

**Rural Out-Migration and Family Life in Cities
in Mongolia**

Background Paper

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May 12, 2011

*Consultant. I am grateful to Andrew Mason for his guidance on this project, to Nancy Cooke and Elaine Sun for their support and encouragements, to Andrew Mason and Trang Van Nguyen for their detailed comments, and to Ralph Van Doorn, Christopher Finch, and Prem Sangraula for their helps. All remaining errors are mine. The findings, interpretations, and conclusions are entirely those of the author. They do not necessarily represent the view of the World Bank, its Executive Directors, or the countries they represent.

Definition of Mongolia words:

Aimag	province
Soum	County
Ger	Traditional round felt tent
Dzud	Winter Disaster
Tugrug	Mongolia currency
UB	Ulaanbaatar

Summary

There is a growing concern among policy makers and the international development community about the rapid concentration of migrants in the capital city of UB and its social, economic, and environmental consequences (UNDP, 2003). These concerns call for a good understanding of the nature of migration in Mongolia and its impacts on the life of migrants. Using the 2007/08 Household Economic and Social Survey of Mongolia, this paper aims to: (i) document the characteristics of recent internal migration in Mongolia and (ii) assess the livelihoods of rural-to-urban migrants in comparison to those staying in rural areas as well as to local urban residents.

Migrants account for as high as 31.6 percent of the adult population (15 years old or above). The majority of those who have migrated come from soum centers and aimag centers. Nearly half of the migrants have chosen the capital city of UB as their destination.

The analysis in this paper suggests that rural out-migration is negatively correlated with the chance of falling into poverty. For those who did not migrate from rural areas, their poverty incidence was much higher, and their consumption level much lower, than that of rural-to-urban migrants. However, not all urban destinations are equal: there is a large discrepancy in livelihoods between those moving to aimag centers versus those moving the UB. The poverty incidence of rural migrant families moving into aimag centers was 33 percent, whereas 24 percent for those migrant families moving into UB.

Assessing the livelihoods of rural-to-urban migrants also reveals significant gaps between the life of rural migrants residing in the capital city of UB and that of local UB residents in terms of the consumption level, the incidence of poverty, and several other non-consumption indicators (the likelihood of having a livable housing, the likelihood of having a better water access, and the likelihood of less using polluted heating fuels).

1 Motivation and research issues to be addressed

One noticeable phenomenon in the urbanization process in Mongolia is the rapid population concentration in the capital city of UB. Population in UB increased by 31 percent during the period of 2000-2007 while, in other regions, population experienced zero or negative growth (Table 1). The overwhelming expansion of the capital city of UB could have put enormous pressure on its capacity to accommodate its population socially, economically, and environmentally. One noticeable piece of evidence is the deteriorating livelihood of migrants. Particularly when the country's economy experienced a setback during the recent global financial crisis, "they (migrants) are likely to fall into extreme poverty if the crisis deepens and is prolonged." (Global Research Center 2009, pp. 8)

Population migration and redistribution have been an integral part of development strategy in Mongolia, and, in recent years, there has been a renewed recognition of urgency of this issue in Mongolia (UNDP, 2003). There is a need for a systematic record of the nature and characteristics of migration in Mongolia and its impacts on the life of migrants. In fact, recent migration data has not been fully documented since the landmark publication of national migration trend based on 2000 population and housing census (NSO, 2002).¹

This paper aims to: (i) document the characteristics of recent internal migration in Mongolia and (ii) assess the livelihoods of rural-to-urban migrants in comparison to those staying in rural areas as well as to local urban residents. The first objective fills the information gap in up-to-date migration trends, regional migration patterns, and its social,

¹ A supplemented migration survey by the Population Teaching and Research Center of National University of Mongolia was also published in 2000 (PTRC, 2001).

economic, and demographic characteristics. The second objective sheds light on the impacts and consequences of migration. This paper uses the national socio-economic household survey of 2007/08.

The rest of the paper is organized in the following way. After providing a contextual background about migration waves in Mongolia, we briefly introduce the data source used in this study. Then, the general trends, regional patterns of migration, and reasons for migration are presented. It is followed by a descriptive analysis of migrants' life in the capital city of UB and in aimag centers. We will discuss various aspects of standard of living: the poverty incidence, consumption pattern, and other non-consumption development indicators such as the likelihood of living in a ger, accessing portable water, and using polluted fuels. The last section of the paper provides concluding remarks.

Historical and country context

The history of migration flows in Mongolia since the 1960s can be characterized by three major waves. In the 60's, 70's and 80's, Mongolia experienced a period of solid development of collectivization and initial industrialization, which brought significant changes in population resettlement. The creation of large collectives appears to have facilitated an intensification of agricultural production through technical improvements and mechanization. This reduced the demand for labor and thus created a labor surplus (Neupert and Goldstain, 1994). People migrated from rural areas and settled in newly established towns and small villages along the railroad. Small and medium towns and soums with several thousand inhabitants were established, and developed into

administrative, trade, and educational centers. At the same time, aimag (province) centers also grew in a quite considerable scale, absorbing surplus rural laborers into industrial centers. Notable examples include the growth of the capital city, Ulaanbaatar, and the birth of two new industrial cities, Darkham, and Erdenet.

Migration movements during this period were basically controlled and associated with work opportunities available. The government took measures in channeling surplus laborers into the industrial centers, mainly from rural to urban centers. Thus, the share of population residing in urban areas rose while the share of rural residence fell. It was estimated that about 60 percent of the total population lived in urban areas by the end of the 1980s, mainly in the three biggest cities (Alгаа, 2007).

Later in the early 90s, Mongolia, like other Eastern European and Central Asian countries, adopted a “shock therapy” approach in its economic restructuring process that relied on rapid privatization, price liberalization, removal of trade restrictions, and a reduced role of the government. During the initial years between 1990 and 1993, many industrial enterprises went bankrupt; production fell, and thousands lost their jobs. It was estimated that the real GDP growth rates were negative, with the years of 1991 and 1992 reaching negative 9 percent (Table 2). This led to a dramatic increase in poverty and economic insecurity, and rising income inequality.

As a consequence, many urban residents moved to the countryside to engage in herding. Between 1990 and 1993, the number of herders increased by 136 percent (Griffin, 2003). Although animal husbandry dominated the rural economy and was able to absorb the new labor, the productivity in herding dropped to a subsistence level.

Along with the introduction of market economic reforms in the early 1990's, the control over population movement was relaxed. The new constitution, which came into being in January 1992, stipulated the right to free migration, including travelling and residing abroad. Thus, this period witnessed a pattern of migration from urban to rural; out-migration also occurred in aimag and soum centers as manufacturing sites there were shut down.

The third wave started in 1999 and 2000, when Mongolia was hit by severe dzuds, which killed millions of livestock. Massive rural out-migration started in the wake of the natural disasters and due to other "push" factors such as poor access to markets and information, poor quality of health and education facilities, lack of work opportunities, and environmental degradation in the rural areas. This abruptly reversed the previously dominant urban-to-rural migration trend.

Starting from 2002, macroeconomic conditions improved in Mongolia. Inflation was brought under control; exports accelerated, and the economy gained solid momentum. Table 2 shows that real GDP started to pick up since 2002, with more employment opportunities in the industrial and services sectors in urban areas. The share of agricultural, animal husbandry, and fishing in GDP dropped rapidly, and the annual real GDP growth reached 7 percent in 2003, and 10.6 percent in 2004; it maintained this high growth momentum up to 2007.

From 2002 to 2007, rapid economic growth reinforced the urban-rural income disparity, and this disparity propelled increasingly rapid internal migration. Rural residents migrated to cities, seeking jobs in places where services and amenities were concentrated. Unemployment increased in rural communities, already devastated by the

dissolution of state-owned farms and institutions that had once provided social services, and supported herding and agricultural livelihoods.

For those who migrated into capital city of UB and aimag centers, life has not been easy. Land permission was the first difficulty that new settlers faced. They were most likely to try to pick up unclaimed land and to live in the gers in the outskirts of the city. As the ger districts expanded, they had to move to steep hillsides, into areas at risk of flooding, and even into dumping sites. Most ger areas had little access to the clean water or garbage collection. And people had to rely on wood or coal-burning stoves for cooking and heating, which affected their health condition by thick and toxic smog from the stove (EAP blog, 2009). According to a country assessment of Mongolia (United Nations Country Team, 2005), ger districts produced 80 percent of air pollution, which adversely affected the health of UB city residents.

Many migrants were not able to pay the costly permanent residency permission fee in UB. According to a recent study (Global Research Center, 2009), obtaining registration was a long and costly process for the migrants, and sometimes it could cost 200,000-300,000 Tugrugs.²

Finding a job has been most difficult for immigrants in the capital city, let alone for those who did not possess the registration. According to a study by the Global Research Center (2009), among 21 migrant households surveyed in the capital city, over one third did not have any family members who were employed. Even for those who found a job, the majority of available jobs for migrants were low skilled and low-paid. This economic hardship also affected migrant children. School-aged migrant children

² This is equivalent to 2-3 times of average monthly per capita consumption.

were three times more likely to be out of school than children of long-term residents (NUM of CHIP and Save the Children Fund UK, 2005). In short, life was not secured for many migrants in Ulaanbaatar.

2. Data

The analysis in this paper uses data come from Mongolia's Household Social and Economic Survey (HSES), 2007/08. The HSES 2007/08 is a nationally representative survey carried out by the National Statistical Office (NSO). The sampling frame of the HSES was developed by NSO based on the population of 2005 as derived from local registration offices.³ Three strata were designed in the sampling; capital city of Ulaanbaatar, aimag centers, and rural areas, which include the soum centers. The HSES is considered as an improved version of the Household Income and Expenditure Survey (HIES) conducted in 2002/2003 as several modules from a typical Living Standards Measurement Survey were merged to the previous HIES. It consists of 16 major modules in total: basic socio-economic information about the members of the household, education, health, reproductive health, migration, employment, wage jobs, job search, agricultural and herding, non-farm family businesses, other income, savings and loans, transportation, and energy, durable goods, non-food expenditures, and food consumption. In the migration module, the survey asked each of individuals who were at least 15 years old in the household whether they had migrated and when the migration took place.⁴

³ As population redistribution has been undergoing rapid changes over the last years, and hence the use of 2005 population distribution from the local registration office could be more relevant as opposed to using 2000 census population figures (Castro 2009). It should be noted though even though, more recent sampling framework of 2005 was used, some demographic attributes could be changed between year of 2005 and year of 2007/08 when the survey was fielded.

⁴ This implies that people who migrated twice or more could only be identified once.

While this data set provides good quantitative data to study migration, it is important to note a few limitations that are typical of migration modules in living standard surveys as opposed to a detailed survey of migrants. Pre-migration individual characteristics are limited. The data cannot identify individuals with multiple circular movements, for example, back and forth between urban and rural areas. Therefore, this paper defines “migrants” as those who reported to have migrated to the current place of residence.

3. Migration trends, regional patterns, and reasons for migration

Aggregate migration trends and regional patterns

A total of 10,191 individuals of age 15 or above reported to have migrated to the current place of residence at the time of survey. There are a total of 32,242 respondents who were 15 years old at time of survey, and thus the migrants accounted for 31.6% of population of 15 years old or above.⁵

Figure 1 displays the sample distribution of the number of migrants each year.⁶ The statistics show two clear jumps as discussed in the historical context. One occurred in the 1990, and the other in 2000. In 1990, many people lost their jobs in manufacturing, construction, and public administration as the “shock therapy” economic reform was implemented. They were motivated to migrate in order to find new jobs elsewhere. Then in the period of 1999-2000, when massive winter storms (dzuds) hit

⁵ In the 2000 population census, it was reported that 20.7 percent of the population of all ages lived outside their places of birth, and 5.0 percent returned to their birthplace (Alгаа, 2007, p.4). So migrants accounted for 25.7 percent if these two categories are added together. Since HESE only collects information of migrants who were at least 15 years old at the time of survey whereas 2000 census collected information of population of all ages, we could not make a direct comparison between these two.

⁶ Survey only asked the latest move of each migrant, In fact many migrants made multiple moves, this could have underestimated the magnitude of migration or scale of migration.

many parts of Mongolia, killing millions of livestock, many farmers and herding families fled to cities to seek employment opportunities.

Most migrants were from soum centers and aimag centers. Table 3-1 presents the distribution of in-migrants by place of origin. Among a total of 10,191 out-migrants, 47.7 percent of them were from soum centers, and 6.5 percent of them from rural areas. This makes up a total of 54.2 percent from rural areas. Migrants from aimag centers accounted for 35 percent; in contrast, only 10% of migrants came from capital city.

The regional pattern of in-migrants reveals UB as the most frequent destination. As shown in Table 3-2, nearly half of migrants chose the national capital UB as their destination (49.15 percent). This includes those migrants who moved around within the capital, which accounts for about 2.5 percent (Table 3-3). The Central region was the second important destination, with 22.4 percent of migrants choosing it as their destination. The share of in-migrants heading to the capital has been increasing over the last two decades, reaching 56 percent during 2004-2007, while the share of migrants going to the Central region has been generally declining. The number of migrants heading to the West, East, and High Land has been declining.

Table 3-3 shows the overall distribution of migrants by their place of origin and current place of residence. Of all out-migrants, migration from soum centers/rural to UB accounted for 24 percent; soum/rural to aimag centers migration accounted for 19 percent. Migration within soum/rural area accounted for 11.6 percent, which probably reflects the fact that as soum centers developed, it created job opportunities, absorbing rural residents nearby working in the centers.

The second largest migration flow is the migration from aimag centers to capital city of UB, which accounted for 22.7 percent of total migrants. The number of migration from aimag centers to national capital has been increasing in recent years, with its share in total migration rising from 24.2 percent in 1999-2003 to 27.7 percent in 2004-2007.

In contrast, the share of migration from soum centers/rural to aimag centers declined to 14 percent during the period of 2004-2007 from a high of 20.5 percent during the period of 1999-2003. Thus, this suggests that secondary cities (aimag centers) have been losing attraction to migrants, whereas the population of the capital city has been increasing.⁷

Migration flow statistics according to the year of migration would shed light on the historical context discussed earlier. The literature argues that a large number of urban residents moved back to the rural areas at the onset of Mongolia's economic reforms in the earlier 1990s" (Griffin, 2003). Table 3-4 provides a breakdown of the share of migration flows by year cohort. It suggests that the migration flow from aimag centers to rural areas was relatively more common during the period of 1990-1998 as opposed to other periods. This is consistent with Griffin's argument, but the data does not suggest a strong flow from the capital to rural areas during that period.

Social and demographic characteristics of migrants

There is a gender difference in migration: migrants are slightly more likely to be female than non-migrant. Table 3-5 displays the percentage distribution of migration status by gender for the sample as a whole. The higher percentage for male in the non-

⁷ Population growth is attributed mainly to three factors, fertility, mortality, and migration. Since the level of fertility and mortality remains quite low, and important component of population growth is migration.

migrants category (48.98%) relative to the migration category (43.61%) may be linked to women moving in connection with marriage.⁸

Migrants were likely to be more educated than non-migrants. Table 3-6 shows the percentage distribution of migration status by educational attainment. Compared to non-migrants, more migrants have higher education or vocational education.

To further shed light on the role of education, we consider the migrant's choice of two destinations: rural/soum to secondary cities (aimag centers) and rural to UB. We use the choice model (multi-logit model) to differentiate the role of education on migration to two locations simultaneously: rural to capital city of UB and rural to aimag centers. We present results with two samples: one sample is all the rural migrants who had migrated since 2000 and were at least 30 years old. The other sample is rural migrants as the head of households who were at least 25 years old. We expect that by that age, the migrants by and large had completed their education. The multi-logit regression results (Table 3-7) confirm the positive role of education on migration to both destinations. Furthermore, the role of education appears to be stronger for those rural migrants who headed to UB than for those rural migrants who headed to aimag centers.

Reasons for rural out-migration

While the level of educational attainment is positively associated with upward migration, what is the main reason for moving? The survey data provide us with a unique opportunity to look at this important issue.

⁸ This is further confirmed in the later section where the reasons for migration are discussed. The marriage has been listed as the top reason for migration.

Marriage is listed as the top reason for moving among migrants from rural areas. As in Table 3-8, among the migrants heading to the national capital city of UB, nearly 39 percent of them listed marriage as the top reason, and the percentage is even a little bit higher among the migrants heading to the aimag centers (40.5 percent). This is still the case even within gender (Table 3-9). Among migrants residing in the capital city of UB, 31 percent of males listed marriage as the main reason for migration; among females, 45 percent of them said so. Migrating for marriage could mean for getting married or joining a migrating spouse. The survey does not allow for distinguishing between these two.

For those who chose UB as their destination, the second most frequent reason is education, accounting for 18.7 percent (17 percent among male migrants and 20 percent among female migrants). However, among those who migrated to the aimag centers or those moving within soum center/rural area, work opportunities became the second most frequent reason, for both genders

4. Life of rural-to-urban migrant households in the cities: descriptive findings

4.1 Rural-to-urban migrant households in the cities

In this section, we describe the life of those who migrated from rural area/soum centers into the capital city of UB and aimag centers. Has their life been better or worse as compared to that of families staying in rural areas and to that of local urban residents? We define a migration household as one in which the head of household had migrated to the current place of residence by the time when the survey was conducted.

Let us first look at the sample distribution of households by migration status. Table 4-1 shows that among 11,152 households in the sample,⁹ 7,028 were non-migration households, which account for 63 percent; the rest of 4,124 were migration households, accounting for 37 percent. We further define the types of migration households according to their origin. Out of a total of 4,124 migration households, 56 percent were originally from rural areas (either from soum centers or from rural area), 34 percent from aimag centers and 10 percent from UB.

We further organize the data in Table 4-2 according to the current and original place of residence. Among a total of 3,572 households currently residing in capital city of UB, 27.8 percent of them moved from soum/rural areas, 25.1 percent moved from aimag centers, 2.6 percent migrated within the UB. The local households accounted for 44.4 percent.

Among a total of 2,618 households currently residing in aimag centers, 32.4 percent were from soum/rural areas. Households migrating between the aimag centers accounted for only 8.5 percent. Households moving from capital city of UB to aimag centers were few in number, accounting for only 6.1 percent. A little over half of the households (53%) in aimag centers were reported to be non-movers, which were the local urban residents.

Among a total of 4,962 households currently residing in the soum centers/rural areas, the majority of them (81.7%) were the non-movers. Migrants from capital city of UB and aimag centers together only accounted for 9 percent in total. There were a small

⁹ We do not include 20 households due to misspecifications found in the raw data.

proportion of households (9.6%) migrating between rural area/soum centers, which in fact were the households moving from rural areas to soum centers.¹⁰

4.2 Consumption level and poverty incidence of rural migration households

Table 4-3 shows the weighted headcount poverty rate and monthly per capita consumption by rural migration group. The monthly per capita consumption (column 1) for a rural migration household residing in the capital city of UB was 120,147 tugrugs, but for a local residence in UB, it was 127,627 tugrugs on average.

Life of rural-to-urban migrant families was particularly difficult for those who migrated to aimag centers. Their monthly consumption per capita was 99,842 tugrugs, which was much less than that of those moving to UB (the difference was a little over 20,000 tugrugs). But as compared with the local families in the aimag centers, who had an average of 93,671 tugrugs, the rural migrants residing in the aimag centers still seem to be well off.

Thus, migration has generally improved their living standard. For those who did not migrate and still remained in the rural areas, the consumption level is the lowest, with monthly consumption per capital being 78,197 tugrugs. Life seems to be much improved even for those who migrated even around the rural areas,¹¹ with per capita consumption reaching to 101,549 tugrugs a month. Thus, in Mongolia there are not just regional (UB vs. aimag center vs, soum/rural) income differences; the discrepancy between migrants

¹⁰ Statistics is not shown here, but available upon request.

¹¹ This mainly refers to families who migrated from rural to soum centers.

and non-migrants within the rural area is getting large. In that sense, migration has been a way to reduce the poverty, which bring us to next section on poverty incidence.

To illustrate this point, we further look into the poverty incidence of migrant households in comparison to incidence to other group. We define the poverty threshold at the monthly per capita consumption of 62,494 tugrugs. This is the national poverty line defined by Mongolia Statistical Office.

Findings on the poverty incidence by household type, as shown in column 2 of Table 4-3, are consistent with the findings on consumption level. Among rural migration households residing in UB, 24.3 percent of them were under the poverty line, which is a little bit higher than the rate of 22 percent for the local resident households of UB.

For those rural migration households residing in aimag centers, the percentage under poverty line jumped a lot, reaching as high as 33.2 percent; yet it is still lower as compared to the rate of 37.3 percent for the local residents at the aimag centers.

Among rural migration households residing in the soum and rural areas, 36.3 percent of them lived under this poverty live, whereas for those who did not move, 48 percent of them lived under this poverty line. Thus the percentage was the highest among rural households who did not migrate and remained in the rural areas. These descriptive statistics suggest that migration is generally associated with improved consumption and less chance of falling into poverty¹², an issue that will be analyzed further in Section 5.

¹² One of the dimensions that the literature looks at was the remittance the rural households who left behind received from out-migrants. Survey questionnaire asks whether household received money, goods, and remittance from various sources such as the government, companies and organization, NGOs, relatives, friends and neighbors, foreign and international organizations and foreign individuals. There are only 10.6 percent of rural households reported to receive the money, goods, and remittance from these various sources; and we are not able to separate the remittance from these other sources. Hence we only focus on the loan they obtained.

4.4 Other development indicators:

To broaden the illustration of migrants' livelihoods beyond consumption and poverty statistics, this paper examines several other aspects of development outcomes such as housing conditions and basic infrastructure.

Housing condition

Rural migration families were more likely to live in the ger as compared to the local UB residents. The housing condition of rural migration households is presented in Table 4-4, with particular reference to the percent distribution of living in gers by origin of migration households. About 31 percent of rural migration households lived the ger in the capital city of UB, whereas among local UB households, only 16.3 percent lived in the ger.

The share of living in the ger is much higher among rural migration households in the aimag centers, with nearly 41 percent living in the ger. This proportion is close to that of local families (42.6%). It is still considerably higher as compared to other two types of migration households currently residing in the aimag centers: 22.5 percent for households migrating from capital city, and 18.4 percent for the households migrating from other aimag centers. It should be noted, however, that living in a ger is very common in rural areas and may actually be preferred by rural migrants.

Basic infrastructure for energy and water

On energy, the focus here is on fuels used for heating, particularly with reference to the use of traditional firewood, coal, and dung stove. Smoke from burning these fuels

usually has an adverse effect on health condition of residents. Data in Table 4-5 suggest that among rural migration households in the capital city of UB, 60.5 percent of them used traditional firewood, coal, and dung stove as their heating energy resource, whereas only 47.5 percent of households of local residents used this traditional means for the heating purpose.

In the aimag centers, the incidence of using traditional fuel was even high among rural migration households, reaching 75 percent. This is close to 73 percent among local households. The difference is quite noticeable across different types of migration households. Among those who migrated from UB and other aimag centers, only half of these migration households relied on the traditional firewood or coal or dung stove, which is significantly less than rural migration households.

In Table 4-6, we look at the water supply among the rural migration households, with particular reference to access to water through the means of well, transportation distribution, snow, and river. We define these means as “potable water” as opposed to the water supplied through a modern centralized delivery system.

Among rural migration households residing in the capital city of UB, 69.8 percent had to depend on “potable water”, whereas among local residents only a little over half of them (54.1 percent) had to rely on “potable water”. So there has been a considerable difference. The difference has also been quite profound depending on the origin of migration households, with only 38.3 percent depending on “potable water” among UB-to-UB migration families and 62 percent among aimag-to-UB migration families.

The lack of access to centralized water was quite common among the rural migration households residing in the aimag centers, nearly 80 percent of them accessing

water through these insufficient means, which is close to that of local urban families in aimag centers. Yet, for migration households of other origins such as migrating from other aimag centers, the issue of lack of water access has been less serious.

Thus, those rural migrant families residing in UB are not only likely to live in a ger as compared to the local households, but also more likely to use polluted fuels for heating and less likely to access the central water supply system. Nevertheless, migrant families with urban origin (from UB or from aimag centers) in fact enjoyed better infrastructure services as compared to the local urban families. In particular, among those who migrated between the aimag centers, their consumption level per capita was higher, and poverty incidence was less as compared to the local families. Again, these descriptive statistics suggest that migration may be associated with improved consumption and less chance of falling into poverty.

5. Life of rural-to-urban migrant households in the cities: multivariate analysis

Many factors, aside from migration, may simultaneously influence consumption, poverty, and other indicators of well-being. Therefore, this section employs a multivariate analysis to assess the role of migration while accounting for other factors such as education.

We estimate a model for the sample of those currently live in urban areas, in which the role of migration on various aspects of life is examined. The model uses ordinary least square regression (OLS), which considers the family life of rural migrants as a function of the characteristics of household, a vector of H , and the characteristics of head of household, a vector Z , work status of the head of household, which is W , and

migration status of head of household, which is M_i . The i ranges from 1 to 3, distinguish migration status by origin, which refers the migrants who came from soum/rural, urban, and aimag centers respectively. The omitted group is the local UB residents, the non-migrant group. V is the dependent variable(s), which could be consumption level (in log), poverty incidence, and other non-consumption dimensions of family life. It can be expressed as following formula.¹³

$$V = a_0 + H + Z + W + M_i + e \quad (1)$$

Thus, the coefficient estimated captures the net effort of work status and migration status.

We further try to answer a question of whether work opportunity for the migrant could help them get out the poverty or could help have a better life such as raising per capita consumption level, the likelihood of not living in the ger, or the likelihood of access to the centralized water supply, or the likelihood of using less polluted heating resources.

For these concerns, we create the interaction terms, which is expressed as

$$V = a_0 + H + Z + W + M_i + WM_i + e \quad (2)$$

Thus we compare those migrants who reported working with those migrants who reported not working.

In Table 5.1, we report the role of migration and their work status on the likelihood of falling into poverty while controlling for other factors such as education.

The analysis for the sample of capital city of UB is presented in the first two columns and for the sample of aimag centers in the last two columns.

¹³ However, migration could be an endogenous variable, which is affected by the unobserved factors. Thus, OLS estimation of the function may be subject to simultaneous bias where these unobserved factors in the error term (e) might affect both M and V . To deal with this endogenous issue, we used two-stage least squares regression to correct the bias, with two instrument variables: 1) Most educated (highest year of schooling) in the household; 2) average level of educational attainment. Model does not fit well as indicated by the over-identifying restriction test statistics, yet the sign of coefficients of migration status does not change, which generally supports result of OLS regression. Thus we only present the OLS regression findings for the sake of simplicity.

For those migrating into the UB, the likelihood of falling into poverty was higher among rural migration family and aimag migration family as compared to similar (based on observable characteristics in the model) families of local residence in UB.

Nevertheless, for those aimag migration family whose head had a job, their possibility of falling into poverty will be significantly less. The work status itself is an important predictor, reducing the chance of falling into poverty.

Migration seems to be negatively correlated with the chance of falling into poverty even when accounting for the role of several other characteristics. For those who migrated into the aimag centers from rural/soum areas, their chance of falling below poverty line was less than that of local families residing in the aimag centers although the difference is not significant. For those who migrated into aimag centers from other aimag centers, their chances of falling below poverty line were significantly less.

Since the duration of migration is expected to play an important role in influencing welfare, a similar empirical model accounting for this factor has been tested. The result (available upon request from the author) suggests that the longer the duration of migration, the less likely is the migrant household to be poor. In other words, long-term migrants have higher consumption and lower poverty incidence than recent/short-term migrants, controlling for various observable characteristics. In the data, however, this duration variable and “age of household head” are collinear. And since the age variable provides a better fit of the model (more variation in the outcome variable can be explained by the model), the results presented here show only the age variable.

Similar findings are also found in the analysis of per capita consumption (Table 5-2). The consumption level of rural migration families residing in the UB was significantly

lower as compared to that of local families. However, among those families who migrated into aimag centers, families of rural/soum origin and aimag origin seem to have higher consumption level per capita. Especially for the aimag centers-origin families whose head had job, their consumption level was much higher.

In Table 5-3, we present the likelihood of living in the ger. We use this dependent variable as an alternative way in measuring the poverty. The findings basically confirm what we have found in the analysis of poverty incidence and of consumption per capita. For migration families of rural/soum origin and of aimag centers origin, the likelihood of living in the ger is significantly higher as compared to the families of local residence. However, work status does not help them reduce their chance of not living in ger. This is unlike what have found in the analysis of poverty incidence in which working status helps.

For those migration families residing in the aimag centers, situation was different. Migration families of aimag centers origin was less likely to live in the ger as compared families of local residence. Working status also help families of rural origin as their chance of living in the ger was less if their head of households worked.

In Table 5-4, we examine the likelihood of using polluted fuels for the purpose of heating in the household. The findings are similar to what we have found in the analysis of likelihood of living the ger. For those who moved into UB, both families of rural and aimag centers origin tended to be more likely to use the polluted heating fuels. However, for those families who moved into aimag centers, working status played a role in migration families in reducing the use of polluted fuels; it is particular true among families of rural origin whose head of household had a job.

In Table 5-5, an OLS regression analysis is performed on the water access, which is an interval level dependent variable. A higher score means a greater likelihood of accessing potable water, not the centralized water supply system. A consistent pattern emerges. Among those moving into UB, both families of rural origin and families of aimag origin were less likely to access the centralized water supply system as compared to the local UB families; work status does not help. For those living in the aimag centers, the work status helps, particular among those families who migrated from other aimag centers.

In short, the OLS regression analysis tends to confirm what we have found in the previous descriptive presentation. Rural migrants have faced difficulties in Ulaanbaatar as compared to the local UB residents. Those rural migrant families residing in capital city of UB are not only more likely to be poor than the local households, but so they were also more likely to live in a ger, use polluted fuels for heating and less likely to access to the central water supply system.

6. Summary and discussion

This paper sets out to: (i) document the characteristics of recent internal migration in Mongolia and (ii) assess the livelihoods of rural-to-urban migrants in comparison to those staying in rural areas as well as to local urban residents.

Several findings about the characteristics of recent internal migration in Mongolia are worth noting. Migrants accounted for as high as 31.6 percent among the population of 15 years of age or above, and nearly half of migrants were from soum centers (47.7 percent) and over one third from aimag centers (35 percent). These two categories

account for the majority of movers. Recently, there has been a decline in the number of migrants since the peak of 2000; yet, the share of migrants heading to the Central region and the capital city of UB still increased during 2004-2007. In terms of regional distribution, nearly half of all migrants chose the capital city of UB as their destination; the Central region was listed as the second important destination, with 22.4 percent of migrants choosing it as their destination.

Education is found to be one of significant predictors of migration in Mongolia. Out-migrants from rural areas tend to possess a higher level of education attainment; rural migrants heading to the capital city of UB generally possessed higher educational attainment as compared to those migrating into aimag centers. Women were found to be more likely to migrate than men, and the top reason for migration was marriage.

Assessing the livelihoods of rural-to-urban migrants suggests that rural out-migration may be a way for poverty reduction. The analysis in this paper suggests that rural out-migration is negatively correlated with the chance of falling into poverty. For those who did not migrate from rural areas, their poverty incidence was much higher than rural-to-urban migrants. Furthermore, for those rural migrants who resided in the aimag centers, their chance of falling into poverty line was in fact less as compared to the local residents. They enjoyed a higher level of consumption, and had better chance of access to the centralized water supply system.

Not all urban destinations are equal: there is a large discrepancy in livelihoods between those moving to aimag centers versus those moving the UB. In many aspects, life of rural migrants in aimag centers lagged far behind those in the capital city of UB. The poverty incidence of rural migrant families almost doubled in aimag centers as

compared to families of rural migrant residing in UB. Other development indicators also lagged behind as compared to UB. Thus, aimag centers seem to become less attractive, and people have chosen the capital city of UB as their primary destination.

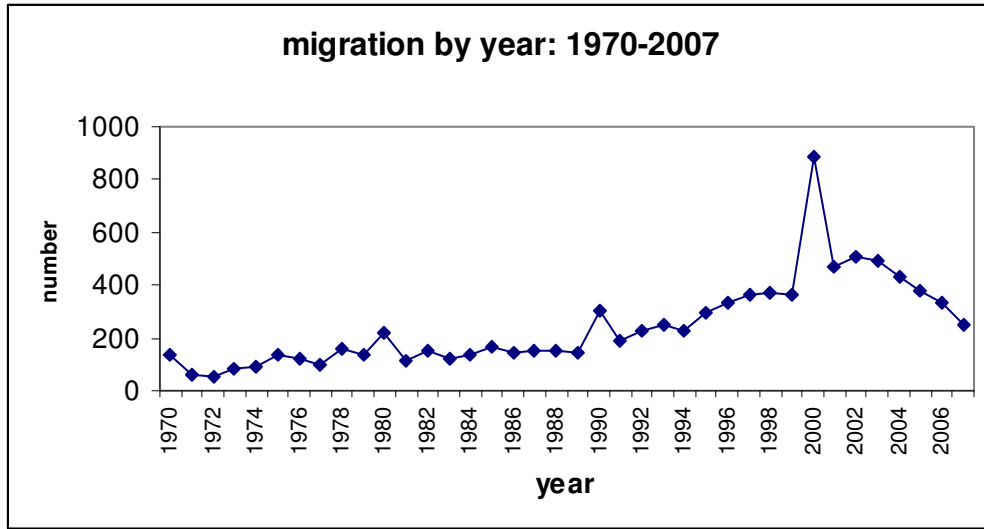
Assessing the livelihoods of rural-to-urban migrants also reveals significant gaps between the life of rural migrants residing in the capital city of UB and that of local UB residents in terms of the consumption level, the incidence of poverty, and several other non-consumption indicators (the likelihood of having a livable housing, the likelihood of having a better water access, and the likelihood of less using polluted heating fuels).

Using a national representative sample data, this study provides a useful diagnosis that could help inform various types of policies in the country. Policies affecting internal migration should take into account the impacts of migration on welfare. The analysis about the large discrepancy in livelihoods between those moving to aimag centers versus those moving the UB could provide inputs into discussions about regionalization policies. Lastly, the detailed empirical evidence about the welfare gaps between migrants to UB and local UB residents would be useful in formulating relevant policies in service provision to reduce these gaps.

The study also raises questions that deserve further investigation to fill knowledge gaps and provide deeper insights into policy. Future research agenda could look at the impacts of multiple moves of migration and the duration of migration in more detail, as well as linkages to sector issues. The availability of quality data on migration is crucial in this process, to improve policy-makers' understanding of migration and potential policy directions. The migration module in the 2007/8 household survey was a step

forward in this direction. Further thoughts into the design of the module would provide high value added to this research agenda.

Figure 1 Sample distribution of migrants by year cohort: 1970-2007



Source: Mongolia HSES 2007/08

Table 1 Urban population growth by region: 1979-2007

Year	1979-89	1989-2000	2000-07
	(in %)		
West region	35.8	-5.0	-2.12
Khanggai	55.2	7.9	0.27
Central region	55.7	5.8	-1.66
East region	41.8	4.4	-1.09
Ulaanbaatar	36.7	44.6	31.11
National	42.7	15.3	9.46

Source: for 1979-2000 data, National Statistical Office 1979, 1989, 2000 Population Census of Mongolia; for 2000-2007 data, National Statistics Office. *Mongolia Statistical Yearbook*, various issues.

Table 2. Macro economic indicators of Mongolia: 1989-2007

Year	GDP Per capita USD (1990 price)	real GDP growth (%)	output of agriculture hunting, fishing in GDP (%)
1989	665	4.2	16
1990	656	-2.5	16
1991	604	-9.2	14
1992	549	-9.5	31
1993	537	-3.0	37
1994	554	2.3	39
1995	595	6.3	39
1996	563	2.4	46
1997	500	4.0	39
1998	459	3.5	40
1999	425	3.2	40
2000	441	1.1	32
2001	470	3.0	28
2002	507	4.7	23
2003	572	7.0	23
2004	710	10.6	25
2005	894	7.3	24
2006	1224	8.6	21
2007	1481	9.9	23

Sources: UNDA database and World Bank DDP Data Base.

Table 3-1. Distribution of migrants by place of origin: 2007/08

Place of origin	frequency	percent
Capital city	1031	10.21
Aimag center	3569	35.02
Soum center	4861	47.69
Rural area	659	6.47
Other	72	0.71
Total	10192	100

Source: Mongolia HSES 2007/08

Table 3-2 Migrants by year of cohort and current place of residence: 2007/08

Region	whole	<1990	1990 -1998	1999 -2003	2004 -2007
(percent in parenthesis)					
n=10192					
West	742 (7.28)	254 (7.18)	205 (8.03)	203 (7.48)	80 (5.76)
High land	1465 (14.37)	465 (13.15)	400 (15.67)	420 (15.48)	180 (12.96)
Central	2285 (22.42)	1061 (30.01)	478 (18.72)	473 (17.43)	273 (19.65)
East	691 (6.78)	251 (7.10)	218 (8.54)	143 (5.27)	79 (5.69)
UB	5009 (49.15)	1505 (42.56)	1252 (49.04)	1475 (54.35)	777 (55.94)
Sample total	10192 (100)	3536 (100)	2553 (100)	2714 (100)	1389 (100)

Source: Mongolia HSES 2007/08

Table 3-3 Migrants flows: 2007/08

Migration flow	freq	percent
Soum center/rural to UB	2457	24.15
Soum center/rural to Aimag center	1942	19.08
Soum center/rural to soum center/rural	1178	11.58
Aimag center to UB	2306	22.66
Aimag center to Aimage center	537	5.28
Aimag center to soum cetentr/rural	725	7.12
UB to UB	248	2.48
UB to Aimage center	397	3.90
UB to soum center/rural	386	3.79
Sample total	10176	100

Source: Mongolia HSES 2007/08

Table 3-4 Migrants by year cohorts: 1932-2007

Migration flow	<1990	1990 -1998	1999 -2003	2004 -2007
(percent in parenthesis)				
n=10176				
soum center/rural to UB	876 (24.82)	494 (19.43)	754 (27.78)	333 (23.97)
soum center/rural to Aimag center	740 (20.96)	451 (17.73)	555 (20.45)	196 (14.11)
soum center/rural to soum center/rural	453 (12.83)	289 (11.36)	280 (10.32)	156 (11.23)
Aimag centers to UB	564 (15.98)	702 (27.61)	656 (24.17)	384 (27.65)
Aimag center to Aimag center	254 (7.20)	167 (6.57)	80 (2.95)	36 (2.59)
Aimage center to soum center/rural	234 (6.63)	216 (8.49)	168 (6.19)	107 (7.70)
UB to UB	64 (1.81)	56 (2.20)	68 (2.51)	60 (4.32)
UB to Aimage center	153 (4.33)	106 (4.17)	79 (2.91)	59 (4.25)
UB to soum center/rural	192 (5.44)	62 (2.44)	74 (2.73)	58 (4.18)
Sample total	3530 (100)	2543 (100)	2714 (100)	1389 (100)

Source: Mongolia HSES 2007/08

Table 3-5 Percentage distribution of migration status by gender: 2007/08

Type of household	whole	non-migrants	migrants
	(n=32242)		
Female	16996 (52.71)	11249 (51.02)	5747 (56.39)
Male	15246 (47.29)	10801 (48.98)	4445 (43.61)
Total	(100)	(100)	(100)
Sample size	32242	22050	10192

Source: Mongolia HSES 2007/08

Note: sample is limited to migrants who were at age 15 or above at the time of survey.

Table 3-6 Percentage distribution of migration status by highest educational certificate obtained: 2007/08

Type of household	whole	non-migrants	migrants
	(n=31267)		
none	4.54	5.25	3.07
primary	13.29	15.29	9.15
secondary	22.68	24.71	18.49
complete secondary	34.32	34.07	34.83
vocational	9.83	7.82	14.00
higher education diploma	7.34	5.58	10.97
bachelor	7.52	6.86	8.88
other	0.48	0.42	0.61
Total	100	100	100
Sample size	31267	21079	10188

Source: Mongolia HSES 2007/08

Note: sample is limited to migrants who were at age 15 or above at the time of survey.

Table 3-7 Multi-logit regression of rural out-migrants who were at least 25 year old on their individual and household characteristics, Mongolia: 2007/08

Variable	all migrants at least 30 years old and migrated in recent 7 years		migrants who were head of HH who at least 25 years old	
	to UB	to Aimage center	to UB	to Aimage center
	(Standard error in parenthesis)			
intercept	-8.966*** (0.455)	-8.409*** (0.447)	-4.414*** (0.200)	-4.326*** (0.196)
individual characteristics				
male	0.014 (0.163)	0.123 (0.167)	-0.801*** (0.125)	-0.221 (0.135)
age at time of migration	0.178*** (0.005)	0.173*** (0.006)	0.128*** (0.004)	0.130*** (0.004)
<u>Education</u> ¹				
Secondary	2.107*** (0.305)	1.830*** (0.296)	1.015*** (0.181)	0.874*** (0.166)
Completed secondary	2.899*** (0.298)	2.251*** (0.290)	1.990*** (0.172)	1.387*** (0.161)
Vocational	2.692*** (0.340)	1.647*** (0.347)	2.420*** (0.186)	1.318*** (0.188)
Higher education diploma	2.660*** (0.428)	1.526*** (0.451)	3.098*** (0.207)	1.744*** (0.215)
Bachelor or higher	3.442*** (0.444)	3.283*** (0.429)	2.953*** (0.266)	2.161*** (0.269)
Household size	0.250*** (0.051)	0.220*** (0.052)	0.071** (0.029)	0.037 (0.030)
Log Likelihood ratio chi-square		1980		4450
n		7061		6,120

Source: Source: Mongolia HSES 2007/08

1. Reference group is primary school or less.

***P<0.01

**<0.05

*<0.10

Table 3-8 Percentage distribution of reasons for rural out-migration by destination: 2007/08

Reasons	destination		
	UB	Aimage centers	Soum center/rural
Work	9.44	13.18	18.34
Job search	9.44	11.64	6.79
Marriage	38.83	40.47	49.75
Health of family	1.67	2.57	0.34
Education	18.72	7.42	2.38
Live near to the market	9.61	12.05	5.35
Live near to relatives	10.70	9.99	13.50
Be occupied with herding	0.00	0.46	1.78
Other	1.59	2.21	1.78
total	100	100	100
Sample size	2457	1942	1178

Source: Mongolia HSES 2007/08

Table 3-9 Percentage distribution of reasons for rural out-migration by destination and gender: 2007/08

Reasons	male			female		
	UB	Aimag center	Soum center/ rural	UB	Aimag center	Soum center/ rural
Work	14.42	16.16	25.88	5.53	10.66	13.09
Job search	10.81	13.80	8.28	8.36	9.80	5.76
Marriage	30.96	32.10	36.44	45.02	47.57	58.99
Health of family	1.66	2.81	0.41	1.67	2.36	0.29
Education	17.28	6.62	1.66	19.85	8.09	2.88
Live near to the market	12.11	14.70	6.21	7.64	9.80	4.75
Live near to relatives	10.54	10.44	15.73	10.84	9.61	11.94
Be occupied with herding	0.00	0.67	2.69	0	0.29	1.15
Other	2.22	2.69	2.69	1.09	1.81	1.15
total	100	100	100	100	100	100
Sample size	1082	891	483	1375	1051	695

Source: Mongolia HSES 2007/08

Table 4-1 Distribution of households by migration status of head of household: 2007/08

Migration status	number	percent
Non-migration	7028	63.02
Migration	4124	36.98
Total	11152	100
<u>Origin</u>		
Soum center/rural areas		56
Aimag center		34
Capital UB		10
Total		100

Source: Mongolia HSES 2007/08

Table 4-2 Distribution of households by current place of residence and origin place of residence of head of household: 2007/08

Current place of residence and origin	number	percent
<u>Current place of residence, UB</u>		
Soum center/rural to UB	994	27.83
Aimag center to UB	897	25.11
UB to UB	94	2.63
Local resident	1587	44.43
subtotal	3572	100
<u>Current place of residence, aimag center</u>		
Soum center/rural to Aimag center	848	32.39
Aimag center to Aimag center	223	8.52
UB to Aimage centers	160	6.11
Local resident	1387	52.98
subtotal	2618	100
<u>Current place of residence: rural</u>		
Soum center/rural to soum center/rural	477	9.61
Aimag center to soum center/rural	275	5.54
UB to soum center/rural	156	3.14
Local resident	4054	81.70
subtotal	4962	100
total	11152	

Source: Mongolia HSES 2007/08

Table 4-3 Weighted Headcount Poverty Rate and Monthly Per Capita Consumption by Rural Migrants, Mongolia: 2007/08

migration status	monthly per capita consumption (tugrugs)	headcount poverty rate (%)
Soum/rural to UB	120,147	24.3
UB local resident	127,627	22.0
Soum/rural to Aimag	99,842	33.2
Aimag local resident	93,671	37.3
Soum/rural to Soum/rural	101,549	36.3
Stayer (Soum/rural)	78,197	48.0

Source: Mongolia HSES 2007/08

Table 4-4 Percentage distribution of household dwelling type by current place of residence and origin of place of head of household: 2007/08

Dwelling type	<u>Origin of place</u>			<u>local resident</u>
	soum center/ rural	aimag center	UB	
<u>Current place of residence</u>				
Capital city of UB (n=3572)				
ger	30.68	27.31	11.70	16.26
detached house	30.78	36.57	47.87	44.93
separate apartment	37.93	35.56	40.43	38.25
others	0.60	0.56	0	0.57
total	100	100	100	100
sample	944	897	94	1587
Aimag Centers (n=2618)				
ger	40.57	18.39	22.50	42.61
detached house	20.52	44.39	40.63	20.69
separate apartment	38.44	37.22	35.63	35.69
others	0.47	0	1.25	1.01
total	100	100	100	100
sample	848	223	160	1387
Soum centers and Rural area (n=4962)				
ger	48.43	41.09	34.62	76.34
detached house	13.00	26.18	23.08	2.89
separate apartment	37.32	31.64	41.67	20.45
others	1.26	1.09	0.64	0.32
total	100	100	100	100
sample	477	275	156	4054

Source: Mongolia HSES 2007/08

Table 4-5 Percentage distribution of sources for household heating system by current place of residence and origin of place of head of household: 2007/08

Heating type	Origin of place			local resident
	soum center/ rural	aimag center	UB	
Current place of residence				
capital city of UB (n=3572)				
centralized	37.83	42.25	62.77	50.85
traditional fire wood/coal/dung stove	60.46	56.52	37.23	47.45
private heaters/boilers/others	1.71	1.23	0	1.70
total	100	100	100	100
sample	944	897	94	1587
Aimag Centers (n=2618)				
centralized	24.65	48.88	48.75	25.74
traditional fire wood/coal/dung stove	74.88	50.22	51.25	72.46
private heaters/boilers/others	0.47	0.90	0	1.80
total	100	100	100	100
sample	848	223	160	1387
Soum centers and Rural area (n=4982)				
centralized	14.26	27.64	24.36	4.71
traditional fire wood/coal/dung stove	84.07	68.73	72.44	91.54
private heaters/boilers/others	1.68	3.64	3.21	3.75
total	100	100	100	100
sample	477	275	156	4054

Source: Mongolia HSES 2007/08

Table 4-6 Percentage distribution of household water supply by current place of residence and origin of place of head of household: 2007/08

Water supply type	<u>Origin of place</u>			<u>local resident</u>	
	soum center/ rural	aimag center	UB		
<u>Current place of residence</u>					
capital city of UB	(n=3572)				
centralized	30.18	38.02	61.70	45.87	
well	18.81	16.61	8.51	19.34	
transportation distribution, snow, river	51.01	45.37	29.79	34.78	
total	100	100	100	100	
sample	944	897	94	1587	
Aimag Centers	(n=2618)				
centralized	19.81	45.29	46.25	20.26	
well	35.02	14.80	26.88	35.04	
transportation distribution, snow, river	45.17	39.91	26.88	44.70	
total	100	100	100	100	
sample	848	223	160	1387	
Soum centers and Rural area	(n=4962)				
centralized	9.22	22.18	23.08	2.24	
well	60.38	46.91	48.72	48.00	
transportation distribution, snow, river	30.40	30.91	28.21	49.75	
total	100	100	100	100	
sample	477	275	156	4054	

Source: Mongolia HSES 2007/08

Table 5-1 Migration and the likelihood of falling into poverty: logistic regression result, 2007/08: Mongolia

Predictors	<u>UB household sample</u>		<u>aimag center household sample</u>	
	model 1	model 2	model 1	model 2
	(standard error in parenthesis)			
Intercept	-2.167*** (0.290)	-2.289*** (0.300)	-0.684** (0.283)	-0.695** (0.289)
Head of Household (male=1)	-0.3173* (0.189)	-0.3016** (0.190)	-0.271 (0.194)	-0.268 (0.195)
<u>Migrants by origin</u> ¹				
Rural	0.208* (0.122)	0.391** (0.186)	-0.084 (0.106)	-0.089 (0.178)
Aimag center	0.169 (0.128)	0.431** (0.196)	-0.425** (0.201)	-0.161 (0.405)
UB	0.164 (0.355)	0.509 (0.572)	0.140 (0.215)	0.321 (0.405)
<u>Education of ead of HH</u> ²				
Secondary	0.466** (0.213)	0.460** (0.214)	-0.132 (0.164)	-0.141 (0.164)
Complete secondary	-0.152 (0.196)	-0.174 (0.198)	-0.714*** (0.162)	-0.724*** (0.163)
Vocational school	-0.699*** (0.221)	-0.727*** (0.222)	-1.031*** (0.197)	-1.041*** (0.197)
Degree of higher education	-1.599*** (0.236)	-1.620*** (0.237)	-2.062*** (0.226)	-2.073*** (0.226)
<u>Age of head of HH</u> ³				
35-44	-0.010 (0.144)	0.002 (0.144)	-0.154 (0.131)	-0.153 (0.131)
45-54	-0.403** (0.158)	-0.401** (0.158)	-0.602*** (0.145)	-0.600*** (0.145)
55 or above	-0.632*** (0.188)	-0.663*** (0.190)	-0.437*** (0.175)	-0.444** (0.176)
<u>Marital status of head of HH</u> ⁴				
Married	-0.251 (0.235)	-0.263 (0.235)	-0.552** (0.257)	-0.552** (0.258)
Widow	-0.001 (0.217)	0.002 (0.217)	-0.711*** (0.248)	-0.716*** (0.249)
Never married	0.210 (0.280)	0.194 (0.280)	0.071 (0.284)	0.069 (0.284)
Household size	0.436*** (0.029)	0.438*** (0.029)	0.457*** (0.034)	0.456*** (0.034)
Work (yes=1)	-0.591*** (0.119)	-0.3767** (0.167)	-0.541*** (0.117)	-0.509*** (0.049)
<u>Interaction term</u>				
UB migrant*work		-0.5543 (0.732)		-0.250 (0.476)
Rural migrant*work		-0.3153 (0.245)		0.008 (0.220)
Aimag center migrant*work		-0.4535* (0.260)		-0.402 (0.419)
Financial supports Received	-0.408*** (0.117)	-0.403*** (0.117)	-0.191 (0.114)	-0.191 (0.120)
-2 Log Likelihood	2587	2583	2697	2696
N	3572	3572	2618	2618

1. Reference group is family of local residence.
2. Reference group is primarily education or less.
3. Reference group is age under 35.
4. Reference group is devious.

***p<0.01,**P<0.05,*P<0.10

Table 5-2 Migration and consumption per capita: OLS regression result, 2007/08: Mongolia

Predictors	<u>UB household sample</u>		<u>aimag center household sample</u>	
	model 1	model 2	model 1	model 2
	(standard error in parenthesis)			
Intercept	11.898*** (0.056)	11.917*** (0.058)	11.223*** (0.065)	11.233*** (0.066)
Head of Household (male=1)	0.004 (0.033)	0.004 (0.033)	0.039 (0.041)	0.038 (0.041)
<u>Migrants by origin</u> ¹				
Rural	-0.051** (0.023)	-0.093** (0.036)	0.046* (0.024)	0.039 (0.041)
Aimag center	-0.028 (0.023)	-0.048 (0.039)	0.129*** (0.039)	0.011 (0.071)
UB	0.076 (0.058)	0.071 (0.110)	0.058 (0.045)	-0.061 (0.092)
<u>Education of head of HH</u> ²				
Secondary	-0.171*** (0.047)	-0.174*** (0.047)	0.052 (0.039)	0.058 (0.039)
Complete secondary	-0.009 (0.041)	-0.010 (0.041)	0.200*** (0.038)	0.256*** (0.038)
Vocational school	0.116*** (0.044)	0.117*** (0.044)	0.284*** (0.044)	0.289*** (0.043)
Degree of higher education	0.388*** (0.042)	0.388*** (0.042)	0.484*** (0.042)	0.491*** (0.042)
<u>Age of head of HH</u> ³				
35-44	0.071** (0.026)	0.069*** (0.026)	0.053* (0.030)	0.052* (0.029)
45-54	0.115*** (0.028)	0.114*** (0.028)	0.138*** (0.031)	0.136*** (0.031)
55 or above	0.081** (0.033)	0.085** (0.033)	0.076** (0.038)	0.080** (0.038)
<u>Marital status of head of HH</u> ⁴				
Married	0.067 (0.041)	0.067 (0.041)	0.272*** (0.056)	0.271*** (0.056)
Widow	0.005 (0.040)	0.006 (0.040)	0.284*** (0.054)	0.287*** (0.054)
Never married	0.080 (0.049)	0.081 (0.049)	0.185*** (0.063)	0.185*** (0.063)
Household size	-0.145*** (0.005)	-0.145*** (0.005)	-0.134*** (0.007)	-0.134*** (0.007)
Work (yes=1)	0.140*** (0.023)	0.114*** (0.031)	0.135*** (0.027)	0.112*** (0.033)
<u>Interaction term</u>				
UB migrant*work		0.009 (0.130)		0.156 (0.105)
Rural migrant*work		0.068 (0.046)		0.009 (0.050)
Aimag center migrant*work		0.031 (0.048)		0.165** (0.084)
Financial supports Received	0.100*** (0.020)	0.099*** (0.020)	0.099*** (0.026)	0.101*** (0.026)
R-square	0.3053	0.3057	0.2296	0.2313
N	3572	3572	2618	2618

1.Reference group is family of local residence.

2.Reference group is primarily education or less.

3.Reference group is age under 35.

4.Reference group is devided.

***p<0.01, **P<0.05, *P<0.10

Table 5-3 Migration and the likelihood of living in ger: logistic regression result, 2007/08: Mongolia

Predictors	<u>UB household sample</u>		<u>aimag center household sample</u>	
	model 1	model 2	model 1	model 2
	(standard error in parenthesis)			
Intercept	-0.587** (0.243)	-0.692*** (0.255)	0.989*** (0.261)	0.899*** (0.267)
Head of Household (male=1)	-0.374** (0.154)	-0.370** (0.254)	0.053 (0.169)	0.043 (0.169)
<u>Migrants by origin</u> ¹				
Rural	0.879*** (0.105)	1.064*** (0.172)	-0.195** (0.096)	0.043 (0.163)
Aimag center	0.822*** (0.108)	0.995*** (0.183)	-1.039*** (0.189)	-1.021*** (0.332)
UB	-0.015 (0.338)	0.095 (0.649)	-0.724*** (0.206)	-0.824** (0.419)
<u>Education of ead of HH</u> ²				
Secondary	-0.019 (0.183)	-0.023 (0.184)	-0.371** (0.153)	-0.362** (0.153)
Complete secondary	-0.560*** (0.167)	-0.573*** (0.168)	-1.028*** (0.151)	-1.026*** (0.151)
Vocational school	-1.111*** (0.186)	-1.128*** (0.188)	-1.372*** (0.177)	-1.365*** (0.178)
Degree of higher education	-1.957*** (0.190)	-1.969*** (0.191)	-2.074*** (0.185)	-2.075*** (0.185)
<u>Age of head of HH</u> ³				
35-44	-0.321 (0.118)	-0.314*** (0.118)	-0.160 (0.119)	-0.155 (0.120)
45-54	-0.649** (0.130)	-0.648*** (0.130)	-0.254** (0.128)	-0.246* (0.128)
55 or above	-0.733*** (0.157)	-0.761*** (0.159)	-0.093 (0.155)	-0.112 (0.156)
<u>Marital status of head of HH</u> ⁴				
Married	-0.094 (0.195)	-0.089 (0.195)	-0.242 (0.228)	-0.230 (0.228)
Widow	0.151 (0.184)	0.148 (0.185)	-0.143 (0.221)	-0.134 (0.221)
Never married	0.158 (0.228)	0.150 (0.228)	0.065 (0.255)	0.071 (0.256)
Household size	0.086*** (0.024)	0.087*** (0.024)	-0.029 (0.028)	-0.017 (0.028)
Work (yes=1)	0.087 (0.106)	0.256 (0.159)	-0.014 (0.108)	0.097 (0.131)
<u>Interaction term</u>				
UB migrant*work		-0.163 (0.760)		0.123 (0.480)
Rural migrant*work		-0.290 (0.214)		-0.360* (0.199)
Aimag center migrant*work		-0.260 (0.225)		-0.022 (0.402)
Financial supports Received	-0.326*** (0.097)	-0.323*** (0.097)	0.095 (0.106)	0.100 (0.106)
-2 Log Likelihood	3420	3418	3180	3177
N	3572	3572	2618	2618

1. Reference group is family of local residence.

2. Reference group is primarily education or less.

3. Reference group is age under 35.

4. Reference group is deoived.

***p<0.01, **P<0.05, *P<0.10

Table 5-4 Migration and the likelihood of using polluted energy resources for heating: logistic regression result, 2007/08: Mongolia

Predictors	<u>UB household sample</u>		<u>aimag center household sample</u>	
	model 1	model 2	model 1	model 2
	(standard error in parenthesis)			
Intercept	-0.083 (0.219)	-0.024 (0.225)	1.314*** (0.292)	1.131*** (0.299)
Head of Household (male=1)	-0.227* (0.130)	-0.227* (0.139)	0.186 (0.184)	0.154 (0.185)
<u>Migrants by origin¹</u>				
Rural	0.542*** (0.092)	0.375*** (0.144)	0.050 (0.106)	0.525*** (0.195)
Aimag center	0.493*** (0.092)	0.425*** (0.153)	-0.820*** (0.156)	-0.440 (0.292)
UB	-0.134 (0.235)	0.438 (0.434)	-0.714*** (0.180)	-1.047*** (0.373)
<u>Education of ead of HH²</u>				
Secondary	0.467** (0.186)	0.461** (0.186)	0.060 (0.195)	0.084 (0.196)
Complete secondary	0.088 (0.159)	0.086 (0.159)	-0.619*** (0.179)	-0.609*** (0.180)
Vocational school	-0.488*** (0.169)	-0.488*** (0.169)	-0.816*** (0.197)	-0.797*** (0.198)
Degree of higher education	-1.414*** (0.163)	-1.416*** (0.163)	-1.693*** (0.188)	-1.690*** (0.189)
<u>Age of head of HH³</u>				
35-44	-0.184* (0.105)	-0.184* (0.105)	-0.023 (0.127)	-0.019 (0.127)
45-54	-0.263** (0.111)	-0.265** (0.111)	0.103 (0.136)	0.110 (0.137)
55 or above	-0.198 (0.132)	-0.177 (0.132)	0.199 (0.164)	0.155 (0.165)
<u>Marital status of head of HH⁴</u>				
Married	0.118 (0.163)	0.116 (0.163)	-0.401 (0.249)	-0.365 (0.251)
Widow	-0.062 (0.184)	-0.053 (0.158)	-0.140 (0.240)	-0.111 (0.241)
Never married	-0.013 (0.197)	-0.015 (0.197)	-0.029 (0.275)	-0.017 (0.276)
Household size	0.161*** (0.023)	0.159*** (0.023)	0.119*** (0.033)	0.124*** (0.033)
Work (yes=1)	0.143 (0.191)	0.065 (0.123)	0.100 (0.117)	0.315** (0.145)
<u>Interaction term</u>				
UB migrant*work		-0.798 (0.518)		0.410 (0.425)
Rural migrant*work		0.281 (0.183)		-0.682*** (0.231)
Aimag center migrant*work		0.100 (0.190)		-0.535 (0.344)
Financial supports Received	-0.262*** (0.081)	-0.266*** (0.081)	-0.467*** (0.109)	-0.458*** (0.109)
-2 Log Likelihood	4377	3471	2902	2890
N	3572	3572	2618	2618

1. Reference group is family of local residence.

2. Reference group is primarily education or less.

3. Reference group is age under 35.

4. Reference group is devoiced.

***p<0.01, **P<0.05, *P<0.10

Table 5-5 Migration and the water access: OLS regression result, 2007/08: Mongolia

Predictors	<u>UB household sample</u>		<u>aimag center household sample</u>	
	model 1	model 2	model 1	model 2
	(standard error in parenthesis)			
Intercept	2.996*** (0.170)	3.020*** (0.175)	4.479*** (0.178)	4.438*** (0.183)
Head of Household (male=1)	-0.115 (0.099)	-0.112 (0.099)	-0.088 (0.114)	-0.099 (0.114)
<u>Migrants by origin</u> ¹				
Rural	0.589*** (0.070)	0.494*** (0.111)	-0.006 (0.065)	0.073 (0.113)
Aimag center	0.427*** (0.070)	0.449*** (0.117)	-0.443*** (0.107)	-0.164 (0.197)
UB	-0.151 (0.077)	0.195 (0.334)	-0.666*** (0.123)	-0.755*** (0.253)
<u>Education of ead of HH</u> ²				
Secondary	0.178 (0.141)	0.168 (0.141)	0.017 (0.108)	0.016 (0.108)
Complete secondary	-0.045 (0.125)	-0.054 (0.125)	-0.166*** (0.105)	-0.170 (0.105)
Vocational school	-0.362*** (0.134)	-0.370*** (0.134)	-0.572*** (0.120)	-0.573*** (0.120)
Degree of higher education	-1.357*** (0.127)	-1.363*** (0.127)	-1.062*** (0.115)	-1.066*** (0.116)
<u>Age of head of HH</u> ³				
35-44	-0.173** (0.080)	-0.172** (0.080)	-0.010 (0.081)	-0.009 (0.081)
45-54	-0.243*** (0.084)	-0.244** (0.084)	0.052 (0.086)	0.055 (0.086)
55 or above	-0.251** (0.101)	-0.241** (0.101)	0.224** (0.103)	0.214** (0.104)
<u>Marital status of head of HH</u> ⁴				
Married	0.079 (0.124)	0.076 (0.124)	-0.382** (0.155)	-0.368** (0.155)
Widow	0.011 (0.121)	0.017 (0.121)	-0.613*** (0.150)	-0.609*** (0.150)
Never married	-0.121 (0.150)	-0.125 (0.150)	-0.436** (0.175)	-0.436** (0.175)
Household size	0.125*** (0.017)	0.124*** (0.017)	0.007*** (0.019)	0.007 (0.019)
Work (yes=1)	0.110 (0.069)	0.089 (0.095)	-0.067 (0.073)	-0.006** (0.091)
<u>Interaction term</u>				
UB migrant*work		-0.478 (0.393)		0.110 (0.289)
Rural migrant*work		0.160 (0.140)		-0.116 (0.137)
Aimag center migrant*work		-0.036 (0.146)		-0.394* (0.233)
Financial supports Received	-0.241*** (0.062)	-0.243*** (0.062)	-0.404*** (0.071)	-0.403*** (0.071)
R-square	0.174	0.175	0.108	0.109
N	3572	3572	2617	2617

1.Reference group is family of local residence.

2.Reference group is primarily education or less.

3.Reference group is age under 35.

4.Reference group is devoiced.

***p<0.01,**P<0.05,*P<0.10

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