LABOR FORCE PARTICIPATION AND EARNINGS IN MONGOLIA[1]

Altantsetseg Batchuluun[2], National University of Mongolia
Bayarmaa Dalkhjav[3], National University of Mongolia

The First Draft was submitted on 20 December 2012
The Last Draft was submitted on 04 March 2014

Abstract

Although, there are many interesting phenomena in the labor market, it is one of the least studied areas of Mongolian economy. Most of the existing literature is limited by reports on surveys conducted by National Statistical Office and International Labor Organization. While these reports provide useful insights into the overall labor market performance in Mongolia, they suffer from the usual aggregation bias and do not control for individual level effects considered in this analysis. The study shows in recent years, the labor force participation rate has decreased significantly. Moreover, if we convert returns to education into schooling years, one more year of schooling raises wage rate by about 10 percent.

Keywords: Labor Supply, Labor Participation, Earnings.

[1] Altantsetseg Batchuluun and Bayarmaa Dalkhjav are thankful to ERI, NUM for financially supporting this research. Authors are also thankful to the participants of the 2nd economic research forum in Ulaanbaatar, Mongolia.
[2] Department of Economics, National University of Mongolia, Ulaanbaatar, Mongolia. E-mail: altantsetseg.b@num.edu.mn
[3] Department of Economics, National University of Mongolia, Ulaanbaatar, Mongolia. E-mail: dbayarmaa@num.edu.mn

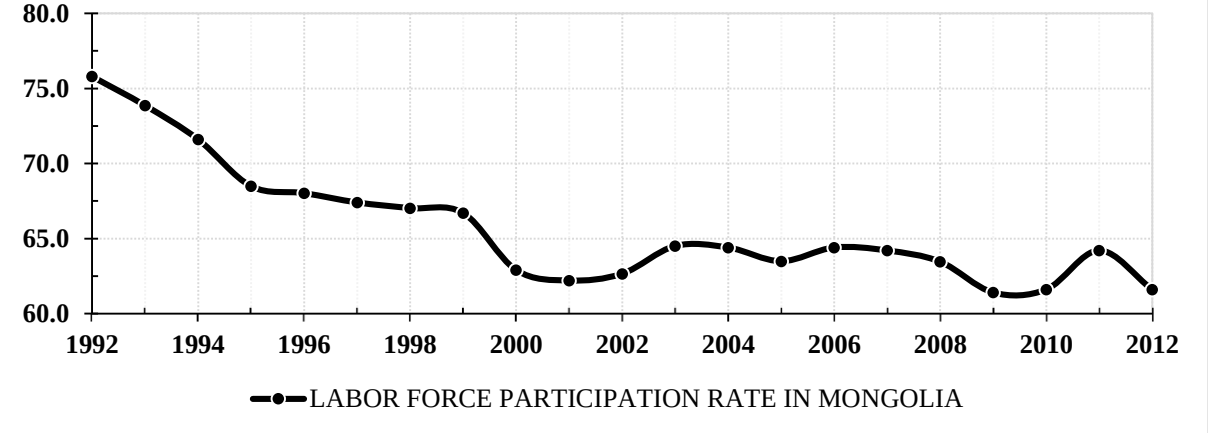
1. Introduction

This paper analyzes the individual level determinants of labor force participation and earnings in Mongolia, based on data from the Labor Force Surveys (2002-2003, 2007-2008, 2010), conducted by the National Statistical Office.

Mongolia is a rapidly growing transition country with small population of over 2.7 million. In 2012, economic growth rate was a record high 17.3 percent. Mongolia experienced a rapid population growth higher than 2.5 percent, between 1956 and 1990. Due to this high population growth, it has experienced a demographic window for three decades and a share of working age population has increased over 30 years until 2010. According to the Population Census 2010, working age population is 1.9 million and its share in population is 72.7 percent. Mongolia benefited from this rapid growth during the Socialist Regime as it is a favorable period for economic growth. Unfortunately, Mongolia has not benefitted substantially from the last decade of the demographic window due to the transition process. Since 1990, population growth rate has fallen to the annual rate of 1.4 percent. For a rapidly growing country with small population, labor is an important issue in Mongolia.

Mongolia was characterized by highly active participation in the previous socialist regime due to employment policy of "every person should be employed". However, during the transition period between 1991 and 2001 the participation rate has dropped sharply from 87 percent to 62 percent (Figure 1).

FIGURE 1 LABOR FORCE PARTICIPATION RATE IN MONGOLIA



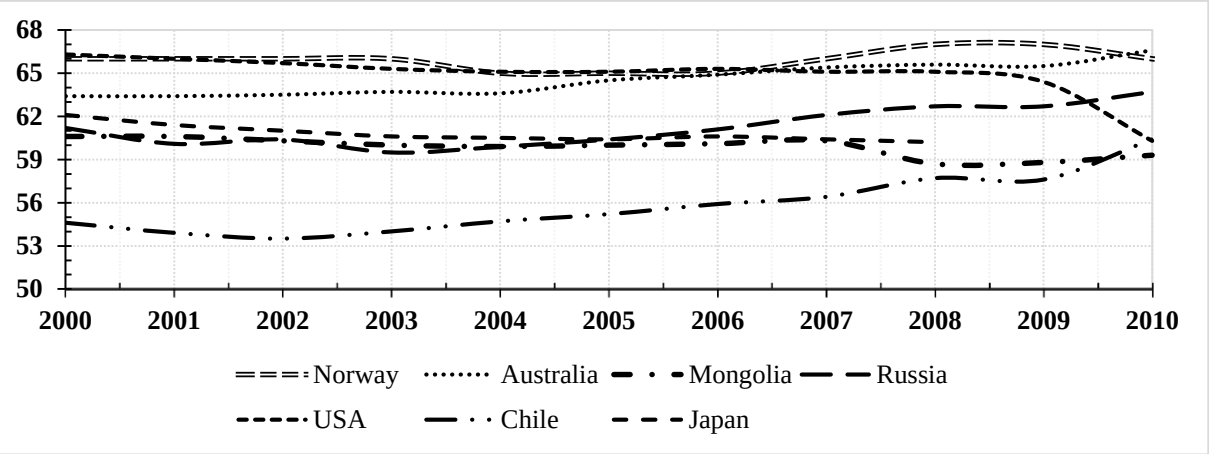
Sources: *WDI database, World Bank*

Over the last decade, participation rate has remained relatively low, fluctuating between 61.4percent in 2009 to 64.5 percent in 2003.

According to the National Statistical Office, the labor-force participation rate was at its historically low level of 62percent in 2010. The labor force participation rate (LFPR) was 62 percent in 2000 as reported in the Population Census Report by NSO. However, Population Census 2010 reported LFPR to be 56.4 percent, which was 5.6 percentage points lower than the level in 2000. This falling trend in LFPR was common across urban and rural area.

In order to do a cross-country comparison, we use World Development Indicators (WDI) database. According to WDI data, labor force participation has been relatively stable over the last 10 years and the participation rate was 59.3 percent in 2010 (Figure 2). In 2010, the world LFPR was 64.2 percent and median LFPR was 64 percent. Mongolia has LFPR lower than in Russia, Canada, Chile, China, Norway, Great Britain and South Korea.

FIGURE 2 LABOR FORCE PARTICIPATION IN SELECTED COUNTRIES, 2000-2010



Sources: *World Development Indicators Data, World Bank*

Russia is an interesting country to compare with as it is a transition country like Mongolia. Until 2005, Russia and Mongolia had similar LFPR of around 60 percent. However, Russia has experienced an increasing participation rate in recent years, while Mongolia has experienced stable or even lower LFPR. In 2010, the difference in LFPR between these two countries reached 4.4 percent. Australia, Norway, Chile and Mongolia are the countries, where mining sector plays important role in economy. In recent years, Australia, Norway and Chile had increasing trend in their participation rate, while Mongolia had constant or even lower participation rate.

One of the key factors, which influence in labor supply and demand, is state policies and regulations. Policies and regulations influence demand and supply of the labor market directly and indirectly[4]. In recent years, there have been substantial changes in labor policies and regulations, especially, in labor promotion policy as the government has started to pay a special attention to labor market issues.

The law on unemployment benefit paid by the social security fund was adopted on July 05, 1994. According to the law, usual duration for unemployment benefit is 76 days. However, from August 1, 2009 to January 01, 2011 the law extended the duration to 126 days in accordance with economic crisis. In 2008, Mongolia has adopted the Millennium Development Goal Based Comprehensive National Development Strategy. According the strategy, the government set goals to increase labor force participation to 70percent in 2015 and to decrease youth unem-ployment (aged 15-24) to 2.5 percent. In 2010, the Law on the Minimum Wage was adopted[5]. According to the law, a national labor and social agreement committee of three parties shall set the minimum wage. Currently, the minimum wage is 196500 tugrug (approximately 140 USD), which was renewed on April 11, 2013. Figure 1B in Appendix B presents minimum wage dynamics. In 2011, the law on labor promotion was adopted and it denies labor promotion activities such as labor promotion trainings, small loans with low interest rate, public work pro-gram and their funding. Moreover, since 2005, the Government of Mongolia has expanded social welfare programs and has implemented series of cash transfer policies worth of billions of Mongolian tugrugs (MNT) such as Child money (2005-2009), Allowances for newly married couples (2006-2010), Allowances for new born babies (2006-

[4] Main laws that regulate Mongolian labor relations are “Law on Labor”, “Law on the Minimum Wage”, “Law on Unemployment Bene.t Paid by Social Security Fund” and “Law on Labor Promotion”.
[5] Until 2010, the government used to set the minimum wage.

2010), Cash transfers to all citizens from Human Development Fund (2010-2012) and so on. However, in the latest national report on Millennium Development Goals' Implementation in Mongolia 2012, the government mentioned a slow progress towards these goals.

FIGURE 3 REAL WAGE

Source: *Statistical Yearbooks, NSO*

Figure 3 shows real wage in Mongolia. The real wage has increased sharply in recent years. In 2012, the real wage was 2.7 times higher than in 2002. The aggregate labor force participation has remained relatively constant over the last 10 years despite the major policy changes on the labor market and wage increases. Hence, it is important to do micro analysis and to study the individual level effects on this decrease and the expected dynamics of the labor-force participation rate. Although, there are many interesting phenomena in labor market of Mongolia, it is one of the least studied areas of Mongolian economy. Currently, there are labor data from surveys conducted by various institutions such as National Statistical Office (NSO), International Labor Organization (ILO), etc. NSO publishes reports on its labor force surveys. We will estimate the determinants of employment and earnings in Mongolia using labor force data.

Many studies have been conducted on labor force participation and labor supply of male and female, especially in USA. Mincer (1962), Heckman (1974) studies labor supply of married women and Juhn (1992) studies male labor market participation and Juhn and Potter (2006) conducts a literature review on labor force participation study. Incentive effects of welfare policies on labor supply are well known. In particular, a simple static labor supply model implies that cash transfer policies reduce labor hours of an agent with low income and empirical studies support this argument. According to Moffitt (1992), the econometric studies show that labor supply is reduced by cash transfer policies such as Aid to Families with Dependent Children and Food Stamp Programs in USA.

On the other hand, there is a little, but growing, literature on the labor markets of developing and transition countries. Li and Zax (2003) studied labor market structure and trends of China based on the two large-scale surveys conducted in 1989 and 1995. They did descriptive analysis of broad range of labor related issues such as labor force participation, working hours, wages, secondary employment, unemployment, labor training and etc. Maurer-Fazio, Hughes and Zhang (2005) studied LFP in China based Chinese Population Census Data for 1982, 1990, 2000. They analyzed the data by disaggregating by age cohort, marital status, gender and rural/urban location. Disaggregation provided marked changes in labor force participation over the time period. As another country in the process of transition, Noorkoiv and others (1997) studies marginal returns to education in Estonia. They applied a standard Mincerian log wage

function to evaluate return to human capital, in particularly, education and experience, in Estonia.

However, there is a lack of researches on labor force participation in Mongolia. Most of the existing literature is limited by reports on surveys conducted by NSO and ILO. While these reports provide useful insights into the overall labor market performance in Mongolia, they su.er from the usual aggregation bias and do not control for individual level effects considered in this analysis. In 2010, Banzragch (2010) studied education and labor market in Mongolia and Tajikistan. Return to schooling in Mongolia was estimated using data from the Living Standard Measurement Survey 2003. She has studied the links between education and earnings in Mongolia and estimated return to education was 5.6 percent to 6.5 percent for wage earners. According to the study, higher participation was associated with higher education.

Section 2 discusses labor supply model and estimation methodology. In section 3, we describe data. In section 4, we present estimation results. Concluding comments are in section 5.

2. Labor supply model

In this research, we closely follow the labor supply model presented in Heckman (1974). House-holds make labor/leisure decision based on their preference and constraints. Household's prefer-ence depends on leisure, l and a bundle of goods and services, X. Let us assume that household's utility function, U is twice differentiable:

$$U(l, X_1, X_2, \dots, X_K)$$

Household has non-wage income, A, earns wage, w and faces price vector, P. Hence, household's budget constraint is given by the following inequality:

$$\sum_{i=1}^{K} P_i X_i \leq A + wl$$

Moreover, household's working hours, h and leisure, l are constrained by available time, T.

$$h + l = T$$

Household maximizes its utility subject to the budget and time constraints. This problem can be solved using the LaGrangian function as shown in the Appendix A. For any arbitrary P, we can write the shadow price of time or reserve wage as the following function.

$$W^* = g(h, Mh + A, P) \quad \textbf{(1)}$$

Market wage is a function of education, E and experiences, S and it is independent of working hours.

$$W = B(E, S) \quad \textbf{(2)}$$

If market wage is greater than the shadow price of time, $W \geq W^*$, then the individual chooses to work positive hours at which $W = W^*$. If market wage is smaller than the shadow price of time, $W < W^*$, then the individual chooses not to work, $h = 0$, and one cannot work negative hours. Hence, we have the following slackness condition:

$$h(W^* - W) = 0$$

When the individual supplies positive hours, then we observe the reserve wages. However, wages are zero for individuals who supply zero hours and we cannot observe their reserve wages.

$$W_i = \begin{cases} W_i^* & if\ W_i^* \leq W_i \\ 0 & if\ W_i^* \geq W_i \end{cases}$$

If an individual works, then the equations for shadow price and market wage can determine working hours. We will estimate equations 1 and 2.

The previous model has two endogenous variables: hours worked and wages. The reserve wage equation and market wage equation may be specified in the following form.

$$log(W_i^*) = \beta_0 + \beta_1 h_i + \beta_2 A_i + \beta_3 X_i + \varepsilon_i \quad \textbf{(3)}$$

$$log(W_i) = b_0 + b_1 S_i + b_2 E_i + u_i \quad \textbf{(4)}$$

Hours worked, h, adjusts such that $\log(W^*) = \log(W)$. Hence we can solve for hours and get the following:

$$h = (b_0 + b_1 S_i + b_2 E_i - \beta_0 - \beta_2 A_i - \beta_3 X_i)/\beta_1 + (u_i - \varepsilon_i)/\beta_1 \quad \textbf{(5)}$$

If $h > 0$, the person is in the labor force, and we observe h and W. If $h \leq 0$, the person is not in the labor force. For the observations for which $h \leq 0$, we have

$$(u_i - \varepsilon_i)/\beta_1 < (\beta_0 - b_0 + \beta_2 A_i + \beta_3 X_i - b_1 S_i - b_2 E_i)/\beta_1 \quad \textbf{(6)}$$

Or

$$u_i - \varepsilon_i < \beta_0 - b_0 + \beta_2 A_i + \beta_3 X_i - b_1 S_i - b_2 E_i \quad \textbf{(7)}$$

Because β_1 is expected to be positive. If $Var(u_2 - u_1) = \sigma^2$, then

$$Prob(H \leq 0) = \Phi((\beta_0 - b_0 + \beta_2 A_i + \beta_3 X_i - b_1 S_i - b_2 E_i)/\sigma) \quad \textbf{(8)}$$

Where $\Phi(\cdot)$ is the distribution function of the standard normal. Thus, the likelihood function for this model is

$$L = \prod_{H>0} F(W, h) \cdot \prod_{H \leq 0} \Phi(\Delta) \quad \textbf{(9)}$$

where

$$\Delta = (\beta_0 - b_0 + \beta_2 A_i + \beta_3 X_i - b_1 S_i - b_2 E_i)/\sigma \quad \textbf{(10)}$$

Heckman estimated this model by maximum likelihood estimation in 1974. The model is subject to selection bias. Hence, in 1976 Heckman suggested two-stage estimation method. We will estimate this model using the two-stage estimation methods. We assume that ε_i and u_i are jointly normally distributed, with mean zero and variance V. Correlation between these errors are allowed.

3. Data

There are labor data from surveys conducted by various institutions such as NSO, ILO, etc. NSO publishes reports on its labor force surveys. In this paper, we use the data from Labor Force Surveys, collected in 2002-2003, 2007-2008 and 2010 by NSO. Labor Force Survey covers the entire country and collects dataset to estimate employment and unemployment consistent with the definitions and methodology of ILO. Thus, it is the primary source of information on Mongolian labor force. According to the LFS reports, the survey uses two-stage stratified random sampling method and the representative national sample size is 12,800 households.

The original surveys consist of 32,611 households (12,787 in 2002-2003; 7,008 in 2007-2008 and 12,816 in 2010). Before processing data, data cleaning process is implemented. Through the cleaning process, we checked variables for values outside of the expected range, for missing values, for duplicates and for miscalculations of calculated variables. Also, we observed individuals working zero hours, but with positive wages. As we found out, they are those individuals, who didn't work in the last week, but have a permanent job. Therefore, we imputed

working hours in a week as 40 hours for those individuals. After cleaning dataset, 81,968 observations are available for analysis. The descriptive statistics of main variables we used are reported in Table 1.

For the sample for analysis, women represent 51 percent and 49 percent is men. Out of all working individuals, 56 percent is married and 34 percent is single or never married. The number of children less than six years old is important factor to labor supply decision, particularly for women, to approximate the constraining e.ect of children (Heckman, 1974). For our sample, 35.6 percent of households have children under the age of six and 62 percent have at least one child under the age of fifteen. According to the location, 35.6 percent of individuals live in Ulaanbaatar, 22.5 percent in aimag centers and 42 percent in rural areas.

People without any formal education represent the smallest fraction of individuals by 3 percent. According to education level, 13 percent of individuals have a primary education and 26 percent has a secondary education. The proportion of individuals with high school education is the highest by 29 percent. Furthermore, 16 percent of working age individuals graduated vocational training schools, while 13 percent of them obtained a university degree. Education level of individuals in rural areas is lower than urban areas. For example, the proportion of individuals with lower education than a high school is 26.8 percent for urban areas and 63.9 percent for rural areas. According to gender, 45.9 percent of men and 38.9 percent of women have education level at secondary school and below, while 26 percent of men and 31.7 percent of women have higher education than a high school diploma.

Average age of working age individuals is 35 years old. According to the employment status, 56 percent of individuals are employed and 8 percent of them are unemployed. Although the average salary in rural area is lower than that in urban area, employment is higher in rural areas (69 percent) than urban areas (46.6 percent). Employment rate is higher among men than women, for example, it is 59.7 percent for men and 52.3 percent for women. For employed people, average working hours in a week are 45.5 hours and workers in urban areas tend to work more hours.

Average weekly salary of wage-earners is 23.7 thousand MNT in 2002-2003, 43.5 thousand MNT in 2007-2008 and 66.1 thousand MNT in 2010. We used real wage for the estimations and chose year 2005 as the base period. In the three surveys, other household members earn wage income of 20.4 thousand MNT weekly on average.

In the sample, non-salaried workers, including self-employed or unpaid workers, accounted for 58.2 percent of employed people. In other words, about 60 percent of employed, who work a positive number of hours in the last week, reported zero wage. This may be considered as a missing data problem if it was random. However, data analysis shows that this is not random. In particular, more than 90 percent of people, who reported zero wages, are either self-employed or workers in agricultural sector. Workers with zeros wages are slightly higher among men than women (54.6 percent for women and 61.5 percent for men). Moreover, 80.6 percent of employed in rural area is non-salaried workers, while it is 34.8 percent in urban area. As a result, this data analysis shows the missing values are non random. In particular, if individuals with lower wage could have been excluded from the data, then it would result in biased estimation. Therefore, research team is looking for solutions to this problem. One possible solution could be finding an approximate estimation of earnings information from other sources.

For an alternative approach of estimation with missing data, we use information from Household Socio-Economic Survey (HSES) of respective years. We compute the average income for self-employed individuals by sectors (agriculture and other enterprise) and four regions and complete the LFS sample for self-employed individuals' income. Average weekly

wage of completed data is higher by 45 percent than average wage for wage-earners in original data. Particularly, average weekly wage in completed data is 66.6 thousands MNT while average wage for salaried workers is 46 thousands MNT.

4. Estimation results

In this section we will present the estimation results and analysis. We estimated the following model using the data of wage earners sample. We have estimated labor force participation and earnings model. In this section, we'll present estimation results of employment and earnings model.

4.1. Labor force participation

Labor force participation is a dummy variable, which takes a value 1 for an employed (including self-employed) or unemployed person. We estimated the probability model of labor force participation based on entire sample and the results are shown in Table 2. Columns (1) and (3) in Table 2 show the coefficients from least square estimation for male and female and columns (2) and (4) show the marginal impacts estimated from probit model of male and female.

Starting from the mid of 2000s, Mongolia has been experiencing a rapid economic growth along with mining sector development. During these years, the government of Mongolia has dramatically expanded social welfare programs. We introduced a dummy variable "mining" for the years 2007-2008 and 2010 to capture changes in labor force participation in recent years.

4.2. Male

Let us start with estimation of the male participation model shown in column (1). In order to estimate the impact of changes such as mining boom and expanded cash transfer policies in recent years on labor force participation, we introduced "mining" dummy for year 2007-2008 and 2010. The estimated coefficient on mining dummy is significant and negative indicating lower male labor participation in recent years. The expanded cash transfer policies could be one of the factors for lower participation. However, we need more information for identification.

A dummy for rural area was introduced to capture variation across urban and rural areas. Estimated coefficients in column (1) on a dummy for rural area are positive and significant in-dicating higher probability to participate in rural area than in urban area. For males, ceteris paribus, a man in rural area are more economically active and the probability is 40 percent higher than a man in urban area. The estimates in column (1) suggest a significant and positive (0.09) impact of marital status on male labor force participation, indicating higher probability of participation of married men than a man with a different marital status. Moreover, being a household head further increases the probability of male participation as the coefficient is positive (0.05) and significant. Labor force participation probabilities form an inverted U-shape with respect to age and coefficients are significant.

In urban area, labor force participation increases with education. However, coefficients on high school level education and lower are not significant and coefficients on vocational and ter-tiary educations are significant. A person with tertiary education, 14 or more years of schooling, has an about 18 percent higher probability of being in labor force than a person with secondary education.

Coefficients on interaction between a dummy for rural area and education levels are negative except for primary education. Hence, in rural area of Mongolia, higher than primary education seems to diminish labor force participation of men significantly. Scott, Smith and Rungeling (1977) provided similar negative impact of education on participation of teenage (16 - 19 years old) men and women in southern rural counties in USA. As they pointed, number of children

has a significant impact on the probability of a man being in labor force. A man with a young child (younger than 6 years) has about 3 percent higher probability than a man without children. This is common in urban and rural area. However, number of children younger than 14 years has different impact rural and urban areas. In urban area, it increases probability of participation of men, while in rural area having children younger than 14 years old decreases the probability. In rural area, a man with a child younger than 14 years old has almost a 5 percent higher probability in being in labor force than a man without children. This could be related to the traditional nomadic livestock sector. In Mongolia, the livestock sector is the largest employer constituting more than 30 percent of employee. Livestock eat grass from open pasture land and traditionally older children help their parents by herding the livestock. Hence, older children may partly substitute their father's labor and decrease their probability of participation.

Estimated coefficients on earnings of other household members are significant but small in both urban and rural area. Greater earnings of other household members related to lower participation by men.

Column (2) in Table 2 show the marginal effects of probit estimation of participation model at the sample mean. In general, signs and significances of the estimated coefficients are similar to the least square estimates. However, marginal impacts of cash transfer policy, marital status, household head and number of young children are larger than the linear regression.

The determinants of male labor force participation in urban Mongolia are comparable to the empirical findings in previous studies in other countries. According to Pencavel (1986), education increases participation, greater nonwage income is associated with lower participation and participation probabilities form an inverted U shape with respect to age.

4.3. Female

Column (3) shows the estimated coefficients for females from a linear regression. The following results for female are quite similar to male. A significant and negative coefficient on mining dummy indicates lower female labor participation in recent years. The expanded cash transfer policies could be one of the factors for lower participation. However, like male model we need more information for identification.

A woman in rural area has a about 35 percent higher probability of being in labor force than a woman in urban area. Participation probabilities form an inverted U shape with age. A married woman is much more likely to be in the labor force than a woman with different marital status. Being a household head increases participation and earnings of other household members have small but negative impact on women's participation.

A significant and negative coefficient on cash transfer dummy indicates incentive impact of cash transfer on female labor participation. A woman in rural area has a about 35 percent higher probability of being in labor force than a woman in urban area. Participation probabilities form an inverted U shape with age. A married woman is much more likely to be in the labor force than a woman with different marital status. Being a household head increases participation and earnings of other household members have small but negative impact on women's participation.

However, education and number of children have considerably different impact on female participation compared to males. In urban area, labor force participation of women increases with education higher than the secondary level. A woman with tertiary education has an about 25 percent higher probability of being in labor force than a woman with secondary education.

As opposed to men, rural women's participation increases with vocational and tertiary educa-tion. Hence, educated women are more economically active than the men counterparts. Having children has significant impact on probability of participation of women. In urban area,

hav-ing children younger than 6 years old decreases the participation of women and a probability of participation of women with a young child is by approximately 7 percent lower than women without children. However, urban women's participation tends to be higher as overall number of children (younger than 14 years) increases. In rural area, having children younger than 6 years old increases the participation of women in contrast to women in urban area. A probability of participation of women with a young child is by about 12 percent higher than the women without children. However, in rural area, women's participation tends to be lower as overall number of children increases contrary as opposed to urban area. This opposite impact of children on women's participation may be due to the difference in economic activity in rural and urban areas.

Marginal effects of probit estimation of participation model at the sample mean are shown in Column (4) in Table 2. Like males, signs and significances of the estimated coefficients are similar to the least square estimates. However, marginal impacts of cash transfer policy, location and number of young children are larger than the linear regression.

Female labor force participation in urban Mongolia are comparable to the empirical findings in previous studies other countries. According to Killingsworth and Heckman (1986), greater schooling is associated with increases in probability of labor force participation, greater non-wage income is associated with lower participation and presence of young children reduces the probability of participation.

As mentioned in section 3, we constructed wage data for the individuals reported positive hours and zero wages. Based on completed wage data we computed wage income of other household members and re-estimated previous models. Estimation results are shown in Table 4.

5. Earnings

In this section, we will introduce the estimation results of market wage model. 60 percent of employed (56 percent for women and 62.7 percent for men), who work a positive number of hours, reported zero wage. This may be considered as a missing data problem if it was random. However, data analysis shows that this is not random. In particular, more than 90 percent of people, who reported zero wages, are either self-employed or worker in agricultural sector or in service sector. However, at this stage, we will follow the previous researches procedure (B.Otgontugs, 2010; Skoufias, 1994) and treat them as missing data. We estimated the market wage equation for male and female salaried-workers by least square regression and Heckman's two-stage regression. The empirical estimation results are reported in Table 3. Column (1)-(2) show least square estimation results and column (3)-(4) show Heckman's two stage-regression results.

5.1. Male

Let us start with the estimation results of the model for male shown in column (1). We introduced a dummy for the years 2007/2008 and 2010 to capture the changes in market wage with time. Estimated coefficients on the time dummies for 2007/2008 and 2010 are 9 percent and 40 percent respectively. Both coefficients are statistically significant. Hence, real market wage has subsequently increased in 2007 and 2010 compared to 2002.

A coefficient on a dummy for rural areas is negative and significant, indicating lower earnings in rural area than in urban area. A worker in urban area earns an hourly wage about 70 percent higher than in rural area. We use age as a proxy for experience in the market wage model. Estimated coefficients on age and age square are positive and significant. Earnings form an inverted U shape with respect to age and an additional year of experience is rewarded increasingly.

According to the estimated coefficient on education, education lower than the high school level has no significant impact on earnings. However, education higher than the secondary school level has significant positive impact on men's wage. Moreover, the returns to education increases with educational attainments. For example, earnings of a men with tertiary education (14 years or more schooling) is about 34 percent higher than a man with high school level education and approximately 20 percent higher than a man with vocational education. If we convert these returns to education into schooling years, one more year of schooling raises wage rate by about 10 percent. Let us look at the returns to education in rural area. In rural area, returns to education is on average 50 percent higher than in the urban area.

5.2. Female

Column (2) in Table 3 show the estimated coefficients of the female model. The coefficients for urban females are very similar to the coefficients for urban males. Coefficients on interaction between a dummy for rural area and education level are not significant. Therefore, the impact of education of women on earnings is similar in both rural and urban areas, whereas men with similar education level get higher wage rate in rural areas than in urban areas.

5.3. Heckman two-stage

Least square regression estimators may be biased due to a problem arising from sample selection as pointed in Heckman (1979). The selection bias arises from estimating wage equations based on only the observed for wage data. We can estimate the model with Heckman two-stage procedure. Column (3)-(4) show the estimated coefficients from Heckman procedure. Column (3) show the results for male model. In general, signs of coefficients are similar to OLS except the coefficient on age and age squared. Moreover, coefficients on education are higher than OLS. Heckman estimation for females is very similar to OLS. Like males, education impacts are larger than OLS.

5.4. Completed data

As mentioned before, for the whole sample, including both men and women, only 41.8 percent of the individuals in the sample are wage earners and the remaining individuals are self-employed or unpaid workers. Hence, 60 percent of employed (56 percent for women and 62.7 percent for men), who work a positive number of hours, reported zero wage. In previous section, we treated them as a missing data problem and dropped from the sample. However, data analysis shows that this is not random. In particular, more than 90 percent of people, who reported zero wages, are either self-employed or worker in agricultural sector or in service sector. Thus simply dropping from the sample may lead to biased estimation.

Duflo (2001) studied schooling and labor market consequences of large scale school construc-tion project of the Government of Indonesia using SUPAS data. She faced with same problem due to missing data as 45 percent of the individuals in the sample reported wage and most of remaining individuals were self-employed. Duflo imputed an income for self-employed using data from another survey called SUSENAS. Comola and Mello (2010) studied determinants of earnings and employment in Indonesia using same data and proposed to use labor market model with multinomial settings. We will follow Duflo's approach and use data from household socio-economic surveys (HSES) to complete the sample. We computed average monthly income of self-employed individuals in different economic sectors from HSES in 2002/2003, 2007/2008 and 2010 and used it to impute an income of self-employed.

Estimated coefficients from completed sample are shown in Table 5. According to the es-timation in the completed sample, increases in wage rate in 2007/2008 and 2010 for both men and women are larger than the estimates from wage-earners' sample. In addition, the

returns to education for the completed sample are higher than those for the sample of wage-earners. However, the impact of education on wage rate for men living in rural areas is smaller than that in wage-earners' estimation.

6. Wage gap

In order to analyze the wage gap between male and female workers, we did Oaxaca-Blinder decomposition. Column (Pooled Sample) in Table 6 presents the decomposition output for the sample, which combined three surveys' data. The mean of log wages is 6.48 for men and 6.41 for women. Hence, the wage gap is 0.07 and it is divided into two parts: explained and unexplained. The first part reflects the mean increase in women's wages if they had the same characteristics as men. The decrease of 0.07 indicates that differences in years of education, age, location decreases the wage gap twice as the unexplained part is 0.132. Hence, in Mongolia if women had similar endowments as men, then the wage gap would have been twice larger than the present level. The (geometric) means of wages are 648.9 MNT for men and 607.4 MNT for women, which amounts to a difference of 6.8 percent. Adjusting women's endowments levels to the levels of men would decrease women's wages by 6.4 percent. A gap of 14.1 percent remains unexplained.

In order to see the dynamics of the wage gap, we did decomposition separately for each year. Columns in Table 6 and Table 7 present decomposition output for 2002, 2007 and 2010 respectively. The wage gap was 0.09 in 2002, 0.04 in 2007 and 0.07 in 2010. The explained part (in absolute terms) has increased from 0.03 to 0.09 between 2002 and 2010. The unexplained part was 0.12 in 2002, 0.11 in 2007 and 0.16 in 2010.

7. Conclusion

Labor force participation in Mongolia has had a decreasing trend over two decades. This trend is common across urban and rural areas. Extensive cash transfer policies in recent years has played some role in this. Estimations of the participation model indicate from 3.4 to 5.4 percent decrease in labor force participation in the years of expanded cash transfer policies. Labor force participation of male and female in urban areas are different and the difference is comparable to previous empirical findings in countries such as USA, UK and Germany.

Determinants of employment or participation in Mongolia are considerably different across rural and urban areas. For example, presence of young children decreases probability of labor force participation of urban women, while it increases the probability of rural women. On the other hand, greater number of children younger than 15 years associated with increased participation in urban area and decreased participation in rural area. In urban area, labor force participation is strongly related to educational attainment. However, in rural area, labor force participation is lower among men with higher level of education. Characteristics of the nomadic livestock sector, the largest employer in Mongolia, may have some answer to these anomalies.

We estimated market wage function. Experience and education are important factors for the market wage. Greater schooling is associated with higher earnings. However, the magnitude of the education impact is different for men and women. Moreover, education impact varies across urban and rural areas.

According to Oaxaca-Blinder decomposition, the wage gap is 0.07 and differences in years of education, age, location decreases the wage gap twice as the unexplained part is 0.132. Hence, in Mongolia if women had similar endowments as men, then the wage gap would have been twice larger than the present level.

8. Reference

Angrist, Joshua D, and Alan B. Krueger. 2001. "Instrumental Variables and the Search for Identification: From Supply and Demand to Natural Experiments." *Journal of Economic Perspectives* 69-85.

B, Cullen Julie, and Jonathan Gruber. 2000. "Does Unemployment Insurance Crowd out Spousal Labor Supply." *Journal of Labor Economics.*

Banzragch, Otgontugs. 2010. *Education and the Labor Market in Central Asia: The Cases of Mongolia and Tajikistan, Doctoral Dissertation.*

Comola, Margherita, and Luiz de Mello. 2010. "Educational Attainment and Selection into the Labor Market: The Determinants of Employment and Earnings." *Indonesia, Working Paper.*

Connelly, Rachel. 1992. "The Effects of Child Care Costs on Married Women's Labor Force Participation, Review." *Economics and Statistics* 83-90.

Duflo, Esther. 2001. "Schooling and Labor Market Consequences of School Construction in Indonesia: Evidence from an Unusual Policy Experiment." *The American Economic Review* 795-813.

Heckman, James J. n.d. "Market Wage Functions: An Empirical Model of Self-Selection in the Labor Market." *Journal of Political Economy, Vol.93* 1077-1125.

Heckman, James J. 1979. "Sample Selection Bias as a Specification Error." *Econometrica, Volume.47* 153-191.

Heckman, James J. 1974. "Shadow Prices, Market Wages." *Labor Supply, Econometrica, Volume 42* 679-694.

Heckman, James J. 1976. "The Common Structure of Statistical Models of Truncation, Sample Selection and Limited Dependent Variables and a Simple Estimator for Such Models." *Annals of Economic and Social Measurement, Volume 5* 4.

Juhn, Chinhui. 1992. "Decline of Male Labor Market Participation: The role of Declining Market Opportunities." *The Quarterly Journal of Economics* 79-121.

Juhn, Chinhui, and Potter Simon. 2006. "Changes in Labor Force Participation in the United States." *Journal of Economic Perspectives* 27-46.

Killingsworth, Mark R, James J. Heckman, Ashenfelter, and R. Layard. 1986. *Handbook of Labor Economics.*

Li, Haizheng, and Je.rey S Zax. 795-817. "Labor Supply in Urban China." *Journal of Comparative Economics* 2003.

Maurer-Fazio, Margaret, James Hughes, and Dandan Zhang. 2005. "Economic Reform and Changing Patterns of Labor Force Participation in Urban and Rural China." *Working Paper 787 William Davidson Institute.*

Mincer, Jacob. 1962. "“Labor Force Participation of Married Women.” In H. Greg Lewis (ed.)." *Aspects of Labor Economics. Cambridge: National Bureau of Economic Research.*

Mo. tt, Robert. 1992. "Incentive Effects of the U.S. Welfare System: A Review,." *Journal of Economic Literature* 1-61.

Mroz, Thomas A. n.d. *The Sensitivity of an Empirical Model of Married Women's Hours of Work to Economic and Statistical Assumptions, Econometrica, Vol. 55, No.4* 765-799.

Parsons, Donald O. 1980. "The Decline in Male Labor Force Participation." *The Journal of Political Economy, Vol. 88* 117-134.

Pencavel, John, Ashenfelter, and R. Layard. 1986. *Labor Supply of Men: A Survey, Handbook of Labor Economics, Vol.1.*

Rivo Noorkoiv, Peter F. Orazem, Allan Puur, and Milan Vodopivec. 1997. *"Employment and Wage Dynamics in the Estonia Transition.*

Scott, Loren C, Lewis H. Smith, and Brian Rungeling. 1977. "Labor Force Participation in Southern Rural Labor Markets." *American Journal of Agricultural Economics, Vol. 59, No. 2* 266-274.

UNDP, Government of Mongolia and. 2012. "Millennium Development Goals."

9. Appendix 1

9.1. Labor market regulations in Mongolia

The following laws regulate employment of foreign citizens and mostly discourage employment by penalty/payment for job-place[6].

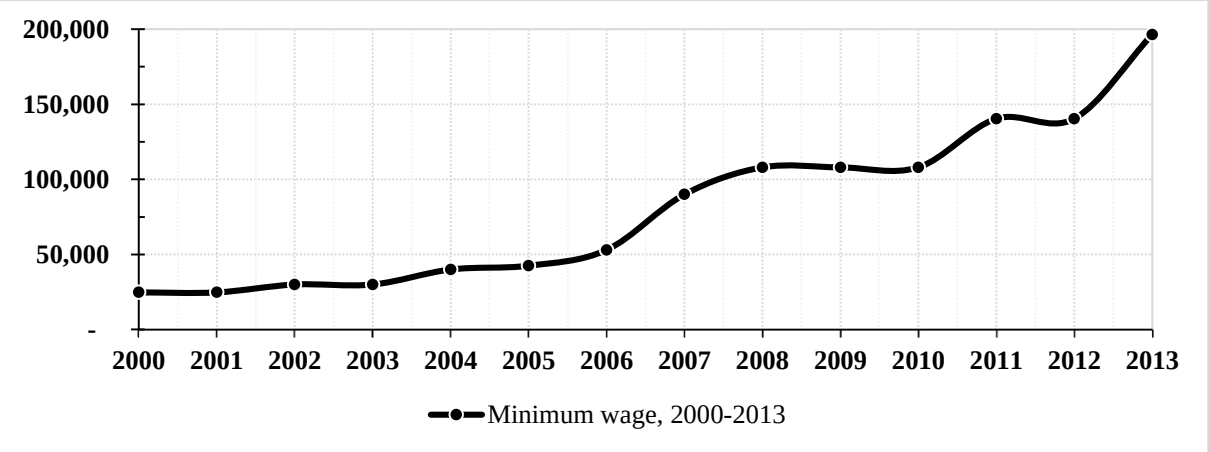
According to the law on export of labor force and import of labor force and profession-als, a legal entity, which hires foreign citizens, should pay monthly job place payment to the government of Mongolia. The payment is equivalent of twice the minimum wage.

Article 43 of the Mineral Law of Mongolia states that an owner of the special licenses has an obligation to provide job places for Mongolian citizens and less than 10percent of employees of the legal entity can be foreign citizens. If the owner of the special licenses hires more foreign citizens than allowed in the law, then it should pay monthly job-place payment equivalent of ten times the minimum wage.

Therefore, on the one hand the current regulations on the labor market aim to promote employment of Mongolian citizens. On the other hand, these regulations are set to discourage employment of foreign citizens.

[6] Law on Export of Labor Force and Import of Labor Force and Professionals, the Article 9.

FIGURE 4 MINIMUM WAGE, 2000-2013



Source: *Ministry of Labor*

10. Appendix 2

10.1. Labor supply model

In this research, we closely follow the labor supply model presented in Heckman (1974). House-holds make labor/leisure decision based on their preference and constraints. Household's preference depends on leisure, l and a bundle of goods and services, X. Let us assume that household's utility function, U is twice differentiable:

$$U(l, X_1, X_2, \dots, X_K)$$

Household has non-wage income, A, earns wage, w and faces price vector, P. Hence, household's budget constraint is given by the following inequality:

$$\sum_{i=1}^{K} P_i X_i \leq A + wl$$

Moreover, household's working hours, h and leisure, l are constrained by available time, T.

$$h + l = T$$

Household maximizes its utility subject to the budget and time constraints. This problem can be solved using the Lagrangian function:

$$L = U(l, X) - \lambda(\sum_{i=1}^{K} P_i X_i - A - Mh) - \mu(l + h - T)$$

Where, λ and μ are Lagrange multipliers. The first order conditions are

$$U_1 - \mu = 0$$

$$U_2 - \lambda P_i = 0$$

We can define the shadow price of time, W^*, to be the money value the household places on marginal units of the member's time l:

$$U_1/\lambda = \mu/\lambda$$

Thus, for any arbitrary P_1 we can write the shadow price of time as the following function.

$$W^* = g(h, Mh + A, P) \quad \textbf{(11)}$$

Assuming the leisure and the price-weighted sum of all other goods are normal goods, we can write the following:

$$g_1 > 0, g_2 > 0.$$

Due to the constraint on hours, an individual has to choose working hours between 0 and T.

TABLE 1 DESCRIPTIVE STATISTICS

	Mean	Std. Dev.	Min	Max
Rural	0.42	0.49	0	1
Household head	0.38	0.48	0	1
Married	0.56	0.5	0	1
Single	0.34	0.47	0	1
Number of child under 6 years old	0.43	0.68	0	5
Number of child under 14 years old	1.09	1.12	0	8
Age	35.4	14.76	15	80
Female	0.51	0.5	0	1
Primary	0.13	0.33	0	1
Secondary	0.26	0.44	0	1
High school	0.29	0.45	0	1
Vocational	0.16	0.36	0	1
Tertiary	0.13	0.34	0	1
Employed	0.56	0.5	0	1
Labor force participation	0.64	0.48	0	1
Unemployed	0.08	0.26	0	1
Weekly hours	24.68	25.2	0	80
Weekly wage*	10413.3	26100.4	0	933,300
Wage income of other members of household*	20429	43069.4	0	1,922,000
Weekly wage from complete data*	35551	111721.3	0	933,300
Wage income of other members of household from complete data*	67621.2	170763.6	0	2,737,559

Source: *Author's calculation.*
** Expressed in MNT. In December 2005, 1221 MNT=1 USD.*
Notes: *Weekly wage from complete data is computed using the average income calculated from HSES.*

TABLE 2 LABOR FORCE PARTICIPATION EQUATIONS

	Male		Female	
Dependent variable: LFP	**LPM (1)**	**Probit: Marginal effect (2)**	**LPM (3)**	**Probit: Marginal effect (4)**
2010	0.011	0.014	-0.004	-0.004
	(0.005)	(0.007)	(0.005)	(0.007)
Cash transfer	-0.034	-0.044	-0.036	-0.054
	(0.005)	(0.007)	(0.005)	(0.008)
Rural	0.399	0.404	0.350	0.454
	(0.023)	(0.023)	(0.025)	(0.028)
Age	0.068	0.077	0.069	0.096
	(0.001)	(0.001)	(0.001)	(0.001)

Age2	-0.001	-0.001	-0.001	-0.001
	(0)	(0.000)	(0.000)	(0.000)
Primary	0.005	-0.002	0.028	0.015
	(0.022)	(0.027)	(0.024)	(0.037)
Secondary	0.026	0.011	0.027	0.042
	(0.021)	(0.024)	(0.023)	(0.033)
High school	0.035	0.016	0.045	0.078
	(0.02)	(0.024)	(0.022)	(0.032)
Vocational	0.125	0.098	0.182	0.217
	(0.021)	(0.021)	(0.023)	(0.027)
Tertiary	0.211	0.178	0.287	0.309
	(0.021)	(0.016)	(0.023)	(0.022)
Married	0.095	0.129	0.072	0.079
	(0.006)	(0.008)	(0.006)	(0.008)
Household head	0.054	0.072	0.035	0.031
	(0.007)	(0.009)	(0.007)	(0.010)
Number of children under age of 6	0.029	0.022	-0.068	-0.081
	(0.005)	(0.007)	(0.005)	(0.007)
Number of children under age of 15	0.009	0.009	0.024	0.021
	(0.003)	(0.004)	(0.003)	(0.005)
Wage income of other members (log)	-0.004	-0.004	-0.003	-0.003
	(0)	(0.001)	(0.000)	(0.001)
Primary in rural	-0.029	0.001	-0.040	-0.018
	(0.025)	(0.032)	(0.028)	(0.042)
Secondary in rural	-0.13	-0.128	-0.051	-0.094
	(0.024)	(0.033)	(0.026)	(0.039)
High school in rural	-0.169	-0.200	-0.096	-0.183
	(0.024)	(0.036)	(0.026)	(0.039)
Vocational in rural	-0.204	-0.178	-0.158	-0.214
	(0.025)	(0.039)	(0.027)	(0.039)
Tertiary in rural	-0.246	-0.261	-0.178	-0.222
	(0.028)	(0.045)	(0.029)	(0.043)
Number of children under age of 6 in rural	0.005	0.041	0.120	0.143
	(0.007)	(0.011)	(0.008)	(0.011)
Number of children under age of 15 in rural	-0.048	-0.054	-0.048	-0.059
	(0.004)	(0.006)	(0.005)	(0.007)
Wage income of other members in rural (log)	-0.009	-0.014	-0.014	-0.020
	(0.001)	(0.001)	(0.001)	(0.001)
Constant	-0.673	0.014	-0.767	-0.004
	(0.025)	(0.007)	(0.026)	(0.007)
Number of observations	**40546**	**40546**	**41422**	**41422**

Source: *Author's calculation.*
Notes: *Standard errors are in parentheses.*

TABLE 03 EARNINGS EQUATIONS

	OLS	Heckman

Dependent variable: Real wage per hour	Male (1)	Female (2)	Male (3)	Female (4)
2007	0.094	0.145	0.258	0.695
	(0.017)	(0.015)	(0.047)	(0.067)
2010	0.401	0.398	0.420	0.809
	(0.014)	(0.013)	(0.040)	(0.058)
Rural	-0.692	-0.347	-2.498	-2.351
	(0.164)	(0.194)	(0.347)	(0.483)
Age	0.030	0.030	-0.077	0.167
	(0.004)	(0.004)	(0.023)	(0.052)
Age2	0.000	0.000	0.001	-0.002
	(0.000)	(0.000)	(0.000)	(0.001)
Primary	-0.015	-0.362	0.402	-0.636
	(0.135)	(0.145)	(0.331)	(0.475)
Secondary	0.163	-0.093	0.955	-0.049
	(0.116)	(0.124)	(0.284)	(0.424)
High school	0.310	0.094	1.191	0.783
	(0.115)	(0.122)	(0.282)	(0.421)
Vocational	0.448	0.265	1.134	1.534
	(0.115)	(0.122)	(0.289)	(0.446)
Tertiary	0.655	0.496	1.369	2.246
	(0.115)	(0.122)	(0.296)	(0.465)
Primary in rural	0.505	0.315	0.074	0.825
	(0.187)	(0.223)	(0.406)	(0.557)
Secondary in rural	0.490	0.248	1.230	1.066
	(0.167)	(0.198)	(0.357)	(0.490)
High school in rural	0.570	0.216	1.663	1.342
	(0.167)	(0.196)	(0.356)	(0.486)
Vocational in rural	0.515	0.275	2.220	1.978
	(0.166)	(0.195)	(0.356)	(0.484)
Tertiary in rural	0.551	0.263	2.212	2.172
	(0.167)	(0.195)	(0.360)	(0.488)
Constant	5.302	5.296	6.722	-0.419
	(0.133)	(0.144)	(0.628)	(1.284)
Number of observations	**9022**	**9545**	**26166**	**29956**

Source: *Author's calculation.*
Notes: *Standard errors are in parentheses.*

TABLE 4 PROBIT MODEL FOR LABOR PARTICIPATION EQUATIONS

	Probit	
	Male (1)	**Female (2)**
2010	0.041	-0.010
	(0.021)	(0.019)
Cash transfer	-0.134	-0.141
	(0.021)	(0.020)

Rural	1.353	1.288
	(0.087)	(0.095)
Age	0.233	0.248
	(0.004)	(0.004)
Age2	-0.003	-0.003
	(0.000)	(0.000)
Primary	-0.005	0.038
	(0.083)	(0.095)
Secondary	0.033	0.110
	(0.075)	(0.086)
High school	0.050	0.204
	(0.074)	(0.084)
Vocational	0.321	0.606
	(0.076)	(0.086)
Tertiary	0.653	0.935
	(0.076)	(0.086)
Married	0.386	0.204
	(0.025)	(0.021)
Household head	0.215	0.081
	(0.028)	(0.027)
Number of children under age of 6	0.067	-0.208
	(0.021)	(0.019)
Number of children under age of 15	0.026	0.055
	(0.013)	(0.012)
Wage income of other members (log)	-0.012	-0.009
	(0.002)	(0.002)
Primary in rural	0.002	-0.047
	(0.098)	(0.108)
Secondary in rural	-0.365	-0.239
	(0.091)	(0.099)
High school in rural	-0.546	-0.463
	(0.092)	(0.099)
Vocational in rural	-0.486	-0.543
	(0.099)	(0.103)
Tertiary in rural	-0.694	-0.563
	(0.112)	(0.113)
Number of children under age of 6 in rural	0.124	0.369
	(0.033)	(0.028)
Number of children under age of 15 in rural	-0.164	-0.151
	(0.019)	(0.017)
Wage income of other members in rural (log)	-0.044	-0.052
	(0.004)	(0.003)
Constant	-3.941	-4.501
	(0.095)	(0.103)
Number of observations	**40546**	**41422**

Source: *Author's calculation.*

Notes: Standard errors are in parentheses.

TABLE 5 EARNINGS EQUATIONS IN COMPLETED DATA

	OLS		Heckman	
Dependent variable: Real wage per hour	**Male (1)**	**Female (2)**	**Male (3)**	**Female (4)**
2007	1.025	0.999	1.053	1.055
	(0.020)	(0.019)	(0.027)	(0.027)
2010	1.380	1.274	1.345	1.291
	(0.017)	(0.016)	(0.023)	(0.023)
Rural	-0.493	-0.363	-0.765	-1.472
	(0.116)	(0.135)	(0.157)	(0.190)
Age	0.036	0.028	-0.062	-0.125
	(0.004)	(0.004)	(0.009)	(0.011)
Age2	0.000	0.000	0.001	0.002
	(0.000)	(0.000)	(0.000)	(0.000)
Primary	0.100	0.128	0.322	0.129
	(0.127)	(0.150)	(0.166)	(0.201)
Secondary	0.546	0.403	0.765	0.275
	(0.113)	(0.132)	(0.146)	(0.177)
High school	0.723	0.732	0.963	0.514
	(0.111)	(0.129)	(0.144)	(0.174)
Vocational	0.663	0.747	0.763	0.294
	(0.112)	(0.129)	(0.147)	(0.176)
Tertiary	0.760	0.909	0.843	0.329
	(0.111)	(0.129)	(0.147)	(0.178)
Primary in rural	-0.102	-0.160	-0.302	-0.068
	(0.135)	(0.158)	(0.176)	(0.212)
Secondary in rural	-0.470	-0.349	-0.487	-0.019
	(0.120)	(0.140)	(0.157)	(0.189)
High school in rural	-0.387	-0.488	-0.412	0.102
	(0.120)	(0.138)	(0.159)	(0.188)
Vocational in rural	-0.174	-0.133	0.015	0.692
	(0.121)	(0.139)	(0.162)	(0.192)
Tertiary in rural	0.074	-0.017	0.228	0.884
	(0.127)	(0.142)	(0.172)	(0.197)
Constant	4.290	4.286	6.265	8.102
	(0.125)	(0.144)	(0.248)	(0.321)
Number of observations	**23402**	**21011**	**40546**	**41422**

Source: *Author's calculation.*
Notes: *Standard errors are in parentheses.*

TABLE 6 BLINDER-OAXACA DECOMPOSITION

	Pooled sample	Sample 2002

Real wage per hour				
Male	648.868		541.980	
	(4.566)		(6.989)	
Female	607.425		492.916	
	(3.836)		(5.885)	
Difference	1.068		1.100	
	(0.010)		(0.019)	
Explained	0.936		0.971	
	(0.004)		(0.005)	
Unexplained	1.141		1.132	
	(0.010)		(0.020)	
	Explained	**Unexplained**	**Explained**	**Unexplained**
2010	0.995	1.023		
	(0.002)	(0.009)		
Cash transfer	0.998	0.968		
	(0.001)	(0.015)		
Rural	1.001	0.921	1.006	0.707
	(0.004)	(0.060)	(0.008)	(0.102)
Age	1.018	1.026	1.041	0.994
	(0.005)	(0.248)	(0.011)	(0.498)
Age2	0.976	0.937	0.957	0.966
	(0.005)	(0.119)	(0.012)	(0.253)
Primary	0.998	1.005	0.999	1.009
	(0.001)	(0.003)	(0.003)	(0.009)
Secondary	1.004	1.028	1.025	1.040
	(0.006)	(0.021)	(0.018)	(0.061)
High school	1.013	1.057	1.012	1.057
	(0.006)	(0.050)	(0.008)	(0.124)
Vocational	0.974	1.050	0.965	1.063
	(0.007)	(0.051)	(0.018)	(0.132)
Tertiary	0.962	1.057	0.977	1.065
	(0.007)	(0.067)	(0.011)	(0.166)
Primary in rural	1.004	1.001	1.003	1.010
	(0.001)	(0.003)	(0.003)	(0.007)
Secondary in rural	1.011	1.009	1.011	1.064
	(0.004)	(0.012)	(0.009)	(0.032)
High school in rural	1.002	1.018	1.001	1.078
	(0.002)	(0.015)	(0.003)	(0.035)
Vocational in rural	0.989	1.021	0.978	1.137
	(0.004)	(0.024)	(0.015)	(0.063)
Tertiary in rural	0.991	1.016	0.999	1.053
	(0.003)	(0.014)	(0.003)	(0.024)
Constant		1.006		0.954
		(0.217)		(0.490)

Source: *Author's calculation.*
Notes: *Standard errors are in parentheses.*

TABLE 7 BLINDER-OAXACA DECOMPOSITION

	Sample 2007-2008		Sample 2010	
Real wage per hour				
Male	587.984		802.732	
	(7.985)		(7.426)	
Female	563.739		747.400	
	(6.850)		(5.915)	
Difference	1.043		1.074	
	(0.019)		(0.013)	
Explained	0.937		0.918	
	(0.008)		(0.006)	
Unexplained	1.113		1.169	
	(0.019)		(0.013)	
	Explained	**Unexplained**	**Explained**	**Unexplained**
Rural	1.000	1.002	1.000	1.002
	(0.011)	(0.097)	(0.011)	(0.097)
Age	1.017	0.622	1.017	0.622
	(0.013)	(0.294)	(0.013)	(0.294)
Age2	0.974	1.220	0.974	1.220
	(0.011)	(0.306)	(0.011)	(0.306)
Primary	0.997	1.004	0.997	1.004
	(0.002)	(0.005)	(0.002)	(0.005)
Secondary	0.986	1.039	0.986	1.039
	(0.008)	(0.029)	(0.008)	(0.029)
High school	0.999	1.131	0.999	1.131
	(0.008)	(0.085)	(0.008)	(0.085)
Vocational	0.983	1.149	0.983	1.149
	(0.011)	(0.106)	(0.011)	(0.106)
Tertiary	0.982	1.118	0.982	1.118
	(0.009)	(0.094)	(0.009)	(0.094)
Primary in rural	1.009	1.000	1.009	1.000
	(0.004)	(0.004)	(0.004)	(0.004)
Secondary in rural	1.017	0.996	1.017	0.996
	(0.009)	(0.015)	(0.009)	(0.015)
High school in rural	1.000	1.001	1.000	1.001
	(0.006)	(0.026)	(0.006)	(0.026)
Vocational in rural	0.985	0.990	0.985	0.990
	(0.008)	(0.033)	(0.008)	(0.033)
Tertiary in rural	0.988	0.998	0.988	0.998
	(0.007)	(0.021)	(0.007)	(0.021)
Constant		0.981		0.981
		(0.342)		(0.342)

Source: *Author's calculation.*
Notes: *Standard errors are in parentheses.*

TABLE 8 DEFINITION OF VARIABLES

Variable name	Definition
2010	A dummy variable for the year2010
Mining	A dummy variable for the years 2007-2008 and 2010
Rural	A dummy variable for rural area
Age	Age of individuals by years
Age2	Age square
Primary	A dummy variable for education of first 3 years
Secondary	A dummy variable for education of first 8 years
High school	A dummy variable for high school or 10 years
Vocational	A dummy variable for vocational training education
Tertiary	A dummy variable for undergraduate or postgraduate
Married	A dummy variable for married
Household head	A dummy variable which takes a value 1 for household head
Number of children under age of 6	Number of children under age of 6 in a family
Number of children under age of 15	Number of children under age of 15 in a family
Rural	A dummy variable for rural area
Wage	Hourly wage, MNT, in real terms (2005)
Wage income of other members (log)	Sum of other members' wages in a family, MNT, in real terms (2005)
Labor force participation	A dummy variable, which takes a value 1 for an employed (including self-employed) or unemployed person

Source: *Author's calculation*.