structures, social customs and religious believes, economic factors are the most influential reasons to migrate in the lean period. In his seminal work, Elkan (1959, page 192) denoted these other factors as the *"...most unlikely to be the whole story, and...it can never be the most important part of the story"*. On the contrary, Elkan denoted the economic factors as *"...largely a rationalization of simple economic motives"*. In this section we will largely focus on the economic factors that causes the migration (rural to urban) and reverse migration (urban to rural) in these areas.
2.2.1 Reasons causing rural to urban migration

During lean period, temporary mobility of labor provides some means of livelihood in the urban areas. For these families, earning some wages while keeping the other members of household at the village is a sensible and rational strategy. In the most cases the head of the household or the most capable member of the household, who are mainly men, migrates to urban area. There are mainly four reasons why families take such decision in the lean period. First, it is always easier and cheaper to survive in the rural than in the urban area. Prices of food grains and other household essentials are relatively cheaper. So, being the lone mover from the household, a person can cope up with the urban life and continue to have a bare minimum living standard to save some money and send those back to the families.

Secondly, seasonal unemployment in agriculture causes an excess supply of unskilled or semi skilled workers in the non-agricultural sector in the rural areas. On the other hand, food grains and other necessary commodities become relatively expensive in this period than normal period, which pulls down the real wage of all the workers. Moreover, the well-off in these regions hoard a large amount of crops in the normal time and sell those in the lean period at a high price which also reduces the real wage of the workers. Thus, it becomes almost impossible for an ordinary agricultural worker to maintain the living standards in the village and thus they choose to migrate.

Thirdly, the role of social network and kinship at the migration destination plays a dominant role in the decision making of the migrants. There is a huge amount of uncertainty associated with the temporary migration to urban areas. Hence, migrants reduce such uncertainty by prior networks and kinships at the migration destinations. Also, previous experiences of migration help them to reduce the search cost and social disutility (like finding accommodation, etc.) associate with such migration.

One of the fundamental differences between temporary mobility with the permanent one is the significant amount of journey between the migration destination and origin. But interestingly, such cost is usually very small and unimportant for the migrants. As mentioned in Hugo (1982, page 73) "...travel costs, time taken, and distance traversed between origin and destination generally constitute a minor element in a mover’s overall calculus in deciding whether or not to migrate and where". However, The recent improvement of communication in the third world countries has also reduced
this cost of move significantly. Moreover, access to formal credit market (through micro-credit schemes operated by NGOs) also give the movers the option of borrowing which can reduce their immediate relocation and travel costs. Though, NGO’s do not run any program to provide credit for the migration, but migrants can always exploit such opportunity by using the loan taken by the other members of the family and keep on repaying that from the migration destinations.

2.2.2 Reasons causing urban to rural migration

Migrants in our case prefer the temporary over the permanent move because such decision offers an opportunity to combine the village based existence with the urban opportunities. Highly seasonal labor demand in the rural areas always creates uncertainty in the lean period. Thus, migrants find the urban informal sector an relatively easy and rational strategy to tackle the seasonal shocks.

However, these temporary migrants mainly get works in the urban informal sector. Informal sector is highly non-skill oriented which requires only manual labor (like Rickshaw pulling, construction works or day laborer etc.). Moreover, the wage and the condition of living is not very pleasant and quite unattractive for these migrants to move permanently in the cities. These people get to live in the slums or in the pavements of the large stations or sometimes by the side of streets under the open sky. Such condition of living is worse than what they had in the villages.

Due to the seasonal shock, large amount of people seek jobs in the urban informal sector which causes a high supply of labor in the market. Employers exploit such advantage by decreasing the wage rate way below to the standard market rate. Since employers know that these movers are temporary workers, there is no incentive for them to provide much training for this labor force. Combined with the lack of formal and skill education, most of the migrant worker remain unskilled which hinder them to seek jobs in the formal urban labor market.

Other than the social cost of leaving their immediate family and friends back in rural area, lack of job security, ineffective labor unions and illness related insecurity also play roles towards reverse migration tendency of the migrants. Elkan (1959, page 193) described such reverse tendency of migration as "...the absence of protection against sickness, unemployment, or old
age obstruct an assumed natural tendency to come to work and live in the

towns.” Moreover, if a migrant unfortunately becomes ill or required money,
the migrant can always seek the village based services which also provides
incentives for the migrants to go back, as stated by Hugo (1982).

3 Data Description

The data has been collected from a random cross-sectional survey from the
northern part of Bangladesh. The survey was conducted in January 2006
by the Economics and Social Sciences Research Group (ESSRG) of BRAC
University. We collected the sample from Kurigram which is one of the
most poverty-stricken districts of the country. About 46% of the total labor
force is involved in agriculture; another 30% are agricultural day laborers
(Banglapedia, 2006).

The study area consisted of four thanas of Kurigram district which are
Chilmari, Ulipur, Rajarhaat and Kurigram. The survey consisted of 290
random individuals who are representative of their household. According
to the National Encyclopedia of Bangladesh (Banglapedia, Second Edition
2006) the population of Kurigram district is a total population of 1,782,277
of which 49.62% are male and 50.93% are female. Majority of the population
are Muslim. As a result, there is only a minor religious and cultural hetero-
genity exists in the survey area which is negligible. Mostly the people of this
region are illiterate as the literacy rate is 22.3% on an average. The sample
area consist of 37.02% of the total population of the district. The survey
covered 17 villages from the four thanas: four from Chilmari, three from
Rajarhat, four from Ulipur and six from the Sadar thana. Though the vil-
lages from each thana were selected randomly, the four thanas were selected
to capture heterogeneity in income, communication, Infrastructure facilities,
economic, catastrophic and other sociocultural factors. We found that the
people living in Ulipur and Chilmari were poor but those of Rajarhaat were
relatively wealthier. We observed that Kurigram Sadar and Rajarhat have
better transportation system compared to Chilmari, and Ulipur. So the
mobility intensity is relatively higher in this area. We also covered a char
area in the Kurigram Sadar to capture the special characteristics of char

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3 A thana is a unit of police administration. In Bangladesh, 64 districts are divided
into 496 thanas. There are ten thanas in the Kurigram district.

4 A char is a small river island created by silt deposits and estuaries.
livelihood regarding the migration decision in the lean period. Among the four thanas, history of these areas suggest that, Rajarhaat suffer less due to natural disasters. On the contrary, Chilmari is the worst affected by both flood and river erosion. River erosion is quite rare in Ulipur though Floods every year ravages the whole area. The char area is affected by river erosion and flood almost regularly. The Kurigram town was also affected by river erosion many times.

The questionnaire for the cross-sectional survey was constructed after several alterations and a pre-test with 30 respondents in Chilmari and Ulipur. The questionnaire consisted of 11 sections. It was designed to collect individual information on the migration decision and the factors influencing it. Starting from general information like age, occupation, average income and the number of dependents, the questionnaire went on to include land usage, occupation at destination if migrated, NGO membership and landownership. The questionnaire also aimed at collecting information on the nature and extent of starvation throughout the year, those on natural disasters, death of earning members and sudden damage of crop or livestock.

Among the two hundred and ninety respondents, 68 percent were identified as migrants. The independent variables were categorized into three groups: variables representing economic factors, ecological vulnerabilities and personal characteristics. The measure of income in the lean period in this study is the earnings of the household if the respondent stays in the village or the earnings of the household if migrates. So, in the data set we do not have counterfactuals.

We did not expect that one could give us a convincing answer of future plans of seasonal migration. Hence, we asked the respondents about their past behavior of migration and income patterns. To capture the seasonal migration behavior of the respondents, we used a dummy variable, which has a value of one if the respondent migrated in the one of the last two lean periods and zero otherwise. We found 68 percent of the respondents were seasonal migrants in our sample.

The variable seasonal unemployment (unemployed during lean period) is a binary variable. A worker reported to remain unemployed during most of the lean season is assigned one and otherwise assigned a value of zero. In the sample, 63 percent of the respondents reported that they were unemployed during the lean period. A simple dummy variable is used to indicate the
land ownership. A worker is assigned a value of one if his/her family owns any cultivable land irrespective of the size. Otherwise, he/she is assigned a value of zero. 43 percent of the respondents reported that they are landless. Access to micro-credit through NGO membership is also measured by a dummy variable, which is coded as one for having access and zero otherwise.

River erosion and flood are the two major natural catastrophes in the study area and to measure both of these factors, dummy variables have been used. For river erosion, an individual has a value of one if his/her family ever experienced forced displacement by river erosion. In the present sample, 61% of the respondents faced such experience at least once in their lives. One problem of such data is associated with the place of such experience as one could have forcefully displaced from their origin which is different than the survey area. Hence, such data is noisy and one has be careful in using this information. The dummy variable for flood equals one if the respondent is a victim of a flood in the year of migration, and zero otherwise. 49 percent of the respondents reported to be a flood victim in the last two years.

Sex is coded as one if the respondent is male and zero if she is female. More males than females were interviewed (89 percent versus 11 percent). Conservative and patriarchal village societies are the reasons for such a small female response rate. Marital status was coded as one for those who are married and zero otherwise. 70 percent of the respondents reported to be married at the time of the survey which is quite a big number for the survey.

The occupation variable was divided into two broad categories rather than fine distinctions to our hypothesis that agricultural workers are the group who migrates in the lean period. Consequently, farmers were assigned a value of one and zero otherwise. The occupational composition of the respondents is as follows: 47 percent of the respondents are involved in agriculture and the rest are non-farm workers like fishermen, potters, petty traders, land leasers, garment workers, rickshaw-pullers to petty village musicians.

Dummy variables were used to capture information on education. An individual having some reading ability was given a value of one and zero otherwise. In the present sample, 42 percent of the respondents have some
means of education. Migration experience was coded as one if the respondent reported to have prior migration experience and zero otherwise. 63 percent of the respondents reported to have prior migration experience. Kinship is coded as one if the respondent reported to have friends or relatives at the place of destination in Migration and zero otherwise. This variable has been introduced to capture the role of networks in the migration destinations. 52 percent of the respondents had kinsmen at the urban centers at the time of survey.

The variables used can be summarized as follows,

1. Migration Decision: A dummy variable that equals one if the individual migrated in one of the last two lean seasons and zero otherwise. \((\text{migdec})\)

2. Income in the Lean Period: Earnings of the household if the chief earner stayed in the village in the lean period or the earnings of the household if the chief bread earner migrates in the lean period (per day in Local currency Units, LCU). \((\text{mincomelean})\)

3. Income in the Normal period: Earnings of the household in the normal period (Non-lean period) (per day in LCU). \((\text{mincomenorm})\)

4. Seasonal Unemployment: A dummy variable that equals one if the worker remains unemployed during most of the lean season, zero otherwise. \((\text{mounemp})\)

5. Seasonal Hardship: A dummy variable that equals one if the individual has one meal or less on a typical day in the lean period, zero otherwise. \((\text{season_hrd})\)

6. Land ownership: A dummy variable that equals one if the respondent’s family owns any land irrespective of the size of land, zero otherwise. \((\text{landownerd})\)

7. Access to Micro-credit through NGOs: A dummy variable, which is coded as one for having access to Micro-credit through any NGOs, zero otherwise. \((\text{ngo})\)

8. River Erosion: A dummy variable, such that an individual has a value of one if his/her family ever experienced forced displacement by river erosion, zero otherwise. \((\text{rivererosion})\)
9. Flood: A dummy variable that equals one if the respondent faced flood in the year of migration, and zero otherwise. *(flood)*

10. Age: Actual age of the respondent. *(age)*

11. Sex: Sex is coded as one if the respondent is male and zero if she is female. *(sex)*

12. Marital Status: A dummy variable, coded as one for those who are married and zero otherwise. *(marital)*

13. Education: A dummy variable, coded as one for those who have any education, zero otherwise. *(edu)*

14. Household size: Number of family members. *(family)*

15. Farm Occupation: A dummy variable, coded as one for the farmers, zero otherwise. *(occupationdum)*

16. Kinship at the Place of Destination: A dummy variable, coded as one for those who have kinsmen at the potential place of destination, zero otherwise. *(knship)*

17. Migration Experience: A dummy variable, coded as one for those who have prior migration experience (any previous experience), zero otherwise. *(migexp)*

### 4 Theoretical model of Seasonal Migration

Let us denote two periods in the agricultural sector in the rural area as the normal period \( n \), and lean period \( l \). An individual in the agricultural sector earns \( Y_n \) in the normal period and \( Y_l \) in the lean period. An individual in the urban sector earns \( Y \). We denote the term ”migration” as movement from rural to urban areas and the term ”reverse migration” as movement from urban to rural areas.

Let \( \pi_n \) and \( \pi_l \) represents the probabilities that period \( n \) or period \( l \) actually occur. Note that, \( \pi_n + \pi_l = 1 \).

An individual chooses to work in the agricultural sector (in the rural area), or in the informal sector (in the urban area). So, we denote \( r \) as staying in the rural areas and \( c \) as living in the urban areas.
Let us assume that the utility function is

\[ U_{t,j} = f(Y_{t,j}) - \alpha \]  

where \( t \) denotes the state (i.e. lean or normal period) and \( j \) denotes the workplace (either rural or urban) for an individual. Here, \( \alpha \) captures the disutility which occurs due to social cost and uncertainty. In case of no migration, \( \alpha = 0 \).

As a result,

\[ \frac{dU}{dY} > 0 \]  

but,

\[ \frac{dU}{d\alpha} < 0. \]  

Suppose, the probability of getting a job in the urban informal sector is denoted as \( \rho \). Here \( \rho = \rho(\gamma) \), where \( \gamma \) captures the role of networks which influence the probability of getting a job. Such networks depend on previous experience of migration and kinship at the place of destination. As a result,

\[ \frac{d\rho}{d\gamma} > 0. \]

For an individual living in the rural area, the expected utility of moving to the urban informal sector can be denoted as

\[ E(U_c) = \rho(U_c) - \alpha. \]  

Here, the social cost (captured through \( \alpha \)) of moving alone to the urban areas and leaving the family in the village will total expected utility.

On the contrary, For an individual in the urban area, the expected utility of moving to the rural area can be denoted as

\[ E_t(U_{t,r}) = \pi_n(U_{n,r}) + \pi_l(U_{l,r}). \]  

Now we want to make some strong assumptions about the income, utility and probability of different states and movements. The assumptions are as following:

1. We consider that the income in the normal time and lean time in the urban area is the same, i.e \( Y_{n,c} \approx Y_{l,c} = Y_c \).
2. In the normal period, $Y_{n,r} > Y_{l,r}$ which means if an individual stays in rural area his normal period income is strictly greater than the lean period income.

3. In the lean period, $Y_c > Y_{l,r}$, which means an individuals urban income is greater than his lean period income in the rural area.

4. In the normal period, $Y_{n,r} > Y_c$ which means normal time income in the rural area is better than the urban income.

5. In the lean period, $Y_{l,r} \approx 0$, that means if stays in the rural area, an individuals income in the lean period is almost close to zero.

6. The total expected utility of moving to urban area is greater than zero, $\rho(U_c) - \alpha > 0$ and $\alpha$ is reasonably small and close to zero.

7. On the whole $Y_{n,r} > Y_c > Y_{l,r}$. Finally,

An individual will migrate if his current utility is less than his expected utility. Which means, an individual will take the decision of migration if,

$$E_t(U_{t,j}) > U_{t,j}. \quad (6)$$

### 4.1 Under perfect information of lean and normal period

- **First case:**

  In the time of seasonal hardship the income of an individual who lives in rural area is almost zero. As a result,

  $$E(U_c) - \alpha > U_{l,r} \quad (7)$$

  which means,

  $$\rho(U_c) - \alpha > U_{l,r}. \quad (8)$$

  Hence, an individual is better off by migrating to the nearby urban areas. Also, the person can improve his expected income based on the prior experience and availability of kinship at the migration destination (by increasing $\rho$).

- **Second case:**

  A person in the urban area
The person who already migrated to urban area in the lean period and works in the urban informal sector, his/her utility is \( U_c - \alpha \), whereas the expected income of the same individual if goes back to rural area at the time of normal period (having perfect information) will be

\[
E_n(U_{t,r}) = U_{n,r} > U_c - \alpha.
\]

Hence, an individual is better off by moving back to the rural area, the place of his origin (reverse migration).

Whereas, in the other two cases,

- Third case:

In the normal time, a person will migrate to urban area, if the expected income in the urban area is greater than the income in the rural area. which means, if

\[
E(U_c) > U_{n,r}
\]

which means if,

\[
\rho(U_c) - \alpha > U_{n,r}
\]

but we know from the assumption, that \( Y_{n,r} > Y_c \). As a result, \( \rho(U_c) - \alpha \not> U_{n,r} \), hence, \( E(U_c) \not> U_{n,r} \). Therefore, migration is not a rational decision in this case.

- Fourth case:

In the lean period, a person in the urban area will migrate to the rural area (reverse migration) if the person’s expected utility in the rural area (under perfect information) is greater than his utility in the urban area. To express this mathematically, a person will migrate in this case if,

\[
E_l(U_{t,r}) = U_{t,r} > U_c - \alpha.
\]

As we know, in lean period, \( Y_{n,r} > Y_c > U_{l,r} = 0 \), as a result, \( U_{n,r} > U_c > U_{l,r} \). Hence, \( U_{l,r} \not> U_c - \alpha \). Therefore, \( E_l(U_{t,r}) \not> U_c - \alpha \). So, migration is not a rational decision in this case either.

4.2 Under imperfect information of lean and normal period

- First case:
In the time of seasonal hardship or seasonal shock in the agricultural sector of rural areas, the income of an individual who lives in rural area is almost zero. As a result,

$$E(U_c) - \alpha > U_{l,r}$$  \hspace{1cm} (10)

which means,

$$\rho(U_c) - \alpha > U_{l,r}.$$  \hspace{1cm} (11)

Hence, an individual is better off by migrating in the nearby urban areas. Also, the person can improve his expected income based on the prior experience and availability of kinship at the migration destination (by increasing $\rho$).

- **Second case:**

The person who already migrated to urban area in the lean period and works in the urban informal sector, his/her utility is $U_c - \alpha$, whereas the expected income of the same individual if goes back to rural area at the time of normal period will be

$$E_n(U_{t,r}) = \pi_n(U_{n,r}) + \pi_l(U_{l,r}) > U_c - \alpha.$$  \hspace{1cm} (12)

In the normal period, $\pi_n > \pi_l$ and $Y_{n,r} > Y_{l,r}$. As a result, $U_{n,r} > U_c > U_{l,r}$. So

$$E_n(U_{t,r}) > U_c - \alpha.$$  \hspace{1cm} (13)

Hence, an individual is better off by moving back to the rural area, the place of his origin (reverse migration).

Whereas, in the other two cases,

- **Third case:**

In the normal time, a person will migrate to urban area, if the expected income in the urban area is greater than the income in the rural area. which means, if

$$E(U_c) > U_{n,r}$$

which means if,

$$\rho(U_c) - \alpha > U_{n,r}$$  \hspace{1cm} (12)
but we know from the assumption, that \( Y_{n,r} > Y_c \). As a result, \( \rho(U_c) - \alpha \not\geq U_{n,r} \), hence, \( E(U_c) \not\geq U_{n,r} \). Therefore, migration is not a rational decision in this case.

- **Fourth case:**

  In the lean period, a person in the urban area will migrate to the rural area (reverse migration) if the person’s expected utility in the rural area is greater than his utility in the urban area. To express this mathematically, a person will migrate in this case if,

  \[
  E_l(U_{l,r}) = \pi_n(U_{n,r}) + \pi_l(U_{l,r}) > U_c - \alpha.
  \]

  As we know, in lean period, \( \pi_l > \pi_n \), \( Y_{l,r} \approx 0 \) and \( Y_{n,r} > Y_c > Y_{l,r} = 0 \), as a result, \( U_{n,r} > U_c > U_{l,r} \). Hence, \( \pi_n(U_{n,r}) + \pi_l(U_{l,r}) \not\geq U_c - \alpha \). Therefore, \( E_l(U_{l,r}) \not\geq U_c - \alpha \). So, migration is not a rational decision in this case either.

### Table 1 Decision mechanism of migration

<table>
<thead>
<tr>
<th>Period</th>
<th>Utility mechanism</th>
<th>Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>Utility in the urban area is less than the expected utility in the rural area (case 2)</td>
<td>Migration</td>
</tr>
<tr>
<td></td>
<td>Utility in the rural area is greater than expected utility in the urban area (case 3)</td>
<td>No migration</td>
</tr>
<tr>
<td>Lean</td>
<td>Utility of the rural area is less than the expected utility in the urban area (case 1)</td>
<td>Migration</td>
</tr>
<tr>
<td></td>
<td>Utility in the urban area is greater than the expected utility in the rural area (case 4)</td>
<td>No migration</td>
</tr>
</tbody>
</table>

### 5 Hypotheses

A good number of studies have been conducted to analyze the internal migration pattern in Bangladesh; Chaudhury (1978), Khan (1982), Huq-Hussain (1996), Begum (1999), Hossain (2001), Barkat and Akther, (2001), Afsar (1999, 2003, and 2005), Kuhn (2001, 2004), Islam (2003) and Skinner and Siddique (2005), to name a few. Broadly, these studies focus on issues like
the scale and pattern of internal migration in Bangladesh, the characteristics or selectivity of the migrants, causes of internal migration, the impacts of internal migration on urbanization and the pattern of resource transfer followed by rural-urban migration.

Several studies have shown that job related motivations (mostly joblessness in the villages and partly the search for better jobs) predominate in the reasons for both permanent and temporary out migration (e.g. Hossain 2001 and Afsar 2000). The autumn-unemployment in agriculture reduces the expected earnings from staying in the village for both the agricultural and non-agricultural workers and thus, raises their migration intention. Hence, a direct relationship between the migration decision and autumn-unemployment is hypothesized.

Regarding the relationship between land holding and internal migration decision in Bangladesh, the empirical studies are inconclusive. For example, Kuhn (2004) argues that family migration is more likely among men from landless households, while the likelihood of both forms of migration (individual and family) drops with greater land holdings. Hossain (2001), in contrast, finds that the migration propensity is higher for the households with agricultural land more than 50 decimals as compared to the landless, while the migration propensity for the households with land 6-50 decimals is lower compared to the landless. Following Kuhn (2004), we hypothesize that holding other things equal, if a worker has to face more competition for land use within the family, his/her migration intention is expected to be higher because it lowers the expected earnings from staying in the village.

Membership of NGOs and/or access to the formal credit market is likely to influence the seasonal migration decision. With the development of micro credit programs, the members of NGOs now enjoy greater opportunities to be involved in income generating activities other than agriculture in the lean period. Thus, their expected earnings from staying in the village are higher than the non-members and the probability to migrate is lower. But the access to the formal credit market is a long term strategy to deal with seasonal hardship whereas temporary seasonal migration is a short term strategy which largely depends on individuals’ attitudes towards risk (Binswanger 1981, Quizon 1984) and income smoothing.

Ecological vulnerability, like floods and river erosion, affects the migration decision. In the flood-affected years, livelihoods become more diffi-
cult compared to the normal years, because flood and water logging create more landlessness and joblessness, which in turn, increase the probability of migration for survival. For example, following the great flood of 1988, the likelihood of migration increased significantly in the Matlab thana of the Comilla district (Kuhn 2004). In general, Kurigram district is a river erosion-prone area. All the three major rivers (Brahmaputra, Dharla and Tista) displace hundreds of families each year. We hypothesize that river erosion raises the migration propensity.

Demographically, the internal migrants of Bangladesh are mostly concentrated in young adult ages (Chaudhury 1978). Household surveys at destinations show that 75% of temporary and 50% of permanent internal migrants (both male and female) of Dhaka city were 15 to 34 years of age. Of the migrant female labor force in the ready-made garment industries, 90% were under 30 years of age. Among the extreme poor, men and women of the 20-40 years age group migrate more than any other group (Afsar, 2003). Based on these studies we hypothesize that, holding other things constant; those who belong to the 20-40 age cohort are more likely to migrate in the lean period because their expected costs of moving are low and the probability of getting an urban job is high.

Due to limited employment opportunities for women in the urban centers, expected earnings from migration are hypothesized to be low for the female population. As a result, female members of a family are less likely to migrate than the adult male members, holding other things equal. Studies on permanent migration reveal that those who are married have closer ties with their families and relatives. So, they are less likely to migrate (e.g. Lee, 1985). Based on the evidence gained from the Matlab thana of the Comilla district, Kuhn (2004) also argues that following marriage, the likelihood of individual migration declines rapidly. Hossain (2001), in contrast, observes that migration propensity is higher among married persons. Huq-Hussain’s study (1996) also shows that more married women participate in the migration stream. In the case of seasonal migration in the lean period, migration propensity among the married people is also expected to be higher. When mere survival is crucial in the agricultural lean season, the responsibility to feed dependents (spouse and children) is expected to increase the probability of individual migration.

The role of education in the migration decision has been widely dis-
discussed in the literature and several studies have shown that migrants are usually more educated than the non-migrants in the same locality (Chaudhury (1978) and Kuhn (2004), for example). A high rate of migration for educated people may be due to the fact that job opportunities are higher for them in the urban centers than in the rural areas. Interestingly, the study of Huq-Hussain (1996) strongly suggests that educational attainments are not always the influencing factor in the migration decision, particularly among the poor female migrants of Dhaka City. In other studies, Sahota (1968) and Yap (1976) found a significant positive impact of education on internal migration of Brazil. Herrick (1965) found evidence that education factors stimulate migration in the case of Chile. The same has been found by the study on internal migration in Costa Rica by Carvajal and Geithman (1974). Falaris (1979) found the same evidence for the Peru and Lanzona (1997) for the Philippines and Greenwood (1971) for India. Although education is evident in influencing internal migration, this study finds its effect is completely opposite in terms of seasonal migration. In the present study, we hypothesize that an educated individual will have a lower propensity to migrate in the lean period, because the seasonal migration intention comes from seasonal destitution and those who are educated are less likely to be more vulnerable to such destitution. It is also very important to note here that the seasonal migrants are usually employed in the urban informal sector, where educational qualifications do not matter. So, the expected earnings from moving in the lean period are not affected by education. But since an educated person is likely to have better job opportunities in the village, his/her opportunity cost of moving will be higher.

A worker occupation has a very close association with the seasonal migration decision. In the autumn lean period, agricultural workers suffer mostly from a shortage of employment. When job opportunities are limited, the opportunity cost of migration is low and the expected earnings from moving are high compared to the expected earnings from staying. So, the migration intention for the agricultural workers is hypothesized to be high compared to the others.

Holding other things equal, an experienced worker is expected to face lower search cost in the urban job market. Thus, we hypothesize that the probability to migrate will be higher if the worker has prior migration experience. Another important determinant of the cost and benefit to migrate is
the social network, i.e. the presence of neighbors, friends, in-laws and family members at the place of destination. Kinsmen at the potential places of residence can provide information as well as economic support for migration. An estimate of late 1990s shows that three out of every five internal migrants, who have kinsmen at the place of destination, managed employment within a week of arrival in Dhaka city (Afsar, 2003). Actually, those who have social networks at the urban centers require fewer resources to find an urban job and thus, are expected to have a higher probability to migrate.

6 Seasonal Migration Decision

6.1 Econometric Modeling of Seasonal Migration

In order to translate the seasonal migration context into an econometric model, we take the approach of the random utility model framework. Let us assume that, the utility from the choice of migration \((j) = 1\) or 0 at the lean period for the individual \(i = 1, 2, ..., N\) can be specified in the flowing form

\[
U_{ij} = V_{ij} + \varepsilon_{ij}
\]

where \(V_{ij}\) is the systematic component of utility and the \(\varepsilon_{ij}\) is the random component. The model is completed by specifying \(V_{ij}\), say \(V_{ij} = x_{ij}'\beta\). Here the \(x_{ij}\) are the vectors of economic factors, ecological vulnerabilities and personal characteristics. As a result, the utility of migration of an individual \(i\) at the time of the lean period will be

\[
U_{migration|Lean Period} = x_{i}'\beta_a + \varepsilon_a,
\]

and the utility of staying of individual \(i\) at the time of lean period will be

\[
U_{stay|Lean Period} = x_{i}'\beta_b + \varepsilon_b.
\]

Now if we denote \(Y_{ij} = 1\) if \(U_{migration} - U_{stay} = Y_{ij} > 0\), and \(Y_{ij} = 0\) otherwise, then the respondent’s choice of migration in the lean period will be

\[
\Pr[Y = 1|x] = \Pr[U_{migration} > U_{stay}]
\]

\[
= \Pr[x_{i}'\beta_a + \varepsilon_a - x_{i}'\beta_b + \varepsilon_b > 0|x]
\]

\[
= \Pr[x_{i}'(\beta_a - \beta_b) + \varepsilon_a - \varepsilon_b > 0|x]
\]

21
\[ \Pr[x'\beta + \varepsilon > 0|x], \]

where the distribution of \( \varepsilon \) is \( N(0, 1) \). In this study we will estimate such a model with univariate probit estimation techniques.

### 6.2 The Determinants of the Seasonal Migration Decision

We have results from two sets of Probit estimations in the Table 2. In Model 1, we have log of income in the lean period as the dependent variable. But this variable can be endogenous as one can argue that income in the lean period is influenced by the prior migration decision. As a result we used seasonal unemployment as a proxy for the endogenous variable mentioned before. Out proposed proxy variable for the lean period income suits the model very well as both of the models have the same significant variables and none of the coefficients change the sign.

The probit estimates show that seasonal unemployment and seasonal hardship in the lean period and individual characteristics like sex, age, size of the family, farm occupation, prior experience and kinship at the place of destination and education have a significant association with the migration decision. The marginal effect of a unit change in the explanatory variables on the decision to migrate has also been calculated. It is evident that seasonal unemployment in the autumn lean period is the most decisive among the economic factors in determining the probability of migration, increases the probability by 10% for a typical worker. The results, however, do show significant effects of lean period income on migration decision.

[Table 3 about here]

Another economic factor, land ownership was also found to be insignificant. It was observed during the survey that there are at least three types of landowners in the Kurigram district: a) absentee landlords who live in urban areas and are engaged in other occupations, b) small land owners who work on their own lands and c) landless or effectively landless workers who work in other people’s farm. It was very hard from our survey to distinguish among these types land ownership as respondents of the survey were either very reluctant or unaware of these information, which could eventually increase the explanatory power of this factor as well as of the model.

The present study finds that the probability to migrate is negative for an individual with access to micro-credit through NGO membership with typ-
ical characteristics, but the relationship is not significant. Prior migration experience has the strongest positive impact among all the factors influencing the migration decision. According to the Model 2 (in table 2), the probability of migration increases by 66% if the typical individual has prior migration experience (after controlling for kinship), if the other variables remain unchanged. Other things being equal, the probability to moving rises by 19% if the typical worker has relatives, friends or countrymen at the potential place of destination.

These two variables, migration experience and kinship at the place of destination reduce the cost of migration by minimizing the time for job searching. Both of these variables were found to be significant at less than the 1% level. These variables have not been used in the previous literature on permanent internal migration. In the case of seasonal migration, a risk averse individual will reduce his/her risk by having some degree of kinship at the place of destination otherwise it will be very hard for the individual to get a job in the urban areas. If a person finds no job at the urban area, s/he will be worse off in the urban area than from the rural area as temporary seasonal migration incurs some economical and social costs. As a result, an individual, who will take the decision of seasonal migration in the lean period will be heavily influenced by kinship and previous experience issues. We find such variables very crucial for the migration decision and have the highest magnitude in explaining the probability of the seasonal migration.

The results also show that migration propensity is significantly higher among males. For a typical worker, the probability of migration falls by 0.26 for a female. Workers of age group 20-40 have a significantly higher intention to move in the lean period; the probability is 0.08 higher than other age groups. Marital status, though insignificant was found to have a positive impact on the migration decision. That means, holding everything else equal, a married worker is more likely to move. This demonstrates the fact that married workers are more vulnerable to seasonal hardship. Interestingly, the size of family is found to be significant and negatively influences the probability to migrate. Thus indicates that for a large family, the chief earner is less likely to migrate as the migration income in the lean period may not be sufficient to overcome the loss of income during the lean period.

One important finding of our study is that farm occupation significantly
modifies the migration decision. Since the seasonal hardship results from seasonal unemployment in agriculture, it is quite logical that the farmers would be keener to seek an alternative livelihood strategy, preferably in the cities. The probit model suggests that the probability of migration is 7.5% higher among the farmers. Agricultural workers are more vulnerable to seasonal unemployment in the lean period. As a result, large number of agricultural workers chose to migrate in the lean period and the present study has found a significant and positive impact of agricultural professionals to opt for seasonal migration. Such evidence contradicts the literature on permanent internal migration. Studying the migration in Costa Rica, Carvajal and Geithman (1974), found that income elasticities of in-migration rates are higher for professionals, managers, white-collar and industrial workers. Thus is quite natural as higher wages for this jobs attract migrants to cities. So, it provides evidence that lean period migration is basically a shock driven migration where farm laborers are mostly affected. Thus they are the vast majority of the population who choose for the temporary internal migration.

A puzzling finding of the study is that regarding river erosions. It was found that those who experienced river erosion at least once in their lives have lower migration propensity. This result does not conform to our hypothesis. The probit results suggest that the probability to migrate falls by 3.1% if the worker experienced river erosion which is marginally significant for the model. One possible explanation of this result may be due the economic vulnerability of the river erosion affected peoples. To migrate nearby cities, one needs at least some amount of asset to cover the transportation and initial relocation cost. Hence, the people who are affected with river erosion have already lost their valuable lands and houses, therefore they can not afford to take decision of migration in the lean period. Those who ever experienced river erosion in their lives fall into the trap of chronic poverty and they cannot cover the minimum cost of adopting an alternative livelihood strategy like migration. Another explanation could be the trauma effect of forced relocation due to the river erosion which may have decreased their migration propensity.

An interesting relationship between farmers and non-farm occupants can be extrapolate from the figure 1. In the figure we have created a graph of a representative individual as a base case. The individual is a male, married, with mean income, who has no migration experience, no kinship at the
destination of migration, no education, no land ownership, no access to micro-credit, no social security, has been affected with river erosion, aged 35 and a farmer. In figure 1, the predicted probabilities of two kinds of occupation for a range of family sizes has been provided. Interestingly for the non farm occupants, the size of family does not decrease the probability of migration. As seasonal hardship results from seasonal unemployment in agriculture, in the autumn lean period, agricultural workers suffer mostly from shortage of employment. But the same is not true for the non-farm workers. As a result, non-farm workers are less likely to migrate in the lean period and the predicted probability of migration for this cohort does not vary much with the changing size of the family. For the agricultural worker, the probability of migration is very high but it decreases dramatically as the size of the household increases.

Another interesting relationship of education and migration probabilities has been shown in figure 2. For the same representative individual (with family size taken to be 5) education significantly affects migration probabilities and this impact remains almost constant even with the increase of age to the maximum. Thus has important policy implications as it illustrates the potential impact of education on the propensity to migrate.

Finally, we have calculated a probability table for the above mentioned base case and calculated the predicted probability by changing units from its base case; see table 3. The predicted probability for the micro-credit is quite an interesting one. Using the base case, we calculated that predicted probability of migration decreases from 0.88 to 0.78 for a person who has access to micro-credit through NGO membership. Thus this result suggests that access to micro-credit reduces the propensity to migration in the lean period but as we find in the table2 that this effect is not significant. As a result, this interesting finding of the study leads us to the next section where we will study if there exists a systematic relationship between these two variables.

[Table 4 about here]
Chapter 7  Seasonal Migration and Access to Micro-credit

7.1 Econometric Model of Migration and access to Micro-credit

The model of section 4.1 will produce inconsistent estimates if we assume that the access to micro-credit is endogenous in nature and may have influence over the people in the lean period and also may influence there propensity to migrate. Thus, a natural extension of the univariate probit model will be to allow two simultaneous equations; one for the access to micro-credit and the other for the migration, with correlated disturbances, which can then be estimated with a bivariate probit model. Following Greene (2003), the general specification for a two equation model where $y_1^*$ is the dummy for Micro-credit and $y_2^*$ is the dummy for migration is as follows,

$$
y_1^* = x_1' \beta + \varepsilon_1, \quad y_1 = 1 \text{ if } y_1 > 0, 0 \text{ otherwise},$$
$$
y_2^* = x_2' \beta + \varepsilon_2, \quad y_2 = 1 \text{ if } y_2 > 0, 0 \text{ otherwise},$$

$$E[\varepsilon_1|x_1,x_2] = E[\varepsilon_2|x_1,x_2] = 0,$$
$$Var[\varepsilon_1|x_1,x_2] = Var[\varepsilon_2|x_1,x_2] = 1,$$
$$Cov[\varepsilon_1,\varepsilon_2|x_1,x_2] = \rho.$$

In this case, unless we find evidence that $\rho = 0$, the probit analysis in the section 4.1 will give inconsistent parameter estimates. Here $\rho$ measures the unobserved heterogeneity which implies that the error term will share a common component and can be expected to be correlated with each other.

Finally, we will use an endogenous treatment model where the first dependent variable (the dummy variable which is coded one to represents the access to micro-credit) appears as an independent variable in the second equation, which is a recursive, simultaneous equation model where

$$
y_1^* = x_1' \beta + \varepsilon_1, \quad y_1 = 1 \text{ if } y_1 > 0, 0 \text{ otherwise},$$
$$
y_2^* = x_2' \beta + y_1 \gamma + \varepsilon_2, \quad y_2 = 1 \text{ if } y_2 > 0, 0 \text{ otherwise},$$

$$E[\varepsilon_1|x_1,x_2] = E[\varepsilon_2|x_1,x_2] = 0,$$
$$Var[\varepsilon_1|x_1,x_2] = Var[\varepsilon_2|x_1,x_2] = 1,$$
$$Cov[\varepsilon_1,\varepsilon_2|x_1,x_2] = \rho.$$
7.2 Modeling Seasonal Migration and Access to Micro-credit

A problem our probit model may encounter is, if there exists an endogenous non random sample selection process for the people who took NGO membership to access micro-credit and the people who migrated in the lean period. Access to micro-credit and migration in the lean period are alternative livelihood strategies to overcome the income shock in the lean period. But access to the formal credit market is a long term strategy to deal with seasonal hardship whereas temporary seasonal migration is a short term strategy which largely depends on individuals’ attitudes towards risk. Hence, there may exist selection problems with the individuals who took NGO membership to access micro-credit and the decision to migrate. Also, we may encounter the problem of unobserved heterogeneity between these two strategies.

For the seemingly unrelated regressions, we used bi-probit estimation techniques with two models. In the first model, we have treated access to NGO and the migration decision as two endogenous equations. In the second equation, following Burnett (1997), we used an endogenous treatment model where the first dependent variable, NGO, appears as the independent variable in the second equation, which is a recursive, simultaneous equation model. As a result, we can also test the impact of treatment (in our case access to NGOs) on the migration decision and can test if the allocation of treatment was random or not. Also we can evaluate the covariance of the disturbance terms of these two equations by estimating the $\rho$.

[Table 5 about here]

From the endogenous treatment model, we found the treatment effect to be insignificant and the estimate of $\rho$ is only -0.50 with a standard error of 0.53. The Wald statistics for the test of the hypothesis that $\rho = 0$ is 0.89. For a single restriction, the chi-squared critical value is 3.84, so the hypothesis can not be rejected. The likelihood ratio test for the same hypothesis leads to the same conclusion. Now for the simultaneous bi-variate probit model, the likelihood ratio test for the hypothesis $\rho = 0$ is only marginally significant as the $\chi^2$ test statistics is 2.83 with an associate $p$-value of 0.09. Hence, the correlation coefficient measures the negative correlation between the disturbances of access to NGOs and the migration decision after the
influence in the included factors is accounted for. But, this relationship between the errors is not very significant and separate estimation of these two equations using univariate probit estimation techniques is unlikely to create inconsistency and biasedness in the estimations.

8 Testing for the Effective Strategy

As we have found evidence that access to micro-credit through NGOs and temporary internal migration in the lean period are the two alternative livelihood strategies to overcome the income shock in the lean period, a natural extension easily leads us to test these two strategies to check which one is more effective. The major problem of the lean period hardship is the significant reduction of income due to the joblessness in the agricultural industries, thus it would be better if we could test the impact of different strategies on the lean period income.

One possible way to test the impact is by using natural experiment techniques. The case explained in this study can easily be qualified as a natural experiment or a quasi-experiment. We know that a natural experiment occurs due to some random exogenous event, in our case, the two strategies described in this study can ideally be suitable for such experiment. An risk averse individual can choose to migrate or access micro-credit as two alternative strategies exogenously and can choose it anytime of the year. A natural experiment always consists of a control group (which is not affected by the exogenous event) and a treatment group (which is effected by the exogenous event). Under a true experiment framework, treatment and control groups are randomly chosen and arise from particular policy or event change. Thus, to control for the systematic difference between these two groups, we need two periods of data, one before and one after the policy change. In our case, we have the income information of two periods, one in the normal period and one in the lean period. Thus we can easily convert the data to use it for two period cross-sectional data sets, one before the lean period hardship and after the lean period hardship and can be used to determine the effect of the two strategies.
8.1 Strategy evaluation through Difference-in-Difference Method

Following Wooldridge (2003, page 458), we use $C$ to donate the control group and $T$ to donate the treatment group, letting $dT$ equal unity for those in the treatment group $T$ and zero otherwise. Then let us call $dP$ a dummy variable for the lean time period, then the equation of interest is

$$y = \beta_0 + \delta_0 dT + \beta_1 dP + \delta_1 dT \ast dP + \text{Other Factors}$$ (15)

where $y$ is the outcome variable of interest, which is the log of income in our case. To measure the effect of a strategy, without the other factors in the regression, the $\delta_1$ will be the difference-in-difference estimator:

$$\delta_1 = (\bar{y}_{2,T} - \bar{y}_{1,T}) - (\bar{y}_{2,C} - \bar{y}_{1,C})$$

where the bar denotes the average, the first subscript denotes the period (1 for normal and 2 for the lean season) and the second subscript denotes the group. Thus the sign of the $\delta_1$ shows the effect of treatment or policy on average outcome of $y$. In our case, if either the temporary internal migration or access to micro-credit have positive impact over the income during the lean season, then the expected sign of the $\delta_1$ will be positive. The parameter $\delta_1$ is sometimes called the average treatment effect. When we add other explanatory variables to equation 3, the OLS estimation $\delta_1$ will no longer be as simple as mentioned above but the interpretation will be the same.

The data set we have can be easily converted to a longitudinal data set where we asked the two period incomes (income in lean period and income in normal period) and other demographical variables are basically time-invariant (like education, occupation, sex, marital status etc.). As a result, the data gives us the opportunity to test the impact of these two alternative policies with the help of difference–in–difference method.

Here, the policy variables are migration in the lean period ($MIGDEC$) and access to micro-finance through NGOs ($NGO$). Now we have two treatment groups; one is the people who choose to migrate versus people who do not and the second is the people who choose to have access to micro-credit through NGO membership versus the people who do not. The outcome variable for our case is the log of income and the parameters of interest are those on the interaction terms between the policy and the treatment effects.
which are \textit{LEAN*MIGDEC} and \textit{LEAN*NGO} in the table 5. If either of the policies is effective in increasing the income in the lean period, then the interaction term should be positive and significant.

[Table 6 about here, see appendix A1]

In table 5, we show two sets of estimation results for two policy variables. The difference between the two separate estimations for a single policy variable is that one used no control variables and the other used a full set of control variables. Interestingly, the coefficients of different estimations are almost similar indicating robustness of our findings. As we can see from Table 5, the coefficient on \textit{MIGDEC} is positive but not statistically significant. This is as expected as controlling for other factors, migration does not increase income significantly. The same is true for the \textit{NGO} variable, as access to micro-finance is a long term policy and we did not expected the variable to have significant influence over income.

On the other hand, the variable \textit{LEAN} is strongly significant and negative which shows the severeness of the lean period shock on income. The variable is significant for all the four models. The interaction term \textit{LEAN*MIGDEC} is highly significant and positive as expected. Surprisingly, the interaction term \textit{LEAN*NGO} is negative but not statistically different from zero, which gives us some evidence of micro-credit’s ineffectiveness in a situation like seasonal hardship\textsuperscript{5}. Temporary internal migration is a short term solution and preferred by any individual who wants to alleviate short term hardship. In contrast, access to micro-finance is a long term policy and the impact of such a policy can not be observed within a short time span. Hence, a myopic individual will always opt for temporary migration over the micro-finance option.

Interestingly, if we look at table 7, we can easily observe that access to micro-credit increases the mean income of the people though the median income is the same. However, in the lean period (refer to table 8) household that took migration decision is better off than other two groups. Household that took no credit and did not migrate are the worst affected with the lean period shock. Whereas, during lean period, only credit access does not improve the income of the household significantly. So the families that took

\textsuperscript{5}We also ran several regressions by controlling for household and village specific effects but such inclusion did not change our result. These results can be provided upon request.
both the option during lean period has more average income than any other group and are better off. The reason for such finding is deep rooted in the micro-credit framework. NGO’s have very strict policy of loan repayment and usually collected on weekly basis. Hence, in most of the cases the female member of the household takes the credit but than transfer it to the male member who migrates in the urban areas and send the savings to replay the loans. Whereas if families do not exploit the credit opportunities described above, than the family lose their mobility and can not migrate during the lean season. As a result, access to credit alone can not improve the family income in the lean period.

9 Impact of Seasonal Migration

Seasonal migration has both positive and negative impacts on the socio-economic infrastructures of any economy. On one hand, such migration reduces the inefficiency and inequality in the rural area with the flow of remittances from the migration destinations. Also the flow of remittance to rural areas increase the living standard of the families. This flow is quite regular which is unlikely for the permanent rural to urban migration. Such flow plays a big role for the families though this money hardly used for any employment generation ventures other than on bare necessities of life (like food grains, etc.).

Also the return migrants diffuse ideas, information and knowledge (for example, importance of education, the use of cellular phone, etc.) in the villages which they have acquired from urban areas which play a vital role in rural development process.

However, we need to be careful in analyzing such tendency of people specially who are very vulnerable and poverty striken. Over the years, major concentration of public and private investments has been focused towards urban areas. Such resource inequality has created no industrial or non-agricultural sectors in the rural areas. Therefore, there exist hardly any alternative means of earning in the rural area other than agriculture and argi-based industries. Thus pattern of temporary labor movement is nothing but the pure response to this resource inequality and lack of alternatives in the rural areas. As suggested by Hugo (1982, page 74), "Much of the nonpermanent migration ..... flows from areas in which there has been very
little investment and development toward regions that have received investment far out of proportion to their share of the national population”.

Moreover, these people (migrants) do not contribute (like taxation, etc.) but consume some proportion of urban public utilities and infrastructure facilities. As a result, urban areas suffer with resource scarcity and congestions which decrease the overall utility and living standards. However, policy makers do not have enough information about the number of people migrating permanently and temporarily. Seasonal migrants are very hard to detect and the definition is not a clear one. Hence national surveys do not include them in their calculation. As a result, policy makers find it hard to provide any rational policy that will accommodate such migrants.

10 Concluding Remarks

This study has found evidence that access to micro-credit through NGOs and temporary internal migration in the lean period are the two livelihood strategies to overcome the income shock in the lean period. We found that economic, ecological and individual characteristics, all play an important role in formulating migration decision. Among economic factors, seasonal unemployment has a significant effect. Personal characteristics such as sex, age, farm occupation, the role of networks and previous migration experience, are all significant at less than the 5% level of significance.

This study has found systemic differences between seasonal migration and permanent internal migration. To the best of my knowledge, all the empirical study on permanent internal migration has found significant impact of education on migration. Seasonal migration is very temporary in nature and, as a result, individuals who have education will choose permanent over temporary migration which is found very significant in our study.

However, such temporary internal migration is not a proper long-term sustainable solution to the seasonal shocks in agriculture sector and village level poverty. Temporary migration can provide short time economic benefits to the migrants, their families and to their villages but such movement may not be possible for a long time. Also such practise suffers with uncertainty and loss of resources like travel cost, travel time and search costs.

Micro-credit schemes have given phenomenon opportunities to the rural people to have some access to the formal credit market. Unfortunately
we found in our study that, during seasonal shocks, such access to credits did not improve the mean income of the people. Other than productivity and output shock in the agricultural sector, lack of labor diversification and skill shortage may lead to such outcome. We found that, households who took both migration decision along with micro-credit earns better than households with only micro-credit in the lean period. NGO’s have very strict policy of loan repayment and usually they collect repayment on weekly fashion. Hence, in most of the cases the female member of the household takes the credit but than transfer it to the male member who migrates in the urban areas and send the savings to replay the loans. On the other hand if male member of the household take credit during the lean period, the person lost his mobility and can not take the migration decision due to the strict weekly repayments rule. Thus NGOs should address such problem by relaxing the loan repayment scheme during the lean period. Also, NGOs should provide proper support and training schemes to capacity building other than just providing access to credits.

Demographers and national statistical bureaus could implement some extra questioner in their survey to capture the temporary tendency of the labor movement. As a result, policy makers as well government will have a clear picture of the whole phenomenon and could address such situation with proper policy mechanism.

Even though seasonal migrants rationally choose to work in the urban informal sector because of the predominance of poverty-led push factors and the limited scope for livelihood diversification along with urban opportunity based pull factors. On the contrary, during normal time, migrants want to come back to their origin due to the unpleasant work environment and insecure job-led pull factors along with better income opportunities and social tie-based push factors. However, should such migration be promoted or discouraged is solely the respective policy makers decision. Hence it is suggested that appropriate national policies should be adopted to minimize the problem at the origin as well as at the migration destinations. Such policies should be aimed at achieving some specific goals like increasing agricultural productivity and crop diversification, encouraging rural non-farm activities, particularly large and medium scale industries and overcoming the credit constraints faced by the poor villagers.

We can not control the agricultural shocks during the lean period, but
we can always study the consequences and try to implement appropriate mechanism and strategies to minimize the loss and uncertainty faced by the poverty stricken people. Thus, policies addressed toward such issues will significantly help people to self sustain themselves and get off from poverty.
References


Figure 1 Migration propensity for farmer vs non-farmer with the change of family size

![Figure 1](image1)

Figure 2 Migration propensity with education vs no-education with the change of age

![Figure 2](image2)
Table 2 Descriptive statistics

<table>
<thead>
<tr>
<th>Variables</th>
<th>Obs.</th>
<th>Mean</th>
<th>S.D.</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Migration decision</td>
<td>290</td>
<td>0.68</td>
<td>0.46</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Income in the normal period</td>
<td>290</td>
<td>67.13</td>
<td>34.46</td>
<td>17</td>
<td>270</td>
</tr>
<tr>
<td>Income in the lean period</td>
<td>290</td>
<td>58.46</td>
<td>42.60</td>
<td>0</td>
<td>200</td>
</tr>
<tr>
<td>Seasonal hardship</td>
<td>290</td>
<td>0.6</td>
<td>0.49</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Seasonal unemployment</td>
<td>290</td>
<td>0.7</td>
<td>0.45</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Previous migration experience</td>
<td>290</td>
<td>0.63</td>
<td>0.48</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Kinship at the migration destination</td>
<td>290</td>
<td>0.52</td>
<td>0.50</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Sex</td>
<td>290</td>
<td>0.89</td>
<td>0.30</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Age</td>
<td>290</td>
<td>39.61</td>
<td>12.53</td>
<td>18</td>
<td>69</td>
</tr>
<tr>
<td>Marital status</td>
<td>290</td>
<td>0.70</td>
<td>0.45</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Education</td>
<td>290</td>
<td>0.42</td>
<td>0.49</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Occupation</td>
<td>290</td>
<td>0.47</td>
<td>0.50</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>NGO</td>
<td>290</td>
<td>0.19</td>
<td>0.39</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Social security</td>
<td>290</td>
<td>0.13</td>
<td>0.33</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>River erosion</td>
<td>290</td>
<td>0.61</td>
<td>0.48</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Flood</td>
<td>290</td>
<td>0.49</td>
<td>0.50</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Land ownership</td>
<td>290</td>
<td>0.43</td>
<td>0.49</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Family size</td>
<td>290</td>
<td>4.94</td>
<td>1.32</td>
<td>3</td>
<td>9</td>
</tr>
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</table>
### Table 3 Univariate Probit Model

<table>
<thead>
<tr>
<th>Variables</th>
<th>Model 1</th>
<th>Model 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coefficients</td>
<td>Marginal effects</td>
</tr>
<tr>
<td>Log of Income in Lean period</td>
<td>0.465 (0.282)*</td>
<td>0.021</td>
</tr>
<tr>
<td>Seasonal Unemployment</td>
<td>-0.461(0.384)</td>
<td>-0.022</td>
</tr>
<tr>
<td>Land Ownership</td>
<td>-0.334(0.156)**</td>
<td>-0.015</td>
</tr>
<tr>
<td>Size of the Household</td>
<td>-0.778(0.507)</td>
<td>-0.059</td>
</tr>
<tr>
<td>Membership of NGO</td>
<td>0.984(0.621)</td>
<td>0.023</td>
</tr>
<tr>
<td>Social Security</td>
<td>-0.633(0.478)</td>
<td>-0.026</td>
</tr>
<tr>
<td>River Erosion</td>
<td>1.038(0.45)**</td>
<td>0.066</td>
</tr>
<tr>
<td>Age dummy</td>
<td>0.924(0.45)**</td>
<td>0.071</td>
</tr>
<tr>
<td>Sex</td>
<td>1.605(0.627)**</td>
<td>0.252</td>
</tr>
<tr>
<td>Farm Occupation</td>
<td>1.297(0.479)**</td>
<td>0.067</td>
</tr>
<tr>
<td>Marriage</td>
<td>0.277(0.424)</td>
<td>0.014</td>
</tr>
<tr>
<td>Education</td>
<td>-0.912(0.422)**</td>
<td>-0.052</td>
</tr>
<tr>
<td>Prior experience of Migration</td>
<td>3.657(0.596)**</td>
<td>0.601</td>
</tr>
<tr>
<td>Kinsmen at Destination</td>
<td>2.387(0.524)**</td>
<td>0.202</td>
</tr>
<tr>
<td>Constant</td>
<td>-4.27(1.443)</td>
<td></td>
</tr>
<tr>
<td>No. of Observation</td>
<td>268</td>
<td>290</td>
</tr>
<tr>
<td>Pseudo-R-Squared</td>
<td>0.78</td>
<td>0.82</td>
</tr>
<tr>
<td>Log Likelihood</td>
<td>-35.048</td>
<td>-32.60</td>
</tr>
</tbody>
</table>

Values in the parenthesis are the reported standard error of the estimation.

***,**,* represents significant at 1, 5 and 10 percent level.
Table 4 Bivariate Probit estimations

<table>
<thead>
<tr>
<th>NGO Equation</th>
<th>Bivariate Probit</th>
<th>Endogenous treatment model</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coefficients</td>
<td>Standard errors</td>
</tr>
<tr>
<td>Sex</td>
<td>0.663*</td>
<td>(0.407)</td>
</tr>
<tr>
<td>Marriage</td>
<td>0.287</td>
<td>(0.221)</td>
</tr>
<tr>
<td>Land Ownership</td>
<td>0.233</td>
<td>(0.194)</td>
</tr>
<tr>
<td>Education</td>
<td>0.0763</td>
<td>(0.188)</td>
</tr>
<tr>
<td>Age</td>
<td>-0.106**</td>
<td>(0.045)</td>
</tr>
<tr>
<td>Age Squared</td>
<td>0.001**</td>
<td>(0.0)</td>
</tr>
<tr>
<td>Farm Occupation</td>
<td>-0.231</td>
<td>(0.192)</td>
</tr>
<tr>
<td>Flood</td>
<td>-0.326</td>
<td>(0.201)</td>
</tr>
<tr>
<td>Social Security</td>
<td>1.400*</td>
<td>(0.245)</td>
</tr>
<tr>
<td>Size of the household</td>
<td>0.026</td>
<td>(0.09)</td>
</tr>
<tr>
<td>Constant</td>
<td>0.16</td>
<td>(1.124)</td>
</tr>
</tbody>
</table>

Migration decision equation

<table>
<thead>
<tr>
<th></th>
<th>Bivariate Probit</th>
<th>Endogenous treatment model</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coefficients</td>
<td>Standard errors</td>
</tr>
<tr>
<td>Prior Experience of Migration</td>
<td>3.866***</td>
<td>(0.64)</td>
</tr>
<tr>
<td>Kinship at destination</td>
<td>2.323***</td>
<td>(0.528)</td>
</tr>
<tr>
<td>Sex</td>
<td>1.564**</td>
<td>(0.617)</td>
</tr>
<tr>
<td>Marriage</td>
<td>0.203</td>
<td>(0.433)</td>
</tr>
<tr>
<td>Education</td>
<td>-0.967</td>
<td>(0.446)</td>
</tr>
<tr>
<td>Age Dummy</td>
<td>1.023**</td>
<td>(0.466)</td>
</tr>
<tr>
<td>Seasonal hardship</td>
<td>1.025**</td>
<td>(0.451)</td>
</tr>
<tr>
<td>Seasonal unemployment</td>
<td>1.25**</td>
<td>(0.458)</td>
</tr>
<tr>
<td>River erosion</td>
<td>-0.785*</td>
<td>(0.452)</td>
</tr>
<tr>
<td>Size of the household</td>
<td>-0.355</td>
<td>(0.16)</td>
</tr>
<tr>
<td>Land ownership</td>
<td>-0.477</td>
<td>(0.38)</td>
</tr>
<tr>
<td>Social security</td>
<td>0.752</td>
<td>(0.577)</td>
</tr>
<tr>
<td>Farm occupation</td>
<td>1.48**</td>
<td>(0.503)</td>
</tr>
<tr>
<td>Membership of NGO</td>
<td>-3.36</td>
<td>(1.118)</td>
</tr>
<tr>
<td>Constant</td>
<td>-3.36</td>
<td>(1.118)</td>
</tr>
</tbody>
</table>

| N                             | 290              |                             | 290              |                             |
| Rho                           | -0.418*          | (0.224)                     | -0.50            | (0.53)                      |
| Log Likelihood                | -149.40          |                             | -149.39          |                             |

*Values in the parenthesis are the reported standard error of the estimation.
***,**,* represents significant at 1, 5 and 10 percent level.
Table 5 Probability Score table

<table>
<thead>
<tr>
<th>Individual Characteristics</th>
<th>Migration</th>
<th>Not-Migration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Base case</strong></td>
<td>0.887</td>
<td>0.113</td>
</tr>
<tr>
<td><strong>Change from the base</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No seasonal unemployment</td>
<td>0.551</td>
<td>0.448</td>
</tr>
<tr>
<td>With landownership</td>
<td>0.807</td>
<td>0.193</td>
</tr>
<tr>
<td>Size of the household =6, not 5</td>
<td>0.827</td>
<td>0.173</td>
</tr>
<tr>
<td>Membership of NGO=1, not 0</td>
<td>0.783</td>
<td>0.217</td>
</tr>
<tr>
<td>Social security =1, not 0</td>
<td>0.966</td>
<td>0.034</td>
</tr>
<tr>
<td>River erosion =1, not 0</td>
<td>0.691</td>
<td>0.309</td>
</tr>
<tr>
<td>Seasonal hardship =1, not 0</td>
<td>0.614</td>
<td>0.386</td>
</tr>
<tr>
<td>Age is 36, not 35</td>
<td>0.885</td>
<td>0.115</td>
</tr>
<tr>
<td>Female not male</td>
<td>0.373</td>
<td>0.627</td>
</tr>
<tr>
<td>Occupation = 0, not 1</td>
<td>0.345</td>
<td>0.655</td>
</tr>
<tr>
<td>Married = o, not 1</td>
<td>0.856</td>
<td>0.144</td>
</tr>
<tr>
<td>Education = 1, not 0</td>
<td>0.54</td>
<td>0.459</td>
</tr>
<tr>
<td>Prior experience of migration = 1, not 0</td>
<td>1.00</td>
<td>0.000</td>
</tr>
<tr>
<td>kinsmen at destination =1, not 0</td>
<td>0.999</td>
<td>0.000</td>
</tr>
</tbody>
</table>

*The base case is with sex=1, marital=1, occupation=1, seasonal hardship=1, mounemp=1, age=35 and family=5.*

Table 6 Bivariate Probit estimations

<table>
<thead>
<tr>
<th>Variables</th>
<th>Dependent variable: Log of income, pooled regression</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Policy variable: MIGDEC</td>
</tr>
<tr>
<td>Constant</td>
<td>4.03*** (0.061)</td>
</tr>
<tr>
<td></td>
<td>3.89*** (0.144)</td>
</tr>
<tr>
<td>Migdec</td>
<td>0.08 (0.073)</td>
</tr>
<tr>
<td></td>
<td>0.11 (0.087)</td>
</tr>
<tr>
<td>NGO</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Lean =1 if lean period, zero other wise</td>
<td>-0.95*** (0.096)</td>
</tr>
<tr>
<td></td>
<td>-0.95*** (0.096)</td>
</tr>
<tr>
<td>Lean*Migdec</td>
<td>1.03*** (0.111)</td>
</tr>
<tr>
<td></td>
<td>1.03*** (0.111)</td>
</tr>
<tr>
<td>Lean*NGO</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Other Controls</td>
<td>No Full Set</td>
</tr>
<tr>
<td>N</td>
<td>447 447</td>
</tr>
<tr>
<td>Adjusted R squared</td>
<td>0.29 0.30</td>
</tr>
</tbody>
</table>

*Values in the parenthesis are the reported standard error of the estimation.*

***, **, * represents significant at 1, 5 and 10 percent level.
### Table 7 Some Summary Information of Income in normal period

<table>
<thead>
<tr>
<th>Normal Period</th>
<th>without NGO support</th>
<th>with NGO support</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>59.63</td>
<td>67.95</td>
</tr>
<tr>
<td>Median</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>SD</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Table 8 Some Summary Information of Income in lean period

<table>
<thead>
<tr>
<th>Lean Period</th>
<th>NGO=0,Migdec=0</th>
<th>NGO=0,Migdec=1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>16.17</td>
<td>77.16</td>
</tr>
<tr>
<td>Median</td>
<td>20</td>
<td>75</td>
</tr>
<tr>
<td>SD</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>NGO=1,Migdec=1</th>
<th>NGO=1,Migdec=0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>74.85</td>
</tr>
<tr>
<td>Median</td>
<td>80</td>
</tr>
<tr>
<td>SD</td>
<td></td>
</tr>
</tbody>
</table>