The Summary of The Monthly Household Survey of Thailand on Labor Issues

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Summary

- The number of individuals in the sample (net of migrants) is between 2,600 and 2850 in each month. Obviously, the number of elder people increases as time goes while the number of children decreases as time goes.

- In total, there are 4894 individuals surveyed during the 88 months. Out of them, 1945 individuals stay in their village through all the

  time surveyed (88months).

Labor market participation

- There are cyclical pattern in labor market participation (defined as a person is involved in at least one economic activity in a month). There is a month in which the participation rate is as high as 85%, while there is a month in which the rate is less than 60%.
- At the same time, there is upward trend in the participation rate. The participation rate in the slack seasons after month 25 is not less than 60%.
- There is a heavy seasonal cycle in the participation rate of cultivation, paid job and free work / labor exchange, corresponding to agricultural cycle.
- The participation rate of paid job picks up a slight upward trend at the same time of agricultural cycle.
- The participation rates of business or fishery / shrimp are almost stable through time.
- There seems to be a slight upward trend in the participation rate of taking care of livestock.
- There seems to be no clear tendency in the relation between maximum number of jobs in a month and education level.
- Minimum number of occupations in a month shows more educated people less tend to have a month when they have no economic activity.
- people in poorer northeast provinces (Buriram and Sisaket) on average tend to have more maximum number of jobs than those in a richer province (Chachoengsao).
- Volatility in number of jobs decreases as education level increases.
- Higher volatility in number of jobs in 27 and 53 (poorer regions) than 7 and 49 (richer regions).
- The labor market participation ratio goes up as education level goes up.

[Corresponding Literature on other countries?]

Labor supply in hours

- Labor supply (per day) of those whose age is less than 18 years old shows that more than 93% of the observation report zero or one close to zero working hour. Another point is that the reported working hours, even if it is positive number, is relatively small.

- Labor supply (per day) of those whose age is between 18 and 50 years old shows that there is a high spike at zero or one close to zero working hour, but the height is about 32%. The distribution of labor supply is somehow close to uniform distribution up to 8 hours. We see non-negligible number of observations in the range between 8 and 16 hours.

- Labor supply (per day) of those whose age is above 50 years old shows the number of observations with zero or one close to zero working hours is close to 60%. The distribution of positive labor decreases as the reported working hour increases.

- Labor supply (per day) by education level clearly shows as the education level goes up, the fraction of zero or one close to zero labor supply decreases and the fraction of 6-7 hours increases.

- Out of 57,475 month-individual observations with zero working hour of adults, 49,816 observations (86.7%) could be explained by either elderliness or intensive involvement in non-economic activities (housework or schooling) or sickness/disease. Some of the others may be attributed to seasonal fluctuation (no work in off-peak seasons).

- The distribution of household labor supply by one defition, aggregate hours (per day) of family members. shows that the mean is 8.35 hours and the standard deviation is 8.72.

- Surprisingly, even if adding up the labor supply of all family members, about 28% of thehouseholds experience a month of zero or one close to zero working hours. We don't see this huge spike at zero in US data.

- The fraction of working hours as a household is uniformly distributed up to around 8 hours and thereafter gradually decreases as working hours increase.

- Some reasons of zero labor supply as a household are (1) all family members are elder, (2) no working-age adult in the household, (3) only working-age female and children, and (4) seasonal fluctuation.

[Corresponding Literature on other countries?]

- US: Both male and female experience increase in leisure. For male, this is achieved by decrease in market working hour while it is achieved by decrease in non-market working hour (home production etc). Aguiar & Hurst (QJE, forthcoming) "The present study focuses exclusively on the United States. There are studies that compare the United States and Europe at a point in time (for example, see Freeman and Schettkat [2005] and Ragan [2006]). However, to our knowledge, there are no other research papers using data from other countries that perform a time-series analysis similar to the one above.

Migration

- There is a increasing trend in migration rate. In month1, the rate is less than 10%. But, it increases to about 44% in month88.
- There is a cyclical movement of migration along the time trend. In the two changwats in north-east, the cyclical movement of migration rate is very clear. However, that kind of cyclical movement is not found in the rate of two changwats in central region.
- The migration rate is higher in two north-east changwats than in changwats in central. So, poorer regions provide more migrants than richer regions.
- the migration rate for young adults (less than 30 years old) is the highest and the rate of increase is also highest.
- The most popular reason of migration is temporary employment, which accounts for more than half of the total number of migration. Migration for better permanent employment follows as the second most popular reason, but the number is much smaller.
- More than 80% of migrants work at the destination.
- Three major occupations of migrants at the destination are ones in construction, agriculture sectors and factory work.
- More than half of the adult population (1,512 out of 2,911) experiences staying out of the village for at least one month.
- More than 20% of the adult population experience migration more than twice.
- In Chachoengsao and Lopburi, the share of those have experienced migration at least once is about 40%. On the other hand, this share is 65% in Buriram and 58% in Sisaket. Furthermore, the share of people with frequent migration (decreased as those experienced migration more than twice) is much higher in Buriram (36%) and Sisaket (27%) than in Chachoengsao (10%) and Lopburi (14%).
- Many temporal migrations are really short. More than 64% of the temporal migration is completed within 5 months. Temporal migration with longer duration is relatively rare or censored at month88.

- The mean duration of temporal migration of the two richer changwats is signicaantly longer than that of the two poorer changwats.

- The mean duration of temporal migration of highly educated people is longer than those with low education.

[Corresponding Literature on other countries?]

- Lots of literature on migration, but not rich interms of data used in the development literature.

Wage jobs

- The number of paid job per person (or, job/people ratio) decreases as education level goes up. The number is as high as 10 for those with no education, while that is 1.8 for those with tertiary level education. This implies that lowly educated people frequently switch jobs (or employer) even among paid job.

- The share of agricultural work out of total number of paid jobs in each education category decreases as education level goes up.

- The share of government work out of total number of paid jobs in each education category increases as education level goes up.

- Factory work is not main sectors for those with no education and with only primary education.

- The share of category of "others" increases as education level goes up (WE CANNOT DECODE THE SPECIFIC EXPLANATION OF JOBS IN THE DATA)

- The share of agricultural work is the highest in all changwats except Chachoengsao.

- The share of factory and general no-agricultural work in Chachoengsao is much higher than those of any other three changwats.

- Mean wage goes up as education level goes up except primary level and lower secondary level of education.

- The mean wage rate in Buriram is the lowest in almost all the months. And, we don't see much wage growth in all the changwats except Sisaket. There seems to be a slight decreasing trend in the mean wage rate of Chachoengsao.

- In Sisaket, most of the jobs other than government work are casual and the numbers of jobs are small. About 20 people are involved in government work and the average wage rate is stable through time between 40 and 60 bahts. Thus, the majority of the jobs observed in each month is government work (except agricultural peak seasons). So, what happens in the transition of the mean wage rate in Sisaket reflects the movement of mean wage rate of government work (especially the hill between month 50 and 70. The high level of mean wage does not mean that overall wage rate is high in Sisaket, but it means the selection bias regarding to participation causes that.

- The mean wage of government work is the highest around at 40-50 bahts/hour. But, as we will look at below, this high wage rate is driven by the one for highly educated government officers. Mean wage rates in all other sectors are similar around at 20 bahts/hour. But, the volatility in mean wage in agricultural sector is higher than other sectors except government work.

- The working hours per week for those whose wage rate is low is likely to be shorter than that of high wage earner.

- The coefficient of variation (c.v.) of wage RATE (per hour) for each education category shows that the c.v. of edu=1 (no education) is lowest almost all the time among the education categories. The c.v. of edu=2 (primary level) is highest almost all the time, and furthermore, it fluctuates a lot. The c.v. of edu=4 (higher secondary) and edu=5 (tertiary level) behave similarly around at 0.8. The movement of c.v. of edu=3 (junior secondary) is very strange. It some times as low as the one of edu=1. But in some month, it jumps up.

- The c.v. of monthly wage EARNINGS (per month) by education level shows that the c.v. of edu=1 (lowest category) is highest most of the time periods, but it seems decreasing through time. The c.v. of edu=2 (primary level) follows the one of edu=1. The magnitude of c.v. is almost in order of education level in each month. That is, education level and magnitude of c.v. is negatively correlated in each month. However, c.v. of edu=3 (junior secondary level) is exception. Its c.v. is lowest in almost all the months.

- government work has relatively high and stable level of c.v. This is becasue the gap of wage rates between workers with low education and high education is large and stable.

- Low and stable c.v in factory work is obtained by similarity in mean wage regardless of education level.

- For construction, more than 80% of works are done by people with edu=2, which creates relatively low and stable c.v. until month of 36. But, it starts to volatile a lot after that.

- We compute c.v of wage for each individual shows that the mean c.v. of edu=1 (no education), edu=4 (upper secondary) and edu=5 (tertiary) seems to be higher than c.v. of edu=2 or edu=3, but the difference is not so clear. However, higher c.v. does not necessarily mean that the volatility in wage rate is high. It may just pick up the growth of wage rate.

- We run a simple OLS regression of the c.v. of each individual through time on several characteristics. Years of education seems to be positively correlated with magnitude of c.v., but the statistical signifficance is marginal (at 10% level).

[Corresponding Literature on other countries?]

- Discussion on skill premium and inequality (between and within group)

"True" profitability of household economic activities

- The share of business households that earn positive profit in each month shows that until month 17, the share is not more than 30%. But, the share has increasing trend thereafter, and the share exceeds 50% in month 88.

- Estimation of profit function reveals strong and increasing time trend in profit. Higher education does not necessarily increase profit. This may be because we subtract family labor cost from crude profit. Higher the education is, larger the imputed wage and shadow earning of the family member is. This kind of "shadow-family-labor-cost" effect reappears in the coefficient of the number of family members involved in household business as more the number of family member involved in the household business is, less the profit is.

- There seems no clear time trend in the share of fish/shrimp households that earn positive profit.

- The number of family members involved in fish/shrimp is positively correlated with the level of profit. This implies that, even after subtracting family labor cost, the profit tends to be higher when the number of family member is larger. The profit is significantly higher in Chachaeongsao than in other three changwats, which may reflect that, in Chachaeongsao, fish/shrimp is closer to stylized business.

- The share of agricultural households that earn positive profit reveals strong agricultural seasonal cycle. but there is no clear time trend.

- Profit function estimation of agriculture shows thet profit is higher if the level of education is higher than primary level. Furthermore, the coefficient of the number of family members involved in cultivation is positive and significant. This implies that,even after subtracting family labor cost, the profit tends to be higher when the number of family member is larger. There is no overall time trend, but highly seasonal cycle in the level of profits.

- The share of livestock households that earn positive profit shows a strong decreasing trend, implying that the share of households with positive profit decreases through time.

[Corresponding Literature on other countries?]

- Profit, Output Supply, and Input Demand Functions for Multiproduct Firms: The Case of Australian Agriculture Lloyd McKay, Denis Lawrence, Chris Vlastuin: International Economic Review, Vol. 24, No. 2 (Jun., 1983), pp. 323-339

Schooling/activity of kids and young

- The (pooled) schooling rate is over 80% until age 12. Then, it steeply decreases as age goes up. The rate is as low as 40% at age 18. [Caution: It seems that the children who migrate out of village tend to have much lower schooling rate than those remain in the village, which decreases the pooled schooling rate significantly]

- The schooling rates of all changwats stays around or above 80% until 12 or 13 years old. However, the schooling rates significantly differ each other after age of 13. As we expect, Chachoengsao (chan=7) has the highest schooling rates at almost all age ranges after 13. The rate is as high as 60% even at the age of 18. Schooling rates of other three changwats behave similarly, but the rate of Buriram (chan=27) is the lowest at almost all age ranges after 13.

- The schooling rates seem to differ depending on the household he's education. The schooling rate of kids whose head has no education is lowest at all age ranges. The schooling rate of kids whose head has primary level education is second lowest at almost all age ranges.

- The schooling rate by income quantile reveals that the highest quantile maintains the highest level of schooling among the four quantiles. But, one strange observation is that the schooling rate of the upper middle quantile is the lowest after age 13.

1 Sample size

1.1 Number of households (after month6)

Table1-1 summarizes the number of households for every month after month 6 in the survey. We use the household tracking question which is conducted after month6. According to the table, about 640 to 699 households were successfully surveyed each month. The success rate of survey (the number of households that were successfully surveyed out of total number of households in each month) is at least 93%. The main reason of failure of surveying some households is migration of the entire family member. The refusal rate is very low or negligible except month 20. Replacement households were added in some months (Table1-2). For example, 12 households were added in month 28 and resurveyed thereafter.

1.2 Number of individuals (by gender and age)

The number of individuals in the sample (net of migrants) is between 2,600 and 2850 in each month. We have complete information of these individuals. Figure1-1 decomposes the number of individuals each month into age categories and gender. The age categories are (1) above 50 years old, (2) between 19 and 50 years old, and (3)less than 18 years old. Obviously, the number of elder people increases as time goes. The number of elder male in month1 is 266 while the number in month88 is 433. The number of elder female in month1 is 350 while the number in month88 is 521. Also, notice that there is a big difference in the number of elder male and elder female in each month. The number of children decreases as time goes. The number of children male in month1 is 511 while the number in month88 is 322. The number of children female in month1 is 488 while the number in month88 is 338. The numbers of children male and female are similar in each month.

In total, there are 4894 individuals surveyed during the 88 months. That is, there are 4894 individuals on the roster. However, not all individuals are surveyed in all the months due to migration and refusal. Actually, 3150 individuals stay in their village through all the time surveyed. This number includes (1) individuals in replacement households which are added after month1 and (2) returning migrants who are not on the roster at the baseline survey but are added after month1, and stay in the village thereafter. If we exclude there individuals, we have 1945 individuals. That is, 1945 individuals are (1) on the baseline survey at month 0 and (2) stay in their village through 80 months. Out of these 1945 individuals, 1059 are the age between 19 and 60 at the time of the baseline survey.

2 Aggregate labor supply

We start with aggregate labor participation rate. The definition of aggregate labor market participation is that a person is involved in at least one economic activity listed below for at least one day since the last interview. The denominator of the rate is the number of adult people between 18 and 60 years old without going school who stay at home (i.e. we exclude those are out of home). Figure2-1 shows the aggregate labor market participation rate through 88 months. We can find

- There are cyclical pattern in labor market participation. There is a month in which the participation rate is as high as 85%, while there is a month in which the rate is less than 60%.

- At the same time, there is upward trend in the participation rate. The participation rate in the slack seasons after month 25 is not less than 60%.

Although the aggregate participation rate exhibits several patterns, it masks what kinds of jobs are available and what the participation rate in each job is. There are lots of possible jobs in the local market of a rural Thai village. The followings are the list of jobs we can detect from the questionnaire.

1. cultivation at own plots
2. taking care of livestock of the own household
3. free work / labor exchange
4. paid job (wage work)
5. fishery / shrimp pond
6. business

We assume that a person provides his labor to a job if he reports that he spent at least one day since the last interview on a specific job. Figure2-2 plots the participation rate in each job category. The denominator of the rate is the number of adult people between 18 and 60 years old without going school who stay at home (i.e. we exclude those are out of home). There are several findings from the graph:

- There is a heavy seasonal cycle in the participation rate of cultivation. Of course, this cycle corresponds to the cycle in agriculture. The participation rate is as high as 50% in peak seasons while it is as low as 10% in slack seasons.
- There is a similar cycle in paid job and free work / labor exchange. These cycles also correspond to the agricultural cycle.
- The participation rate of paid job picks up a slight upward trend at the same time of agricultural cycle.
- The participation rates of business or fishery / shrimp are almost stable through time.
- There seems to be a slight upward trend in the participation rate of taking care of livestock.

Caveat

- We neglect migrants.

3 Multiple-job holding

3.1 Maximum and minimum number of jobs in a month

As we see in the previous section, there are lots of possible occupations and jobs in rural villages of Thailand. And, at the same time, people do not necessarily have only one job every month. Some people may have several jobs in a month, and others may have no job in a certain month.

Maximum and minimum number of jobs in a month by education level (Table3-1 and Table3-2) tells some stories about multiple (or no)-job holding. Education levels are classified into 5 categories (0:no education, 1:primary level education, 2: junior secondary level education, 4: senior secondary level education, 5: above senior secondary level education). We find:

1. There seems to be no clear tendency in the relation between maximum number of jobs in a month and education level.

2. Minimum number of occupations in a month shows more educated people less tend to have a month when they have no economic activity

Then, we run a simple ordered probit model on maximum and minimum number of jobs for male. We control log of age, square of log age, years of education, and village dummies. The estimation results are in Table3-3 and Table3-4. The regression results confirm findings from the simple tabulation above. There is a negative correlation between education and minimum number of jobs in a month, which implies more educated people are less likely to have a month when they have no economic activity. Any robust correlation is not found between education and maximum number of jobs. There is also a negative correlation between education and maximum number of jobs in a month, but the coefficient is not significant.

The coefficients of village dummies are also worth to look at. Notice that an omitted village in the regression analysis is a village in Chachoengsao, which is relatively a rich changwat in central Thailand. The coefficients of village dummies in the regression analysis on maximum number of jobs in a month shows that those for all other provinces are positive except one village in Lopburi, which is also in relatively richer central area. This implies that people in poorer northeast provinces (Buriram and Sisaket) on average tend to have more maximum number of jobs than those in a richer province (Chachoengsao). Also note that the coefficients are highly significant. This may imply as a determinant of maximum number of jobs in a month, local condition is more important than education level.

However, the negative correlation between minimum number of jobs and education survives even after controlling village dummies. In general, people in poorer northeast provinces (Buriram and Sisaket) on average tend to have less minimum number of jobs than those in a richer province (Chachoengsao).

Note that even when we use education level dummies (5 categories) instead of years of education, the positive correlation between minimum number of jobs in a month and education is clear. So, this relation seems to be robust.

3.2 Volatility in number of jobs through time

So far, we just look at the maximum and minimum number of jobs in a month. The analysis is silent how the number of jobs in a month moves through time through a year or observed periods. Then, we conduct analysis on the standard deviation of number of jobs for each individual through time. Table3-5 and Table3-6 exhibit that

1. Volatility in number of jobs decreases as education level increases. The mean of standard deviation of number of jobs for those with no education (edu=0) is 0.57, while that for those with tertiary level education is 0.37. Higher education leads to more stable job, not more (or less) diversification in activities.

2. Higher volatility in number of jobs in 27 and 53 (poorer regions) than 7 and 49 (richer regions).

Simple OLS regression confirms those findings above. Table3-7 reports the estimation results. There is a negative significant correlation between standard deviation of number of jobs and years of education. So, volatility in number of jobs decreases as education level increases. Further, the volatility in number of jobs is impacted by where people live. Notice that an omitted village in the regression analysis is a village in Chachoengsao, which is relatively a rich changwat in central Thailand. We see that all other three villages in Chachoengsao experiences less volatility in number of jobs than the default village, while all villages in other three changwats (except one village) experiences higher volatility than the default village. Especially, the volatility is relatively higher in two north-east changwats (Buriram and Sisaket) than another changwat (Lopburi) in central Thailand.

Caveat (or further investigation needed)

- If we use education level dummies (5 categories, and default if edu=1) instead of years of education, the coefficients of edu=3, 4, and 5 are negative, but only the one for edu=5 is statistically significant.

- It is obvious that even if the number of jobs people have are same, the composition of jobs may differ depending on various characteristics and environment. This point must be explored.

4 Appearing and disappearing from labor market

As we mentioned in the previous section, some people completely disappear from the labor market in some months. In this section, we look at how often people appear or disappear from the labor market. We define appearance in the labor market by the ratio of number of months in which he/she supplies his labor to at least one economic activity out of total number of months in which he/she stays in the village, that is,

$$\frac{number\ of\ months\ in\ which\ he\ works}{total\ number\ of\ months\ in\ which\ he\ stays\ in\ the\ village}$$

Let us call this ratio as "participation ratio"

We impose the following conditions to restrict the sample

1. a person must stay in the village for at least 10 months
2. months in which a person goes to school are excluded in counting total number of months
3. age is between 16 and 50 at the time of baseline survey

which leaves us 1,557 individuals (760 male and 797 female). Table4-1 shows the distribution of the "participation ratio". 19.4% of the individuals work every months, meaning they do at least one economic activity each month. On the other 3.3% of the individuals have never done any economic activities. The mean of the ratio is 0.71 and the ratios of at least 60% of the individuals exceed 0.7.

We conduct a simple OLS regression on appearing and disappearing from lobar market. The dependent variable is the ratio of number of months in which he/she supplies his labor to at least one economic activity out of total number of months in which he/she stays in the village. We regress this dependent variable on several characteristics (age at the baseline survey, education level and changwat dummies). The result is shown in Table4-2. Since the dependent variable is a ratio, the coefficients of the regression means percent change of labor market participation with respect to the marginal change of the explanatory variables. The labor market participation ratio goes up as education level goes up. The coefficient of years of education is positive (0.007) and significant at 1% level.

Judging from the coefficients of village dummies, the labor market participation ratio is significantly lower in two north-east changwats, especially in Sisaket.

Caveat

- We neglect migrants.
- In using education categories instead of years of education, the relation almost holds.

5 Labor supply in quantity (hours)

5.1 Definition and construction

In this section, we study the distribution of time spent on labor supply. The each individual's time in hours spent on labor supply in each interview month is computed as:

$$Labor\,supply\,in\,hours = sum\,of\,time\,spent\,on\,each\,economic\,activities\,(in\,hours)$$

Economic activities includes cultivating own plots, taking care of livestock, business, fish/shrimp, paid work, free labor and labor exchange. However, the number of days between the two consecutive interviews differs by households. We re-adjust the computed labor supply in hours so that how many hours on average each individual supplies his labor per day. So, the unit of the labor supply is hours per day. It is easy to readjust the measure to the one per month, etc. Note that we consider individual's labor supply at the residence. Hence, we ignore labor supply at the destination of migration (hence we ignore migrants). This information is available once an individual returns to his village, but not available in the case of permanent migration. We concentrate on labor supply at the residence.

Although we don't go in detail here, we define leisure as:

$$Leisure\,in\,hours = Total\,time\,endowment - Labor\,supply\,in\,hours$$

So, the unit is hours per day. There is one reminder. We don't consider household works (such as preparing meals, taking care of kids) as economic activities. This is due to limitation on measuring time spent on those activities. So, by construction, those activities are included in leisure. Times spent on all other non-economic activities such as sleep is also included in leisure.

5.2 Individual labor supply/leisure

5.2.1 Distribution of labor supply

Here, we start with overall distribution of labor supply. Then, we restrict the sample into various categories. Figure5-1 shows the distribution of labor supply for all month-individual observations. We pool all observations (all age, gender, education, etc) in the figure. There are 181 strange observations in which sum of the working hours exceed 24 hours, which we exclude. As the result, we have 235,923 observations. Note that 996 observations report more than 16 hours (but equal or less than 24 hours) of working hours, which may be implausible. Clearly, about 60% of the observations fall in zero working hour. This is partially because the sample includes kids, elders and female.

Distribution by age Let us divide the sample into three age categories: (1) less than 18 years old, (2) between 18 and 50 years old, (3) above 50 years old. Note that, for 258 individuals, we have no information on age. All of them are added after month1 (not on the roster at the time of baseline survey). This amounts to 11,122 month-individual observations.

Figure5-2 to 5-4 show the distribution of labor supply for each of the three groups. Figure5-2 shows the distribution of labor supply of those whose age is less than 18 years old (67,991 observations). More than 93% of the observation report zero or one close to zero working hour. Another point is that the reported working hours, even if it is positive number, is relatively small. About 80% of the reported positive working hours are less than 5 hours. See Figure5-2-2. The distribution of positive working hours is not uniformly distributed.

Figure5-3 is on age between 18 and 50 years old (94,631 observations). There is a high spike at zero or one close to zero working hour, but the height is about 32%. Figure5-3-2 shows the distribution of positive working hours. The distribution of labor supply is somehow close to uniform distribution up to 8 hours. We see non-negligible number of observations in the range between 8 and 16 hours.

Figure5-4 is on age above 50 years old (62,103 observations). The number of observations with zero or one close to zero working hours is close to 60%. Figure5-4-2 shows the distribution of positive labor supply only. The fraction decreases as the reported working hour increases. The shape of distribution is different from that of working-age adult (between 18 and 50 years old).

Distribution by education level (working-age adult) Next, we show the distribution by education level. Here, we concentrate on the group of working-age adults (between 18 and 50 years old). Figure5-5 to 5-9 shows the distribution of labor supply for those with no education, primary level education, junior-secondary, senior-secondary, and tertiary level education, respectively. We see clear transition of the shape of distribution as the education level goes up. As education level goes up, the fraction of zero or one close to zero labor supply decreases (except edu=4) and the fraction of 6-7 hours increases.

Distribution by gender (working-age adult) Figure5-10 and 5-11 show the distribution by male and female, respectively. Both of the distributions have a spike at zero or one close to zero working hour. But, female has more density mass at zero or close to zero working hour than male. Interestingly, the shape of these distributions are similar each other. In both distributions, positive working hours are distributed uniformly up to around 8 hours.

Distribution by calendar month (working-age adult) Obviously, there is a huge variation by calendar month. We just show the ones for February (off-peak season) and

November (Peak season). Figure5-12 shows the distribution of February. The fraction of zero or one close to zero working hour is as close as 40%. On the other hand, the distribution of November in Figure5-13 shows that the fraction of zero or one close to zero working hour is only 16%, and the distribution of positive working hours is not look like uniform.

5.2.2 Three possible reasons of no labor supply

As we show above, there is a spike at zero working hour (except for those with high education). In this sub-sub section, we explore the reasons of zero labor supply of adults. So, we restrict the sample to those whose age is above 18 years old.

Out of 156,734 month-individual observations, 57,475 (37%) are zero working hour. There could be three main reasons why an individual does not supply his labor at all. They are (1) elderliness, (2) ignorance of household work, and (3) sickness/disease. We look into each of them.

Relation to elderliness Elderliness is closely related to economically inactive status. When we define individual whose age is above 50 years old as elder, 31,583 observations out of 57,475 observations with zero working hour (hence, 55%) come from this group. So, we may be able to say that these individuals report zero working hour due to elderliness.

Relation to housework/schooling Another reason why there are many individuals with zero working hour is because we don't consider housework as an economic activity. It is easily imagined that this could be frequent for female observations. We compute the ratio of number of days spent on housework to total number of days between the two interviews. Then, if the ratio is greater than 0.95 (i.e. the person spends 95 days for housework if there are 100 days between the two interviews), we consider that this person has no labor supply because he/she is involved in housework. We find 16,519 month-individual observations satisfy this criteria. Among the 16,519 observations, female observations account for 72% (11,861 observations).

Similarly, we compute the ratio of number of days spent on schooling and we consider that a person has no labor supply because he/she goes to school if the ratio is greater than 0.6. There are 1,659 month-individual observations that satisfy this criteria. Most of them (98.5%) are age less than 23 years old.

Relation to sickness/disease Suffering from sickness/disease could be another reason why an individual does not supply his labor. Here, we restrict the sample of zero working hour to those whose age is between 18 and 50 because we attribute zero working our of those whose age is above 50 years old to elderliness. (We will discuss cases in which sickness/disease partially decrease labor supply below).

I compute the number of days in which a person is disable to work from sickness/disease between the consecutive two interviews. Then, I compute the ratio of number of days of disabled to total number of days between the two interviews. if the ratio is greater than 0.5 (i.e. the person has no labor supply and is disable to work for 50 days if there are 100 days between the two interviews), we consider that this person has no labor supply because he/she is in sickness or disease.

The result reveals that sickness/disease is not a main constraint of labor supply. I find only 55 month-individual observations satisfies the criteria above. This accounts for less than 0.1% of zero labor supply observations of adults. We find that there are 407 elder observations that satisfy the criteria above. So, these observations are inactive by either elderliness or sick/disease or both of them. But, we may say that sickness/disease is not a crucial reason of zero labor supply.

Where do we stand? Out of 57,475 month-individual observations with zero working hour of adults, 49,816 observations (86.7%) could be explained by either elderliness or intensive involvement in non-economic activities (housework or schooling) or sickness/disease. We are left with 7,659 month-individual observations. Some may be attributed to seasonal fluctuation (no work in off-peak seasons).

Relation between sickness/disease and partial decrease in labor supply Here, we are interested in a case in which sickness/disease may reduce labor supply in a month. The relation between sickness/disease and zero labor supply discussed above is a kind of extreme: we considered a case in which sickness/disease makes people completely disable so they cannot supply labor at all. That exercise is informative to explore the reason of zero labor supply. Instead, we consider moderate cases here: people may be in sick so that they may not be able to supply as much labor as otherwise they could. This case is important since sickness/disease may impact the level of labor supply.

We run a simple fixed effect (for each individual) regression to see the impact. The dependent variable is average labor supply per day in a month. The independent variables are education level, age, gender, time trend and calendar month dummies (changwat dummies are dropped due to the fixed effect estimation). Other than those variables, we include the following three variables: the ratio of number of days of disabled, spent on housework, and schooling to total number of days. The way of construction of these variables are discussed above. These variables take the value between 0 and 1.

Table5-2 shows the result. Clearly, the coefficient of "ratio of sick days" is negative and significant at 1% level. The coefficient implies that 10% increase (i.e. 3days increase in sick days) leads to 5,2 minutes (0.86*0.1*60) reduction of labor supply per day / 2.58 hours (0.86*0.1*30) reduction per month. Note that mean hours of labor supply per day is 3.7 hours. So, 10% increase in the number of sick days decrease labor supply by 2.3% ((0.086/3.7)*100). Do we interpret this is small, moderate, or large???

Other coefficients are also worth looking at. As we expect, the ratio of number of days spent on housework is negative and significant. But, the coefficient is so small that it is not economically so significant (or negligible). Schooling is a strong substitute to labor supply. We also find seasonal cycle in labor supply reflecting agricultural cycle.

Further investigation

- There is a paper on the relation between illness and labor supply in Indonesia: Gertler and Gruber (AER, 2002) The result is not directly comparable to ours as the measurement of "illness" differs. But, it is interesting to explore this further.

- It is also important to figure out how a family member's sickness/disease impacts other family members' labor supply.

5.3 Labor supply as a household

5.3.1 Definition and construction

Considering labor supply as a household is interesting and important. This is because in several economic theories, such as labor supply behavior in terms of risk insurance, the unit of economic agent should be an household, not each individual. So, if we want to be consistent with those economic theories, we should know aggregate labor supply as a household. However, there are two issues to be addressed:

(1) What is the unit (e.g. hours per person?, hours per household?)

(2) How to interpret migrants?

For the first issue, we show two measure of household labor supply. One is in aggregate hours, and the other one is in hour per adult family member. For the second issue, we neglect migrants. So, we define a household as a set of family members residing in the household. A similar study on US is found in Mulligan and Rubinstein (2005?).

As we see above, there are some individuals who report working hours of more than 16 hours per day. We set the working hours of these individuals to 16 hours to minimize the impact of misreporting.

5.3.2 Distribution of household labor supply

Figure5-14 shows the distribution of household labor supply by one definition, aggregate hours of family members (but less than 60 hours to exclude outlier households). We pool all month-household observations. The mean is 8.35 hours and the standard deviation is 8.72. Surprisingly, even if adding up the labor supply of all family members, about 28% is zero or one close to zero working hours. Indeed, about 20% (11,683 out of 59,256 observations) of the total month-household observations is zero working hour. We don't see this huge spike at zero in US data. The fraction of working hours is uniformly distributed up to around 8 hours and thereafter gradually decreases as working hours increase. There seems to be wide variation in the amount of family labor supply.

Figure5-15 shows hours spent on labor supply per adult family member. We define adult family member as one with age above 18 years old. Again, there is high spike at zero or one close to zero working hours. The distribution is uniform up to around 5-6 hours, then gradually decreases.

In sum, there is wide variation in household labor supply whichever measures of household labor supply we apply.

Household labor supply by income category The motivation here is that we are interested in how labor supply behavior as a household differs by income level. We guess that high income households supply labor constantly every month while poor households are in agriculture and hence there is a seasonal fluctuation in household labor supply. Another motivation is that if a household is in agriculture, it may face more risk than a household with a person having a stable job (e.g. government officer). If we see fluctuation in household labor supply regardless of the existence of much degree of risk, we may say that the household is vulnerable to risk.

We classify households into four income groups based on total net income reported (IS_28). This classification is rough as IS_28 does not consider self-consumption (so non-negligible portion of labor supply to cultivation and livestock activities may not be reflected), but we use as a first approximation.

Figure5-16,5-17,5-18,and 5-19 show the distribution of household labor supply by income groups. The measure is aggregate hours of family members. The order is, lowest quantile, lower middle quantile, upper middle quantile and highest quantile. Except the highest quantile, the fraction of zero or one close to zero working hour exceeds 0.3. So, there are many households ending up with no economic activities. Especially, the fraction in the lower middle quantile exceeds 0.4 because the number of households consisting of only family members whose ages are above 50 is largest in this group. The fraction is about 0.12 in the highest quantile group. There does not seem to be so clear relation between family labor supply and income quantiles, except the highest quantile.

5.3.3 Reasons of zero household labor supply

We need to figure out the characteristics of households with zero labor supply. There are 11,683 month-household observations with no labor supply. Among them, 2,741 (23.5%) are consist of only family members whose age are above 50. So, we could say that these households are economically inactive because all family members are elder. Furthermore, there are 1,643 (14.1%) month-household observations that consist of elders and kids (less than 18 years old). They are probably economically inactive because there is no working-age adult in the household. Other than those observations, 1,020 (8.7%) month-household observations are those that consist of only working-age female and children. 208 (1.8%) month-household observations are those that consist of only working-age male and children.

However, there are still 6,071 (11,683-2,741-1,643-1020-208) month-household observations. It seems that seasonal fluctuation matters. Table5-2 shows the number of household with zero labor supply by calendar month for first 84 months. From the subsample, we exclude the households that are considered above (e.g. elder households, households with only elder and children, etc). November is busiest season in which we find only 136 month-household observations with no labor supply. On the other hand, the number of month-household observations with no labor supply in March is more than five times as large as that in November. We can infer that, in off-peak season, some households end up with no economic activity or migration because the "cost" of doing such activities overweigh the benefit from them.

Any other reasons of no labor supply? Sickness/disease of a primary worker in a household could be a reason. But, the analysis of individual labor supply above cast doubt on the importance of this reasoning.

Further investigation

- Further investigation of no household labor supply
- Theoretical discussion

5.4 Non-economic activities

From the questionnaire, we can know what kinds of "non-economic" activities people are involved every month. This might be crucial to know the alternatives of each individual other than economic activities, division of labor within household, or reason of non-participation in the rural labor market. The non-economic activities available from the questionnaire are the following

- doing housework, preparing meals, caring for children, etc for the household
- attending school or a training program
- fulfilling obligations or doing work related to village positions or membership in an organization
- fulfilling social obligations (attending weddings, funerals, ordinations, etc)
- unable to perform ordinary activities because of illness or disability.

We have already used some information of those above to figure out the number of days spent on housework and schooling. However, the most informative question on non-economic activities is on the number of days spent for each listed above. We have no information on time allocation for economic and non-economic activities in a day.

There are some remainders in considering non-economic activities:

1. The most informative question on non-economic activities is on the number of days spent for each listed above. However, the number of days spent for these NON-ECONOMIC activities is not necessarily exclusive against the number of days spent for ECONOMIC activities. Thus, there is a danger of double-counting. For example, a person may work on his farm and do housework at a same day.

2. Leisure is not directly observed in the data. Since all the data we have for non-economic activities is on the number of days spent and since there is a danger of double-counting, it is extremely difficult to estimate (or subtract) out the time spent for leisure from the data.

3. For each ECONOMIC activity, the data on the number of days and the average working hours per day are available. So, it is theoretically possible to estimate (or subtract) out the time endowment for non-economic activities, leisure and sleep. But, since we don't have hours spent on each non-economic activity, we cannot go further.

Further investigation needed

- Is there any literature on estimating leisure from a data given???

6 Migration: its trends, motivations and patterns

Holding jobs in the village and disappearing from the local labor market are not the complete alternatives for people. Migration, regardless that it is temporal or permanent, is a crucial alternative for people, especially, living in rural areas. We restrict the sample those whose age between 18 and 60. In total 2,935 migrations (1,840 by male and 1,095 by female) occurred during the 88 months. Migration occurs more frequently in Buriram (1,206 migrations) and Sisaket (793 migrations) than in Chachoengsao (475 migrations) and Lopbri (461 migrations).

6.1 Aggregate trend in migration rate

Figure6–1 shows the crude migration rate through time. The crude migration rate is defined as number of people out of village divided by total number of people on the roster. Clearly, there are two findings. First, there is a increasing trend in migration rate. In month1, the rate is less than 10%. But, it increases to about 44% in month88. Second finding is that there is a cyclical movement along the time trend. That is, the time trend is not monotonically increasing. The second finding is more clearly exposed in Figure6-2, which shows migration rate by changwat. In the two changwats in north-east, the cyclical movement of migration rate is very clear. However, that kind of cyclical movement is not found in the rate of two changwats in central region. To check if this cyclical trend corresponds to agricultural cycle, we run a simple regression of migration rate on time trend and monthly dummies. Table6-1 to Table6-4 summarizes the regression result for each changwat. In the estimation results for two changwats in central region (Table6-1 and Table6-3), none of coefficients of monthly dummies is significant. Only constant and time trend strongly predict the migration rate. On the other hand, the coefficients of several monthly dummies are significant in two north-east changwats (default month is April). In Buriram, the migration rate is significantly higher in January and February, while it is significantly lower in November. In Sisaket, the migration rate is significantly lower in October, November, and December. The cyclical movement along the time trend found in two north-east changwats clearly corresponds to agricultural cycle since November and its surrounding months are harvest season. This kind of cyclical movement is not found in the two changwats in central region.

Another finding from Figure6-2 is that the migration rate is higher in two north-east changwats than in changwats in central. So, poorer regions provide more migrants than richer regions.

Figure6-3 shows the migration rate by education level. Although not in clear order, the migration rate of those with edu=1 and edu=2 is low and the Increase rate of the rate is not so steep. The migration rates of other three education categories behave similarly. Finally, Figure6-4 shows the migration rate by age category. As we expect, the rate for young adults (less than 30 years old) is the highest and the rate of increase also highest. The migration rate exceeds 60% after month56.

6.2 Reason, work status, and destination of migration

We summarize the reason of migration, if they work at the destination, what the occupation is if working, and the destination of migration. However, note that these information is available only at the first month of the migration. So, even if a migrant change his work status, job, or place, we cannot trace them.

Table6-5 shows the reason of migration. The number of observations is more than the number of migration since people can answer plural reasons. The most popular reason of migration is temporary employment, which accounts for more than half of the total number of migration. Migration for better permanent employment follows as the second most popular reason, but the number is much smaller. Thus, the main motivation of migration is to find work in the destination. Indeed, we find that more than 80% of migrants work at the destination. 185 individuals leave the village to return own household. In the analysis of migration, we probably should exclude them since their motivation of migration is completely different from the migration for work.

Table6-6 summarizes the occupation of migrants at the destination if they work. Three major occupations are ones in construction, agriculture sectors and factory work. Finally, Table6-7 summarizes the destination of migration. Bangkok is the destination where the most number of migrants goes. However, the "importance" of Bangkok is different between migrants from north-east and from central region. We had better exclude migration "within" the same village (hence, 214 observations).

6.3 Frequency and duration of migration

Thanks to the panel property of the data, we can follow individuals through time so that we can know how frequently and how long an individual is out of his village.

Table6-8 shows the frequency of migration. It shows the number of individuals by the frequency of migration. We can obtain some findings. First, more than half of the adult population (1,512 out of 2,911) experiences staying out of the village for at least one month. Second, more than 20% of the adult population experience migration more than twice. Although not shown here, a similar table as Table6-8 by changwat exhibits a consistent picture with the aggregate migration rate above. First, in Chachoengsao and Lopburi, the share of those have experienced migration at least once is about 40%. On the other hand, this share is 65% in Buriram and 58% in Sisaket. Furthermore, the share of people with frequent migration (defined as those experienced migration more than twice) is much higher in Buriram (36%) and Sisaket (27%) than in Chachoengsao (10%) and Lopburi (14%).

Table6-9 summarizes duration of temporal migration. Note that we can observe the duration of migration if the individual returns his village. So, we cannot measure the duration if the migration is permanent or if the individual is still out of village at month88. So, there is a danger of over-representation of short-period migrations. To handle this issue, we need econometric hazard analysis. In total, 1,781 temporal migrations are observed. That is, return migration is completed before month88. Many temporal migrations are really short. More than 64% of the temporal migration is completed within 5 months. Temporal migration with longer duration is relatively rare or censored at month88.

Finally, Table6-10 shows mean duration of temporal migration by changwat. Although the standard deviation is relatively large, a simple mean comparison exhibits that the mean duration of the two richer changwats is significantly longer than that of the two poorer changwats. Furthermore, the last column shows the share of completed return migration out of total number of migration observed. The shares of two poorer changwats are by 20-30% higher than those of two richer regions. Although not show here, mean duration by education level also shows a similar pattern. The mean duration of highly educated people is longer than those with low education.

Further investigation needed

- How are migrants seeking for temporary employment and seeking for permanent employment different?
- Involved in a different occupation than the one at the village?
- What is the impact of migration on the economic activities of the family member in the origin village?
- wage comparison between people with frequent migration and never-migrating people.
- How is migration related to the asset (or wealth) growth of poor?
- Temporal migration as a consumption/income smoothing device for poor?
- How to deal with the relation between diversification and migration
- If migration is a way to diversify, further observation is needed.
- Selection issue could occur in the analysis on wage (or other activities).
- econometric duration analysis

7 Analysis on wage jobs

Wage jobs are very important in rural Thai villages [need more story].

Nominal hourly wage rate is computed for each wage job in each month by the following formula:

$$Nominal\ hourly\ wage\ rate = \frac{Earnings + Benefit - Expense}{Hours * Days}$$

Then, all wage rates are converted into real term using CPI, available from Bank of Thailand, for each province.

7.1 Simple summary statistics on wage jobs

7.1.1 Number of paid jobs per worker by education level and changwat

We first count number of paid jobs and number of those who have ever been involved in at least one paid job. The tabulation is done by education level and changwat respectively (Table7-1 and Table7-2). First, Table7-1 summarizes number of paid job created and number of people who have at least once experienced a paid work by education level. Then, the former number is divided by the latter number for each education category, which corresponds to "number of paid job per person by education level". Interestingly, the number of paid job per person (or, job/people ratio) decreases as education level goes up. The number is as high as 10 for those with no education, while that is 1.8 for those with tertiary level education. This implies that lowly educated people frequently switch job (or employer) even among paid job.

We do a similar exercise on changwats. Table7-2. Chachoengsao has the lowest job/people ratio. Interestingly, the job/number ratio of Lopburi, which is another changwat in Central Thailand, is higher than that of two changwats in north-east.

7.1.2 Sectors of paid jobs

Next, we look at sectors of paid jobs. The following sectors are the main ones: agricultural work, government work, construction, factory worker, and general non-agricultural job. All other categories are classified as "others".

Table7-3 summarizes the sectors of paid jobs and education level. We find

- The share of agricultural work out of total number of paid jobs in each education category decreases as education level goes up.
- The share of government work out of total number of paid jobs in each education category increases as education level goes up.
- Factory work is not main sectors for those with no education and with only primary education.
- The share of category of "others" increases as education level goes up (WE CANNOT DECODE THE SPECIFIC EXPLANATION OF JOBS IN THE DATA)

Table7-4 summarizes the share of each sector in each changwat. We find

- High share (more than 50%) of agricultural work in all changwats except Chachoengsao.
- The share of factory and general no-agricultural work in Chachoengsao is much higher than those of any other three changwats.

Finally, Table7-5 summarizes sectors and type of employers. We find

- Most of the employers for agricultural work and construction work are individuals.
- Most of the employers for government work and factory work are business/organization.

7.1.3 Mean wage and variance by education level

Table7-6 shows the mean and variance of wage by education level. The mean and variances are computed by pooling all wages for 88 months. It seems that mean wage goes up as education level goes up except primary level and lower secondary level of education. However, since we have not controlled any other factors affecting wage level, this could happen. For example, the average age of those with primary level of education (edu=2) is 40, while the average age of those with lower secondary level of education (edu=3) is 26. So, there is 14 years difference between the means of the ages. This "potential experience" could affect the wage level, which may have caused the reverse order of mean wage between edu=2 and edu=3. We will conduct partial correlation analysis below.

In terms of variance of wages, the one for those with no education is very low.

Figure7-1 plots mean wage by education level in each month. The mean wages of edu=2 and edu=3 are very similar through the time, which confirms the findings from a simple tabulation of Table7-6.

7.1.4 Wage by changwats

We next tabulate the mean and variance of pooled wage by changwat in Table7-7. Surprisingly, the mean wage in Sisaket (53) is higher than the one in Chachoengsao (7). Remember that Sisaket is a changwat in north-east. Although we poled all wages for 88 months in Table7-7, Figure7-2 shows that mean wage rate of Sisaket is highly volatile, but is the highest among the four provinces especially after 40th month. The mean wage rate in Buriram is the lowest in almost all the months. And, we don't see much wage growth in all the changwats except Sisaket. There seems to be a slight decreasing trend in the mean wage rate of Chachoengsao.

Note on Sisaket In Sisaket, most of the jobs other than government work are casual and the numbers of jobs are small. About 20 people are involved in government work and the average wage rate is stable through time between 40 and 60 bahts. Thus, the majority of the jobs observed in each month is government work (except agricultural peak seasons). So, what happens in the transition of the mean wage rate in Sisaket reflects the movement of mean wage rate of government work (especially the hill between month 50 and 70. The high level of mean wage does not mean that overall wage rate is high in Sisaket, but it means the selection bias regarding to participation causes that.

Further investigation needed

- We need to know the driving force of wage growth in Sisaket. What occupation?, Characteristics of people experiencing wage increase?, What is the difference between Sisaket and all other three changwats???

7.1.5 Sectoral wages

Figure7-3 plots mean wage by sector in each month. The mean wage of government work is the highest around at 40-50 bahts/hour. But, as we will look at below, this high wage rate is driven by the one for highly educated government officers. Mean wage rates in all other sectors are similar around at 20 bahts/hour. But, the volatility in mean wage in agricultural sector is higher than other sectors except government work.

7.1.6 Wage and hour-worked per week

The tabulation on wage rate and hour-worked per week by education level shows an interesting finding. We compute hour-worked per week by

$$hour - worked\ per\ week = \frac{total\ hours\ worked\ \sin ce\ the\ last\ intervies}{number\ of\ days\ \sin ce\ the\ last\ intervies} * 7$$

The hour-worked per week is classified into 6 categories (<10. 10<<20, 20<<30, 30<<40,40<<50, 50<). The wage rate (bahts per hour) is also classified into 6 categories (<10. 10<<20, 20<<30, 30<<40,40<<50, 50<). Table7-8 shows the result of tabulation by education level. Although the result is a bit noisy, there is a tendency. That is, the working hours per week for those whose wage rate is low is likely to be shorter than that of high wage earner. In deed, in Table7-8, the observations of edu=1 are concentrated in the north-west region of the table. As education level goes up, the region of concentration shifts to east and south. In the case of edu=5, the most frequent category is the one with 30-40 hours per week and wage rate of more than 50 bahts per hour.

This is consistent with the findings from other tables: lowly educated people rather have occasional and low wage job such as ones in agricultural sector. On the other hand, highly educated people tend to have jobs with regular full time work and high wage rate.

7.2 Partial correlation

The observations from the simple tabulations on wage and one variable of interest above cannot control other factors. Here we conduct partial correlation analysis to control, at the same time, many factors which are likely to affect wage rate. The variables we use are

- changwat dummy
- monthly dummy (e.g. January, February, March...)
- general time trend
- changwat specific time trend

- log age and log age squared
- education dummy
- sector dummy
- type of employer dummy

Table7-9 shows the result. Main findings are:

1. The wage rate is significantly higher in March, April, May and June than October.
2. Chagwat specific trend exhibits that Lopbri (49) and Sisaket (53) experiences the rapid upward trend in wage growth than Brirum (27), which confirms the finding from Figure7-2. On the other hand, that of Chachoengsao is negative.
3. Log age has a quadratic curve.
4. Primary education does not help much.
5. Wage goes up as education level goes up after secondary level of education. Although Table7-6 or Figure7-1 shows the mean wage of those with primary education and those with lower secondary level are similar, the impact of the education significantly differs once other factors (especially, age, I think) are controlled.
6. Once other factors are controlled, wage of all sectors are significantly lower than that of construction. Especially, wage rates of agricultural and government work are much lower.
7. If an employer is business/organization or many individuals, it pays higher than individual employers.

7.3 Simple wage regressions

7.3.1 Mincerian

[I skipped this part since the observations obtained are similar to the ones obtained from partial correlation analysis. But, in the partial correlation analysis, since individual effect is neglected, we may have to run some regressions controlling the effect.]

7.4 Coefficient of variation by education level and sectors

7.4.1 By education level

Figure7-4 shows the coefficient of variation (c.v.) of wage rate through 88 month for each education category. The c.v. of edu=1 is lowest almost all the time among the education categories. The c.v. of edu=2 is highest almost all the time, and furthermore, it fluctuates a lot. The c.v. of edu=4 and edu=5 behave similarly around at 0.8. The movement of c.v. of edu=3 is very strange. It some times as low as the one of edu=1. But in some month, it jumps up. However, if we consider the c.v. of "monthly" wage earnings, the story is very different. Figure7-5 shows the c.v. of monthly wage earnings. Monthly wage earnings is obtained by adjusting total net payment for number of days since the previous interview. In this case, the c.v. of edu=1 is highest most of the time periods, but it seems decreasing through time. The c.v. of edu=2 follows the one of edu=1. The magnitude of c.v. is almost in order of education level in each month. That is, education level and magnitude of c.v. is negatively correlated in each month. However, c.v. of edu=3 is exception. Its c.v. is lowest in almost all the months.

Next, we compare our findings with c.v. figure from the Labor Force Survey prepared by Tee (Figure7-6). First, in LFS, the c.v.s are in very clear order. In each month, the lower the education level is, the higher the c.v. is. In the monthly data, we get a similar finding except the one of edu=3. Second, in comparing the level of c.v. at each education level, the c.v. from the monthly data is much lower than that from LFS except the ones of edu=5. The c.v. of edu=5 is around at 0.7-0.8 in both the monthly data and LFS. However, the c.v. of edu=1 and edu=2 in LFS exceeds 2 while that in the monthly data is far below 2 in almost all the months. Similarly, the c.v. of edu=3 and edu=4 is far above 1 in LFS while that in the monthly data is less than 1 in most of the months.

In sum, in comparing the c.v. obtained from the monthly data with the ones from LFS, the order of c.v. by education level is very similar each other, but the level itself is much different except the ones of edu=5.

Further investigation needed

- Again, the similarity in the level of c.v. of edu=5 between the monthly data and LFS could give us a clue. Popular jobs (such as government works) by people with edu=5 could be very homogeneous among various changwats while those by lowly educated people are more heterogeneous among changwats. Another explanation is just by noise in the data...

7.4.2 By sectors

Figure7-7 shows c.v. by each sector through time. Several findings are:

- high volatility in c.v. of agricultural work
- relatively high and stable level of c.v. in government work
- low and stable c.v. in factory work
- c.v. of construction is low and stable until month of 60, but it starts fluctuating highly after month of 60.

We will look into further the mechanism behind the movement of each c.v.

For agriculture, it is likely to depend on type of jobs. Since it is impossible to decode the concrete description of the jobs in the data, I need to contact Thai office.

For government work, first, note that no observation of government work is found in edu=1. Second, the wage gap due to education level is huge. For example, (pooled) average wage of government worker with primary level of education(edu=2) is 19 bahts while that of those with edu=5 is 92 bahts. The wage gaps in any other sectors due to education level are much smaller than this. Third, Figure7-9 shows the variation in wage in lower education categories (edu=2) is larger than higher education categories(edu=4 or edu=5), but the level of c.v. is stable. These facts yield relatively high and stable level of aggregate c.v. in government work.

Low and stable c.v in factory work is obtained by similarity in mean wage regardless of education level. For example, (pooled) mean wage of edu=2 is 24bahts while that of edu=5 is 31 bahts. And, c.v. of each education category is stable and low. These yields low and stable aggregate c.v. in factory work.

For construction, more than 80% of works are done by people with edu=2. Figure7-10 plots c.v. of construction work done by people with edu=2. It is relatively low and stable until month of 36, but it starts to volatile a lot after that.

Further investigation needed

- variation in agricultural work
- the reason why the c.v. of construction work starts to volatile as time goes.

7.5 Coefficient of variation by each individual through time

Next, we trace wage variation of each individual through time. We compute c.v of wage for each individual who is at least involved in wage work for 5 months during the 88 months. Table7-10 summarizes the mean c.v. of individual by education category. The c.v. of edu=1, edu=4 and edu=5 seems to be higher than c.v. of edu=2 or edu=3, but the difference is not so clear.

Table7-11 summarizes the mean c.v. of individual by changwat. Note that the mean c.v. in Sisaket (53) is much higher than the ones of all other three changwats. But, this does not necessarily mean that the volatility in wage rate is high. It may just pick up the growth of wage rate as we looked at in section 6-1. The mean c.v. of Buriram is also higher than the one of two central changwats.

Finally, we run a simple OLS regression of the c.v. on several characteristics. Years of education seems to be positively correlated with magnitude of c.v., but the statistical significance is marginal (at 10% level). Age has no correlation with c.v. People in two villages in Sisaket (_Ivilid_5306 and _Ivilid_5310) experience much higher c.v. than people in other villages.

Further investigation needed

- How to distinguish between wage growth and wage volatility?
- Issues of selection bias (selection bias of what???)
- coefficient of variation by each individual through time require that a person is observed as a paid worker for enough number of months.

8 Wage imputation exercise

We are interested in the (shadow) wage rate of individuals even in a month which they do not show up wage labor market since:

(1) it makes possible to compare marginal productivity of wage work and other economic activities, and

(2) leisure-work choice can partially considered.

(3) partially observe the shadow cost of migration

For these motivations, we utilize as much information as possible to impute (shadow) wage rate for individuals.

8.1 The procedure

The procedure of wage imputation is the following:

1. If we can observe a wage rate in a month, we use the wage rate for the month (no further work needed).
2. If we don't observe a wage rate in a month, but we observe a wage in another month which is not in the month of interest.: we impute the wage rate in the month of interest by using the wage rate in the another month after adjusting for age, changwat-specific time trend and monthly cycle. For the adjust ment, I just pool all wage rates and run a simple mincerian regression. I used the coefficients for the adjustment (but, this may be logically inconsistent with the selection corrected regression below. However, due to a problem of instrument variables, this is probably best I can do). To impose

the following rule, I just experiment how many times each person need to show up in the wage labor market. It seems that the result does not change a lot. So I proceed with the simplest one: if a person shows up at least one time in the wage labor market, we impute his wage in other months by the following rule:

- If we can observe wages three months prior or after the month of interest, we use the wage of nearest month for the month of interest.
- If we cannot satisfy the condition above, we look for wages in a same calendar month but in a different year back and forth. If we can find, we use the wage in nearest year of the same calendar month.
- If no conditions of the two above are satisfied, we look for a wage in the nearest month.
- If no conditions above are satisfied, it means an individual has never entered wage labor market. We need other way to impute wage for these individuals.

3. In a case that a person has never show up in the wage market, we cannot utilize his information in the market. So, we need to use cross-sectional information for the imputation. Also, a selection problem is an issue. I run the following standard selection corrected wage regression and impute wages.

   Suppose each individual determine whether to participate in the wage job market by the following equation:

   $$D = \begin{cases} 1 \quad (participate) \quad if \quad z\gamma + \epsilon > 0 \\ 0 \quad otherwise \end{cases}$$

   Applying probit, we get propensity score $P(z)$. The wage equation is given by

   $$\log W = x\beta + u$$

   where W is wage rate, x is the covariates. Note that we should have at least one variable which is included in z, but not in x . And we assume that

   $$E(u|x, z) = 0$$

   However, all we have is

   $$E(\log W|x, z, D > 0) = x\beta + E(u|x, z, D > 0)$$

   and

   $$E(u|x, z, D > 0) \neq 0$$

   We model $E(u|x, z, D > 0)$ by using the propensity score:

   $$E(\log W|x, z, D > 0) = x\beta + \sum_{k=1}^{K} \eta_k P(z)^k$$

By using the sample of those who actually work in the wage job market, we can estimate β and η_k. Then we use these coefficients to impute the wage for those has never shown up in the market. Note that

$$E(u|x,z) = E(u|x,z,D>0)P(z) + E(u|x,z,D<0)(1-P(z)) = 0$$

So, we get

$$E(u|x,z,D<0) = -\frac{E(u|x,z,D>0)P(z)}{1-P(z)} = -\frac{\left(\sum_{k=1} \eta_k P(z)^k\right) * P(z)}{1-P(z)}$$

So, from the information we have, we can construct

$$E(\log W|x,z,D<0) = x\beta + E(u|x,z,D<0)$$

which is a wage a person who are out of the wage job market would get if he were in the market.

We still need caution on how we restrict the sample used in the regression so that we have at least one plausible instrument in the first stage (probit). We restrict the sample of those who work in the wage market to those whose job is only the wage job. That is, I drop all observations who have wage work AND some other works (such as cultivation, livestock, business, etc). So all observations with wage rate are those who have wage work and it is only job they have in the month. For the first stage estimation, we pool those observations and those who have never shown up in the labor market. The exclusion restrictions (ie. instrumental variables) are (1) non-labor asset, and (2) demographic information of the household, which are commonly used in the labor literature in developed countries. There will be argument whether they are valid instruments or not in the setting of developing countries. To minimize the bias and make the instruments valid, we exclude multiple job holders who have wage work and some other works. So, extensive margin is whether they do wage work or not. If there are significant difference between those with wage work as a single job and those with multiple jobs including wage work, our method may derive biased result.

There are some reminders. First, I pool the observation of all the 88months and don't use any fixed effect estimation method. This is because it is impossible to recover the individual time-invariant effect for the imputed wages. Second, after several experiments, I choose 4th orders polynomial of propensity score to model the control function. Third, since we do not know the sector, we just assume the imputed wage is set so that they work in agricultural sector.

8.2 The results

We restrict the sample to those whose age is between 18 and 59. There are 2421 individuals. With the procedure explained above, we get the following results

- 90 individuals (4.2%) supply their labor for wage jobs in all months observed. There is no need of imputation for these individuals.

- For 59 individuals (2.5%), we can observe wage in all months other than those months when they are out of the village. So, it is possible to impute wage for the months they are out of village.

- 761 individuals (31.4%) show up wage labor market at least once. With the information, we can impute wage for other months.

- There are 1265 individuals (53.6%) who are in the village and have never entered wage labor market. We cannot impute wage for them with the procedure above.

- There are 141 individuals who does not do any economic activities for entire period when they stay in the village. Out of the 141 individuals, 88 individuals are female.

- There are 105 individuals (8.2%) who are out of village for all the months. We cannot impute wage for them with the procedure above.

8.2.1 Estimation results of selection corrected wage equation and the comparison of wage distributions

Here, I report the estimation results of probit and selection corrected wage equations. Then I show the distribution of the imputed wages with propensity score and compare them to the distribution of actual wage (and propensity score).

Table 8-1 shows the estimation result of probit. Most of the coefficients are significant and of expected sign. Exclusion restriction variables are also significantly explain the wage job market participation.

Table 8-2 shows the estimation result of selection corrected wage regression. Most of the coefficients are significant and of expected sign. The coefficient of education dummies are positive and increases as education level goes up. Wage level is higher in Chachoengsao than other three changwats, but changwat specific time trend shows some catch-up by these three changwats. Note that the overall time trend is negative. Coefficients of polynomials of propensity score are all significant.

Then, we imputed wages for those who have never shown up in the wage job market, using the coefficient of the regression and propensity score. Table 8-3 compares the (pooled) mean of imputed wages and actual waged used in the wage regression by education level. To exclude the impact by outliers, we exclude the wages greater than 200 bahts/hour. At any level of education, the mean of imputed wage is lower than the counterpart. For example, in edu=3, the mean of imputed wage is 13 bahts/hour, while that of actual wage is 24 bahts/hour.

There are two reminders. First, although the level of imputed wage is a bit sensitive to the choice of order of polynomials in the wage regression, the mean level of imputed wage is almost always lower than the counterpart.

Second, the econometric model estimates the imputed wage extremely high for some people whose propensity scores have high value (close to 1). Indeed, the imputed wages of about 0.3% of the observations exceed 100 bahts/hour, which may not be plausible. Judging from the figures below, we may be sure that those people would earn high wage, but the actually imputed wages seem to be too high. To minimize the estimation error, we set the imputed wages for those observations to 100bahts/hour.

Figure8-1 to Figure8-10 compare the distribution of imputed wages to actual wages that are used in the wage regression by the value of propensity score. So, in each figure, the imputed or actual wages are on the vertical axis, while the values of propensity score are on the horizontal axis. We have following findings:

- InFigure8-1,3,5,7,and 9, we find observations whose propensity scores are close to 1 and the wage rates are at 100 bahts. These observations are the ones adjusted due to the reason mentioned above. In general, the value of propensity score and wage rate has positive correlation in the range where the propensity score is greater than 0.8. The rate of increase in wage rate is very steep (this is true even changing the order of polynomials in the wage regression). But, wage rate is not increasing as value of propensity score increases in the range where value of propensity score is less than 0.8. Or, there seem to be a slight negative relation between them in that range.
- Although noisy, if we compare the mass of observations at a same level of propensity score between imputed and actual wages, actual wages have more mass at higher wage levels. This leads to higher mean of actual wage than imputed wage.
- But, at the same time, it is also true that levels of some actual wages are lower than the imputed wages due to the disturbance term.

9 "True" profitability of household economic activities

9.1 Aim and method

In usual accounting data, we can measure revenue and expense of each household economic activity, which allows us to compute profit of the activity. However, family labor cost is usually neglected. That is, the shadow wage paid to family members involved in the economic activity is not appeared in the data. So, this cost is simply neglected. The aim of this section is to compute the family labor cost by using the imputed wages so that we can calculate "true" profit of the household activity. This is very important and interesting because this is consistent with economic theory on household model.

For the purpose, we implement the following procedures for each household economic activity.

(1) We calculate shadow earning of each family member by using the imputed wage and number of hours and days reported.

(2) Then, we add up the shadow earnings to calculate family labor cost of each household economic activity in each month.

(3) We subtract the family labor cost at the month when the household earn revenue. If no revenue while positive labor cost, we carry the family labor cost forward until we observe revenue.

9.2 Re-calculation results

For the sake of comparison, we show the results of "true" profit and "gross" profit for each household economic activity. Gross profit is defined as a profit without considering family labor cost. Hence, by definition, "gross" profit is always higher than or at least equal to "true" profit. For each household economic activity, we show (1) distribution of profit, (2) share of positive/negative profit households and (3) estimation of profit function.

9.2.1 Business

Figure9-1 shows the distribution of true profit. I pool true profits of all business households in all months available. Outliers, whose profit are greater than one hundred thousand bahts or less than negative one hundred thousand bahts are excluded. The observations are centered around zero, implying many business earn small positive or negative profit. However, it is also true that more than 60% (62.7%) of month-household business observations earn negative profit.

We next show the time trend of business. Figure9-2 shows the share of business households that earn positive profit in each month. That is, it is defined as

$$\frac{\#\, of\, HH\, that\, earn\, \text{positive}\, profit}{\#\, of\, HH\, that\, raise\, revenue}$$

Interestingly, there is an increasing trend in this share through time. Until month 17, the share is not more than 30%. But, the share has increasing trend thereafter, and the share exceeds 50% in month 88. A simple regression of the share on time trend and calendar months makes sure the finding. Table9-1 shows that time trend is positive and strongly significant. There could be several interpretations on what causes the increasing trend of the share of positive profit business households. Macro shock could explain the finding. If household business survives for long time enough, learn-by-doing may explain the finding.

We next run very simple profit function. The result is shown in Table9-2. The independent variables are dummies for highest education level among family member, age of the family member of the highest education, the age squared, changwat dummies, calendar month dummies, time trend, changwat specific time trends, and number of family members involved in household business (nib).

There are several interesting observations emerge. First, higher education does not increase profit. Especially, secondary level education decreases profit a lot. This may be because we subtract family labor cost from crude profit. Higher the education is, larger the imputed wage and shadow earning of the family member is. This results in the negative and significant coefficients of education dummies. This kind of "shadow-family-labor-cost" effect reappears in the coefficient of the number of family members involved in household business (nib). It implies that more the number of family member involved in the household business is, less the profit is. The subtracted family labor cost impacts the true profit. There is strong and increasing time trend in profit. This is consistent with the increasing share of positive profit business households. Profit tends to be higher in Lopburi and Sisaket compared to that in Chacheongsao, but the increasing trend is lower.

Finally, we re-do all analysis for gross profit. Figure9-3 shows the distribution of gross profit. We see lots of household business earn positive profit although the level of the profit is relatively small. Indeed, 78.9% of the month-business household observations earns positive profit. This implies 41.6% of the observations turn to negative profit from positive profit once we subtract family labor cost. Figure9-4 shows that there is a strong and increasing trend in the share of business households that earn positive profit. A simple regression in Table9-3 makes sure the trend statistically. Finally, Table9-4 shows the result of simple gross profit estimation. The coefficient of education dummy of edu=5 is positive and significant. So, if there is a highly educated family member, the gross profit is significantly higher. At the same time, the coefficient of the number of family members involved in household business (nib) is positive and significant. So, more the number of family member involved in the household business is, higher the profit is. The last two results are completely opposite to the ones found in true profit regression. This implies how to deal with shadow family labor cost is very important and crucial to how we interpret the profitability of household business.

9.2.2 Fish/shrimp

For fish/shrimp, there are two cautions. First, we include all type of fish/shrimp activities. Some could be large scale fishery, others are those that people just go to river and catch fish. Second and related to the first caution, in the case of the latter case, lots of households report no family labor supply. So, they could have only profit, but no physical nor family labor cost.

Figure9-5 shows the distribution of true profit. Outliers, whose profit are greater than 1,000 bahts or less than negative 1,000 bahts are excluded. As it is obvious from the figure, the profits of fish/shrimp are very small. More than 90% of the month/fish/shrimp household observations earn positive profit. These two facts may be artificial because of the two cautions mentioned above.

We next show the time trend of fish/shrimp. Figure9-6 shows the share of fish/shrimp households that earn positive profit in each month. There seems no clear trend. Table9-5 confirms that there is no clear time trend.

We run very simple profit function. The result is shown in Table9-6. The independent variables are same as ones used in the regression of business profit. Profit tends to be lower as highest level of education among family members goes up. Furthermore, the coefficient of the number of family members involved in fish/shrimp (nif) is positive and significant. This implies that, even after subtracting family labor cost, the profit tends to be higher when the number of family member is larger. The profit is significantly higher in Chachaeongsao than in other three changwats, which may reflect that, in Chachaeongsao, fish/shrimp is closer to stylized business.

Finally, we re-do all analysis for gross profit. Figure9-7 shows the distribution of gross profit. Most fish/shrimp activities earn positive profit. Indeed, 96.7% of the month-fish/shrimp household observations earns positive profit. But, the observed profits are very small. Figure9-8 shows that there is not so clear trend in the share of fish/shrimp households that earn positive profit. Table9-7 shows that the coefficient of time trend is very close to zero and insignificant. Finally, Table9-8 shows the result of simple gross profit estimation. Education dummies do not have monotone relation with profitability. The coefficient of the number of family members involved in fish/shrimp (nif) is positive and significant. There is no significant time trend. The profit is significantly higher in Chachaeongsao than in other three changwats.

Cultivation Figure9-9 shows the distribution of true profit. As it is obvious from the figure, the profits of fish/shrimp are small and non-negligible number of the observations earns negative profit.. Only 58.13% of the month-household observations earn positive profit.

We next show the time trend of cultivation. Figure9-10 shows the share of agricultural households that earn positive profit in each month. We can find strong agricultural seasonal cycle. But, there is no clear time trend. Table9-9 reveals in which months there are more households with positive or negative profits. According to the results. The share of agricultural households with positive profits is higher in February and November (compared to March). But, the reasons why the share is higher seem to be different between the two months because February is a typical agriculturally off-season while November is a typical peak season. Further, although not shown here, the numbers of households that have revenue (or income) in these two months are very different. For example, there are 128 households that raise income in the first February (7th month) in the survey, while there are 319 households in the first November (4th month) in the survey. We infer that, in February, households sell some agricultural products from their stock, so they don't have much labor or physical cost. This leads to higher share of households with positive profit. On the other hand, in November, many households need lots of labor, but at the same time they can raise high revenue because it is harvesting season. The share of agricultural households with positive profits is lower in May to August.

We run very simple profit function. The result is shown in Table9-10. The independent variables are same as ones used in the regression of business profit. Profit is higher if the level of education is higher than primary level. Furthermore, the coefficient of the number of family members involved in cultivation (nic) is positive and significant. This implies that, even after subtracting family labor cost, the profit tends to be higher when the number of family member is larger. There is no overall time trend. The profit in two northeast changwats is significantly lower than that of Chachaeongsao. Especially, the profit level in Sisalet is far below the one in Chachaeongsao. However, changwat-specific time trend of Sisaket (chan53m) implies that the growth rate of profitability in Sisaket is significantly higher than that of Chachaeongsao. We also find that highly seasonal cycle in the level of profits. Profit level tends to be higher in January, February, and September-December (compared to March). On the other hand, the level tends to be lower in April to June.

Finally, we re-do all analysis for gross profit. Figure9-11 shows the distribution of gross profit. Many earn positive profit. Indeed, 91.4% of the month-household observations earns positive profit. This implies 33.3% of the observations turn to negative profit from positive profit once we subtract family labor cost. Figure9-12 shows strong agricultural seasonal cycle. But, there is no clear time trend. Table9-11 shows that the share of agricultural households with positive profits is lower in June to August, but there is no clear tendency of higher share in February and November as seen in the case of the true profits.

Table9-12 shows the result of simple gross profit estimation. The findings are very similar to the ones from true profit estimation.

Livestock Figure9-13 shows the distribution of true profit. As it is obvious from the figure, the profits of livestock activity are small and non-negligible number of the observations earns negative profit.. Only 71.3% of the month-household observations earn positive profit.

We next show the time trend of livestock activity. Figure9-14 shows the share of livestock households that earn positive profit in each month. We can find a strong decreasing trend, implying that the share of households with positive profit decreases through time.Table9-13 confirms the decreasing time trend. There seems no seasonal cycle.

We run very simple profit function. The result is shown in Table9-14. The independent variables are same as ones used in the regression of business profit. Education has non-monotonic impact on the level of profits. Profit tends to be lower if the highest level of education among family member is primary or tertiary level. The coefficient of the number of family members involved (nil) is strongly negative and significant. There is no overall time trend. Combining with the result in Table 13, we may say that the level of profit has no clear decreasing trend, but the share of households with positive profit is decreasing. This may implies that profit levels among households may diverge through time. The profit is significantly higher in Chachaeongsao than in other three changwats.

Finally, we re-do all analysis for gross profit. Figure9-15 shows the distribution of gross profit. The profits are highly centered around zero. 90.2% of the month-household observations earns positive profit. This implies 18.9% of the observations turn to negative profit from positive profit once we subtract family labor cost. Surprisingly, Figure9-16 has no decreasing trend as Figure 9-14. Family labor cost does play a crucial role in determining true profitability of livestock. Table9-15 even shows positive an significant time trend by reflecting the steep increase of the share after 70th month

Table9-16 shows the result of simple gross profit estimation. The profit tends to be higher as education level goes up. The coefficient of the number of family members involved (nil) is strongly POSITIVE and significant. These two results are completely opposite to the ones found in true profit regression. This implies how to deal with shadow family labor cost is very important and crucial to how we interpret the profitability of livestock activity. The profit is significantly higher in Chachaeongsao than in two northeast changwats.

Summary and further investigation

- Among economic activities, very different trend in the share of the share of households that earn positive profit.
- In business and livestock, role of education and number of family member are completely opposite between true and gross profit functions.
- I guess actual wage, not imputed wage, may cause the vast negative profitability of business. Highly educated people are more likely to have paid job AND business if they have multiple jobs. So, for them, actually observed wages are used to compute family labor cost for business. Any way to adjust that? So far, I have no justification to modify the wage rates for business....
- What kind of business enter/exit?
- In each economic activity, what kind of households enter/exit? : extensive margin (enter/exit) is not considered
- learn-by-doing
- what determines highly educated people's decision?
- more sophisticated econometrics (considering the structure of panel data)

10 Schooling/activity of kids and young

In this section, we focus on schooling of kids and youth between age of 6 and 18. There are several assumptions imposed in constructing the variable of schooling. First, the definition of "age" in the survey is a bit ambiguous because it asks the age on the last birthday. So, two individuals who were born in a same year may report different ages, which may make cohort effects ambiguous. We assume that all individuals gain their age by one year every 12 months (i.e., in month13, 25, 37,...). Second, although there are questions on completion of schooling in the survey, there are lots of missing data. We cannot get the information on when and which grade an individual completes. So, all we can do is to estimate the progress of grade from the data on the number of days spent on schooling and the data on migration (migration for schooling). One good point is that we can trace kids who migrate when possible. We assume that if an individual goes to school at least 4 months in a year, he/she proceeds to the next grade.

In the data, there are 1,636 who are at age between 0 and 18 at least for one month during the 88 months. Table10-1 shows the number of individuals in each cohort. In the table, cohorts are defined by the age at the time of the initial baseline survey. Note that the numbers of observations include those who are added later (those in replacement households) and those who disappear after month1 (those in the households which entirely migrate or which refuse answering). So, the number of individuals in each cohort is the "maximum" number. The size of each cohort is relatively small. the largest cohort in terms of the number of individuals is the one whose age is 13 at the baseline survey, whose size is 96.

We start with the "pooling" schooling rate of all cohorts at the same age. I pool all observations by age and compute schooling rate. By this procedure, any cohort effect is neglected. Figure10-1 shows the schooling rates of each age between age of 6 and 18. The rate is over 80% until age 12. Then, it steeply decreases as age goes up. The rate is as low as 40% at age 18.

We next try to figure out cohort effect. As discussed, the sample size of each cohort is relatively small and the definition of age is somehow ambiguous. So, I pool the observation by three-year cohorts depending on the age at the time of the baseline survey. For example, I pooled those observations whose ages at the baseline are between 4 and 6 years old and compute the schooling rate of the three-year cohort by age. Figure10-2 shows the result. Unfortunately, cohort effect is not so clear from the figure. We may expect that later cohort enjoy higher schooling rate than earlier cohort compared at a same age. But, this is not always true. For example, at age 10, the schooling rate of 7-9 cohort is higher than that of 4-6 cohort.

Next, we decompose the schooling rate by several characteristics. Figure10-3 shows schooling rates by changwat. Interestingly, the schooling rates of all changwats stays around or above 80% until 12 or 13 years old. However, the schooling rates significantly differ each other after age of 13. As we expect, Chachoengsao (chan=7) has the highest schooling rates at almost all age ranges after 13. The rate is as high as 60% even at the age of 18. Schooling rates of other three changwats behave similarly, but the rate of Buriram (chan=27) is the lowest at almost all age ranges after 13.

Figure10-4 reports schooling rates by household head's education level. The distribution of household heads' education level is: no education (7.6%), primary level (82.47%), lower secondary (1.6%), upper secondary (5.2%), and tertiary (3.2%). So, most of the household heads have primary level of education and we must be cautious in small sample issue of other education categories of household heads. However, even if this is a problem, the schooling rates seem to differ depending on the household heads' education. The schooling rate of kids whose head has no education is lowest at all age ranges. The schooling rate of kids whose head has primary level education is second lowest at almost all age ranges.

Figure10-5 reports schooling rate by income quantiles. The schooling rate of the highest quantile maintains the highest level among the four quantiles. But, one strange observation is that the schooling rate of the upper middle quantile is the lowest after age 13.

Table1-1: Number of households in the survey

month	successfully surveyed	failed due to migration	refusal	Total
6	665	20	1	686
7	666	14	1	681
8	671	14	1	686
9	672	12	2	686
10	673	18	0	691
11	668	21	2	691
12	674	18	0	692
13	670	19	0	689
14	670	20	1	691
15	671	20	0	691
16	665	24	1	690
17	660	29	2	691
18	655	31	1	687
19	652	36	1	689
20	640	32	16	688
21	648	37	2	687
22	658	26	5	689
23	662	24	3	689
24	664	21	4	689
25	657	27	4	688
26	654	33	2	689
27	664	29	2	695
28	674	25	2	701
29	673	28	1	702
30	671	31	1	703
31	670	32	2	704
32	675	27	2	704
33	673	29	2	704
34	675	27	2	704
35	679	24	1	704
36	679	25	3	707
37	681	25	1	707
38	679	27	1	707
39	680	26	2	708
40	677	29	1	707
41	671	36	1	708
42	673	34	1	708
43	674	33	1	708
44	674	31	1	706
45	672	33	2	707
46	676	28	4	708
47	672	34	2	708
48	673	34	2	709
49	675	30	2	707
50	675	30	2	707
51	675	31	2	708
52	666	38	5	709
53	667	39	4	710

54	666	40	4	710
55	662	31	5	698
56	666	39	4	709
57	664	41	4	709
58	670	36	4	710
59	671	35	4	710
60	669	36	5	710
61	672	12	1	685
62	670	15	1	686
63	672	13	1	686
64	671	14	1	686
65	668	16	2	686
66	667	17	2	686
67	670	15	1	686
68	671	14	1	686
69	673	13	0	686
70	672	14	0	686
71	672	14	0	686
72	691	5	0	696
73	691	7	0	698
74	692	5	0	697
75	697	2	0	699
76	699	0	0	699
77	697	2	0	699
78	696	2	1	699
79	694	5	0	699
80	690	9	0	699
81	692	7	0	699
82	696	3	0	699
83	697	2	0	699
84	696	2	1	699
85	696	3	0	699
86	696	3	0	699
87	696	3	0	699
88	697	2	0	699
Total	55,967	1,788	143	52,306

Table1-2: The number of replacement households added in each month

Month	# of replacement households
7	1
8	1
9	2
10	4
11	2
14	1
22	1
27	7
28	13
29	1
30	1

31	1
35	4
36	3
37	1
39	1
40	1
48	1
50	1
51	1
53	2
55	1
56	2
61	1
62	1
67	3
68	2
72	18
73	1
74	2
75	2
76	1
79	1
83	1
85	1
Total	87

Figure1-1

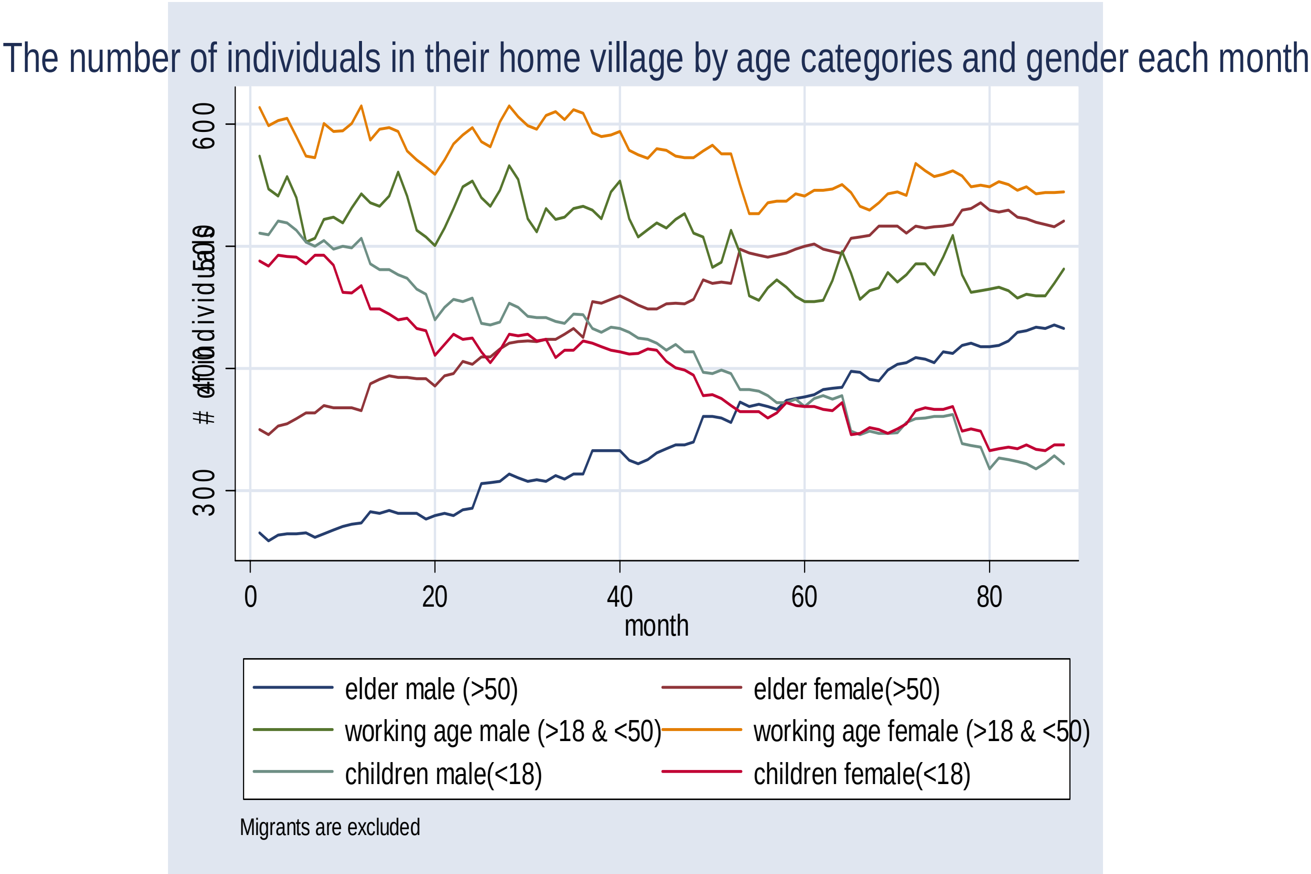

The number of individuals in their home village by age categories and gender each month
# of individuals
300
400
500
600
0
20
40
60
80
month
elder male (>50)
elder female(>50)
working age male (>18 & <50)
working age female (>18 & <50)
children male(<18)
children female(<18)
Migrants are excluded

Figure2-1

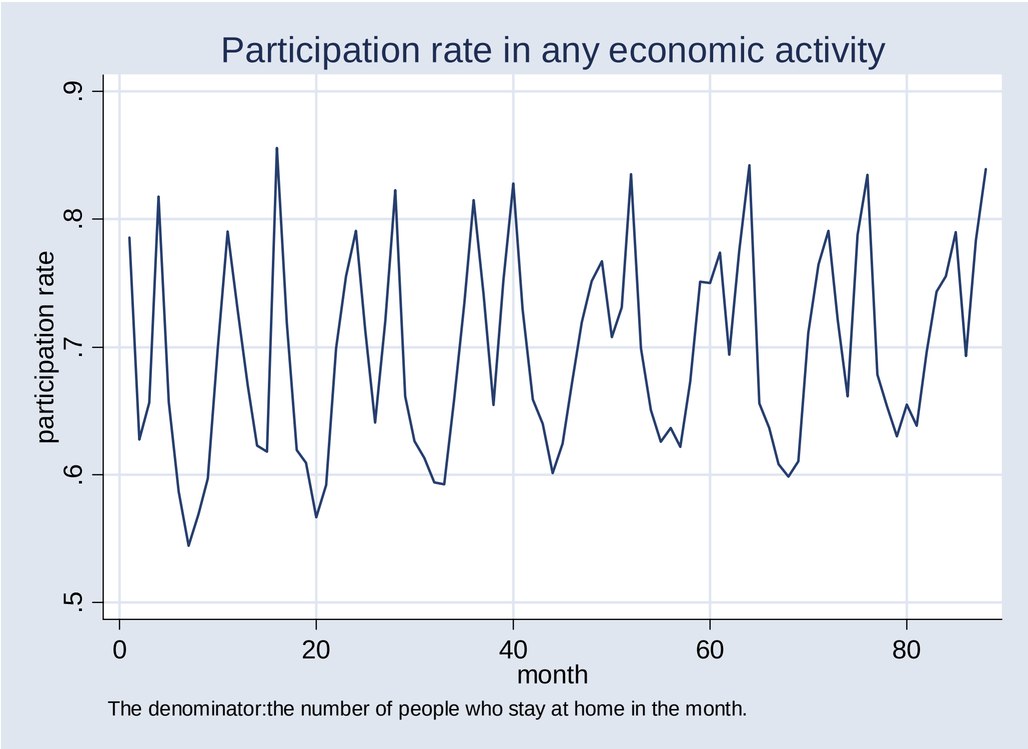


Figure2-2

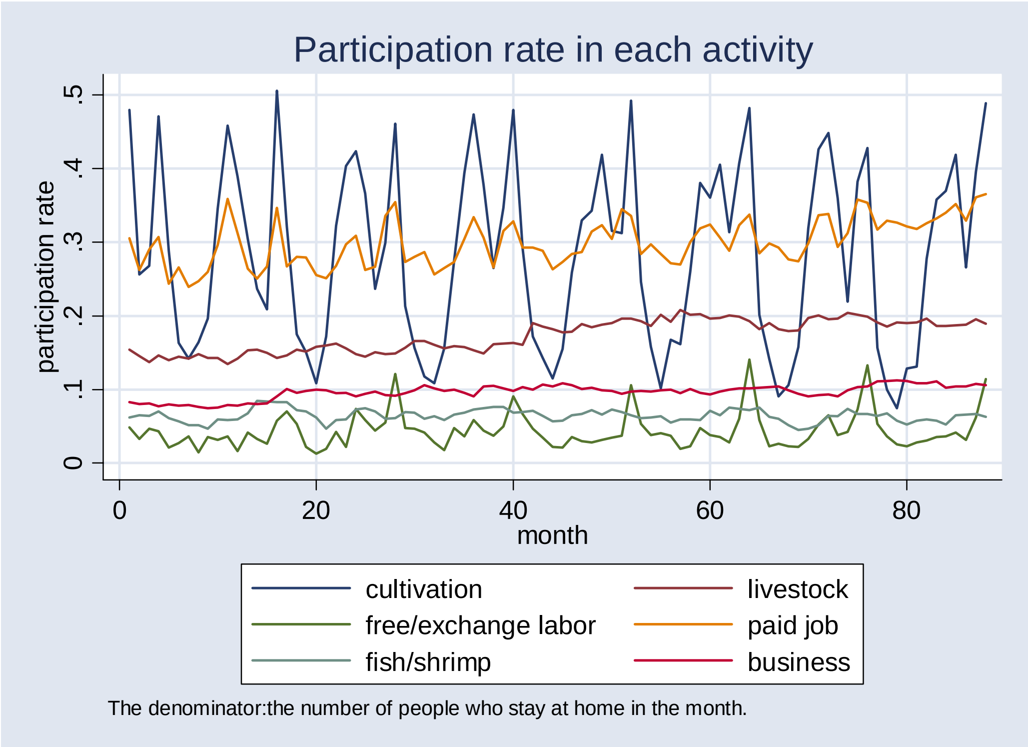


Table3-1: Maximum number of jobs in a month by education level

Male

# of jobs	Education level 1	2	3	4	5	Total
0	1	14	8	15	10	48
1	3	77	27	44	29	180
2	11	211	29	40	24	315
3	9	173	17	33	13	245
4	2	49	7	11	2	71
5	0	8	0	2	0	10
Total	26	532	88	145	79	869

Female

# of jobs	Education level 1	2	3	4	5	Total
0	3	15	13	18	9	58
1	16	117	28	53	30	244
2	27	276	19	41	21	384
3	17	222	7	17	4	267
4	1	30	3	2	0	36
5	0	1	0	0	0	1
Total	64	661	70	131	63	990

Table3-2: Minimum number of jobs in a month by education level

Male

# of jobs	Education level 1	2	3	4	5	Total
0	26	420	74	108	57	685
1	0	106	14	35	20	175
2	0	5	0	2	2	9
3	0	1	0	0	0	1
Total	26	532	88	145	79	870

Female

# of jobs	Education level 1	2	3	4	5	Total
0	59	583	59	110	52	863
1	5	77	11	20	12	125
2	0	1	0	1	0	2
Total	64	661	70	131	64	990

Table3-3: Ordered probit regression on maximum number of jobs

Number of obs = 1855
Wald chi2(8) = 3273.93
Prob > chi2 = 0.0000
Log pseudolikelihood = -2391.6155   Pseudo R2 = 0.1042

(Std. Err. adjusted for 16 clusters in vilid)

maxa	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf.	Interval]
Log(age)	8.78285	.785319	11.18	0.000	7.243653	10.32205
Log(age) squared	-1.221666	.1277192	-9.57	0.000	-1.471991	-.971341
Years of education	-.0235832	.0170097	-1.39	0.166	-.0569217	.0097553
Village dummies						
_Ivilid_704	-.0545391	.0053383	-10.22	0.000	-.065002	-.0440761
_Ivilid_707	-.4607135	.0101711	-45.30	0.000	-.4806484	-.4407786
_Ivilid_708	-.2211027	.0112997	-19.57	0.000	-.2432497	-.1989558
_Ivilid_2702	.1868375	.0279427	6.69	0.000	.1320708	.2416041
_Ivilid_2710	.4559311	.0357436	12.76	0.000	.385875	.5259873
_Ivilid_2713	.717641	.0565495	12.69	0.000	.6068059	.8284761
_Ivilid_2714	.3976489	.0483586	8.22	0.000	.3028677	.49243
_Ivilid_4901	-.2491658	.0212916	-11.70	0.000	-.2908966	-.2074349
_Ivilid_4903	.2020312	.0342535	5.90	0.000	.1348956	.2691668
_Ivilid_4904	.3128856	.0253934	12.32	0.000	.2631154	.3626558
_Ivilid_4906	.5928113	.0348695	17.00	0.000	.5244684	.6611541
_Ivilid_5301	.3901968	.0189998	20.54	0.000	.3529578	.4274358
_Ivilid_5306	.4470265	.0298189	14.99	0.000	.3885825	.5054704
_Ivilid_5309	.6524616	.0408368	15.98	0.000	.5724229	.7325002
_Ivilid_5310	.8759145	.0351562	24.91	0.000	.8070095	.9448194
Gender dummy (=1 if male)	.2744421	.0434566	6.32	0.000	.1892687	.3596155
/cut1	13.89015	1.179483			11.57841	16.2019
/cut2	15.01724	1.170737			12.72264	17.31184
/cut3	16.18361	1.178877			13.87305	18.49416
/cut4	17.41044	1.188941			15.08016	19.74073
/cut5	18.52351	1.258007			16.05786	20.98916

Table3-4: Ordered probit regression on minimum number of jobs

Number of obs	= 1856
Wald chi2(6)	= 71691.07
Prob > chi2	= 0.0000
Pseudo R2	= 0.1535

Log pseudolikelihood = -756.35209

(Std. Err. adjusted for 16 clusters in vilid)

mina	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf.	Interval]
Log(age)	11.78456	2.060068	5.72	0.000	7.746902	15.82222
Log(age) squared	-1.648291	.3013027	-5.47	0.000	-2.238833	-1.057748
Years of education	.0648997	.0181485	3.58	0.000	.0293293	.1004702
Village dummies						
_Ivilid_704	.093937	.0094749	9.91	0.000	.0753665	.1125074
_Ivilid_707	.4238943	.0058663	72.26	0.000	.4123966	.435392
_Ivilid_708	-.1638397	.015965	-10.26	0.000	-.1951305	-.1325489
_Ivilid_2702	-.138977	.0260414	-5.34	0.000	-.1900173	-.0879368
_Ivilid_2710	-1.012718	.0411554	-24.61	0.000	-1.093381	-.9320549
_Ivilid_2713	-.4225919	.0526448	-8.03	0.000	-.5257738	-.3194101
_Ivilid_2714	-.1877427	.0501573	-3.74	0.000	-.2860493	-.0894362
_Ivilid_4901	-.2029375	.0285694	-7.10	0.000	-.2589325	-.1469425
_Ivilid_4903	.1533746	.0389395	3.94	0.000	.0770546	.2296946
_Ivilid_4904	.0761068	.0323463	2.35	0.019	.0127093	.1395043
_Ivilid_4906	.2891255	.0368185	7.85	0.000	.2169627	.3612884
_Ivilid_5301	-.5160763	.0217691	-23.71	0.000	-.5587429	-.4734097
_Ivilid_5306	-1.111239	.0399679	-27.80	0.000	-1.189574	-1.032903
_Ivilid_5309	-.903291	.0388179	-23.27	0.000	-.9793727	-.8272094
_Ivilid_5310	-.6791509	.02773	-24.49	0.000	-.7335007	-.624801
Gender dummy (=1 if male)	.3096391	.046174	6.71	0.000	.2191397	.4001385
/cut1	22.21254	3.512659			15.32786	29.09723
/cut2	23.92502	3.519983			17.02598	30.82406
/cut3	24.56798	3.525261			17.6586	31.47737

.

Table3-5: Standard deviation of number of jobs and education level

	Obs	Mean of Std.Dev.	Std. Dev.	Min	Max
Edu=1	84	.5685505	.2173723	0	1.115857
Edu=2	1160	.5775902	.2305858	0	1.265481
Edu=3	104	.4833593	.3042003	0	1.129945
Edu=4	205	.4579822	.2864715	0	1.171713
Edu=5	120	.3678772	.2542715	0	1.116748

Table3-6: Standard deviation of number of jobs and changwat

Variable	Obs	Mean of Std.Dev.	Std. Dev.	Min	Max
7	488	.4106054	.2715049	0	1.119785
27	366	.6258446	.2425841	0	1.265481
49	413	.5293817	.2046217	0	1.017244
53	372	.6477958	.2188697	0	1.171713

Table3-7: OLS regression on standard deviation of number of jobs

Number of obs = 1835
F(3, 15) = .
Prob > F = .
R-squared = 0.2734
Number of clusters (vilid) = 16
Root MSE = .22722

jsd	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf. Interval]	
Log(age)	1.494526	.2780753	5.37	0.000	.9018226	2.08723
Log(age) squared	-.2117323	.0428255	-4.94	0.000	-.3030128	-.1204518
Years of education	-.0108453	.0036571	-2.97	0.010	-.0186402	-.0030503
Village dummies						
_Ivilid_704	-.0367555	.0010545	-34.86	0.000	-.0390031	-.0345079
_Ivilid_707	-.0740664	.0003493	-212.07	0.000	-.0748108	-.073322
_Ivilid_708	-.0316645	.0020714	-15.29	0.000	-.0360796	-.0272494
_Ivilid_2702	.0409634	.0054868	7.47	0.000	.0292687	.0526582
_Ivilid_2710	.1819194	.0061459	29.60	0.000	.1688197	.1950191
_Ivilid_2713	.2002478	.0109249	18.33	0.000	.1769619	.2235337
_Ivilid_2714	.145169	.0099089	14.65	0.000	.1240486	.1662894
_Ivilid_4901	.0043119	.0039796	1.08	0.296	-.0041703	.0127942
_Ivilid_4903	.0725315	.0068609	10.57	0.000	.0579077	.0871552
_Ivilid_4904	.0788756	.004902	16.09	0.000	.0684273	.0893239
_Ivilid_4906	.1122465	.0058447	19.20	0.000	.0997888	.1247041
_Ivilid_5301	.1241585	.0024562	50.55	0.000	.1189232	.1293938
_Ivilid_5306	.1656634	.0050477	32.82	0.000	.1549044	.1764223
_Ivilid_5309	.2132722	.0068755	31.02	0.000	.1986173	.227927
_Ivilid_5310	.271747	.0037675	72.13	0.000	.2637169	.2797772
Gender dummy (=1 if male)	.0509141	.0095565	5.33	0.000	.0305448	.0712834
_cons	-2.106767	.4386942	-4.80	0.000	-3.041821	-1.171712

Table4-1: The distribution of "participation ratio"

Ratio	% of the individuals
0	3.3
0<, <0.2	3.9
0.2<=, <0.4	8.4
0.4<=, <0.6	14.9
0.6<=, <0.7	8.9
0.7<=, <0.8	9.4
0.8<=, <0.9	12.6
0.9<=, <1	18.8
=1	19.4
Total	100.0

Variable	Obs	Mean	Std. Dev.	Min	Max
Participation ratio	1557	.7086383	.2886326	0	1

Table4-2: OLS regression on participation ratio

Number of obs = 1551
F(19, 1531) = 23.04
Prob > F = 0.0000
R-squared = 0.1784
Root MSE = .26294

	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
Log(age)	3.179196	.5148238	6.18	0.000	2.169361	4.18903
Log(age) squared	-.4376055	.0756341	-5.79	0.000	-.5859629	-.2892482
Years of education	.0077759	.0025738	3.02	0.003	.0027273	.0128245
Village dummies						
_Ivilid_704	.0162441	.0411604	0.39	0.693	-.0644926	.0969808
_Ivilid_707	-.0607001	.0462971	-1.31	0.190	-.1515125	.0301122
_Ivilid_708	-.0831087	.0406279	-2.05	0.041	-.162801	-.0034164
_Ivilid_2702	-.1302766	.0430294	-3.03	0.003	-.2146795	-.0458738
_Ivilid_2710	-.1148976	.039081	-2.94	0.003	-.1915555	-.0382397
_Ivilid_2713	-.0842852	.0401091	-2.10	0.036	-.1629598	-.0056107
_Ivilid_2714	-.1190084	.0392062	-3.04	0.002	-.1959119	-.0421048
_Ivilid_4901	-.0596607	.0423253	-1.41	0.159	-.1426824	.023361
_Ivilid_4903	.0959333	.0383208	2.50	0.012	.0207665	.1711002
_Ivilid_4904	.0895588	.037383	2.40	0.017	.0162315	.1628861
_Ivilid_4906	.086754	.0383518	2.26	0.024	.0115263	.1619817
_Ivilid_5301	-.1411563	.0417758	-3.38	0.001	-.2231	-.0592125
_Ivilid_5306	-.2109683	.035818	-5.89	0.000	-.2812259	-.1407108
_Ivilid_5309	-.1509879	.0359905	-4.20	0.000	-.2215838	-.0803919
_Ivilid_5310	-.1109549	.0454773	-2.44	0.015	-.2001594	-.0217504
Gender dummy (=1 if male)	.0824933	.0132774	6.21	0.000	.0564495	.108537
_cons	-5.043583	.8747256	-5.77	0.000	-6.75937	-3.327796

Figure5-1: Aggregate (pooled)

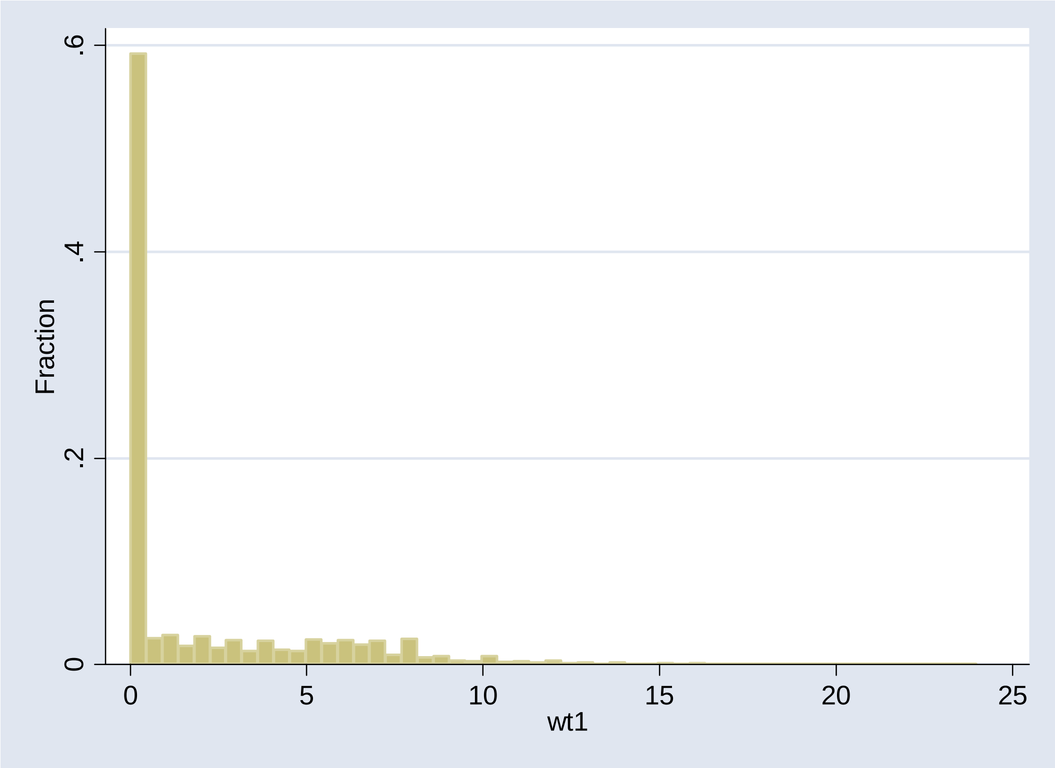


Figure5-2: Kids

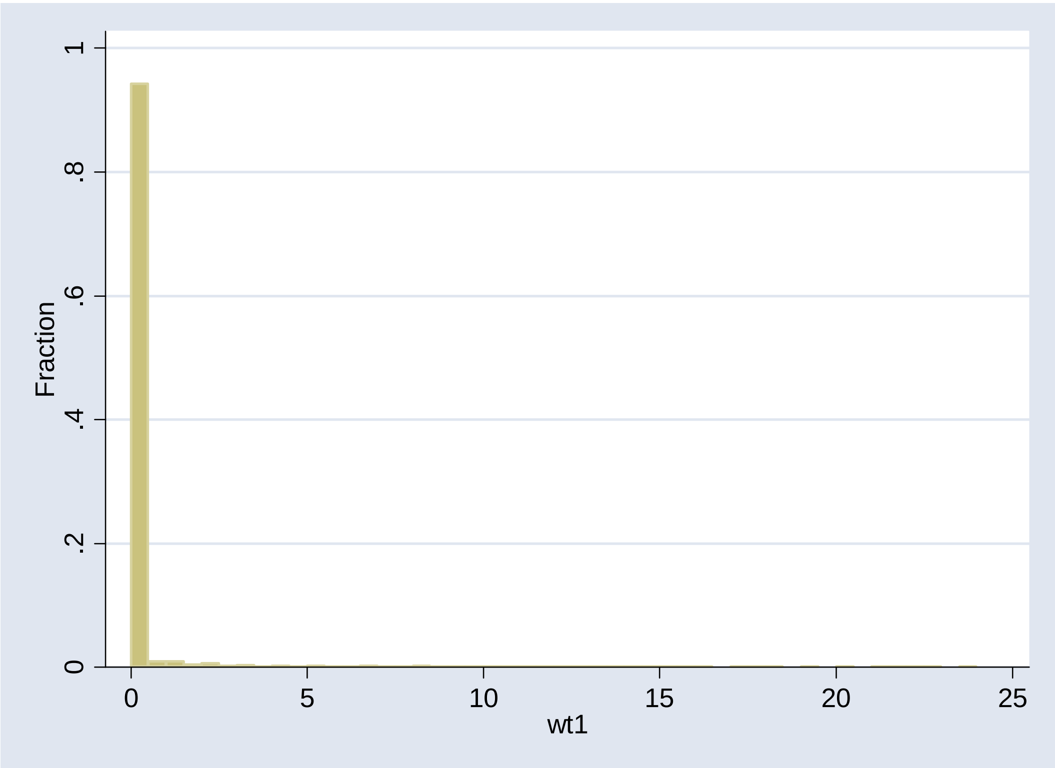


Figure5-2-2: Kids with positive working hour

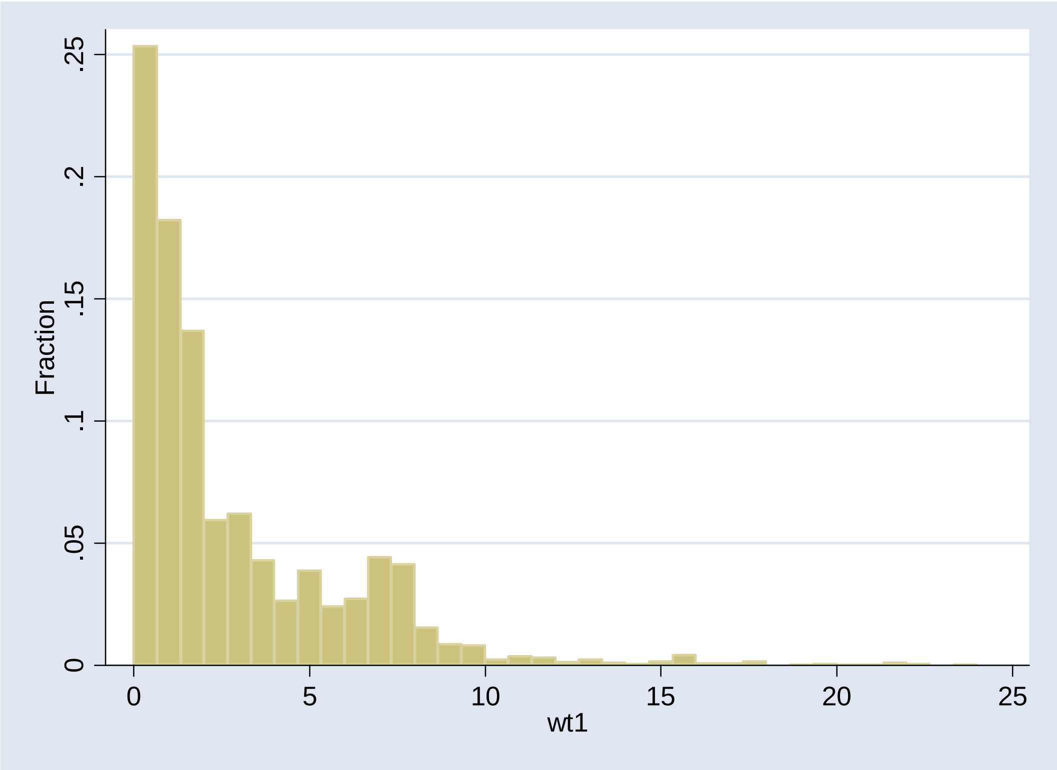


Figure5-3: Working-age adults

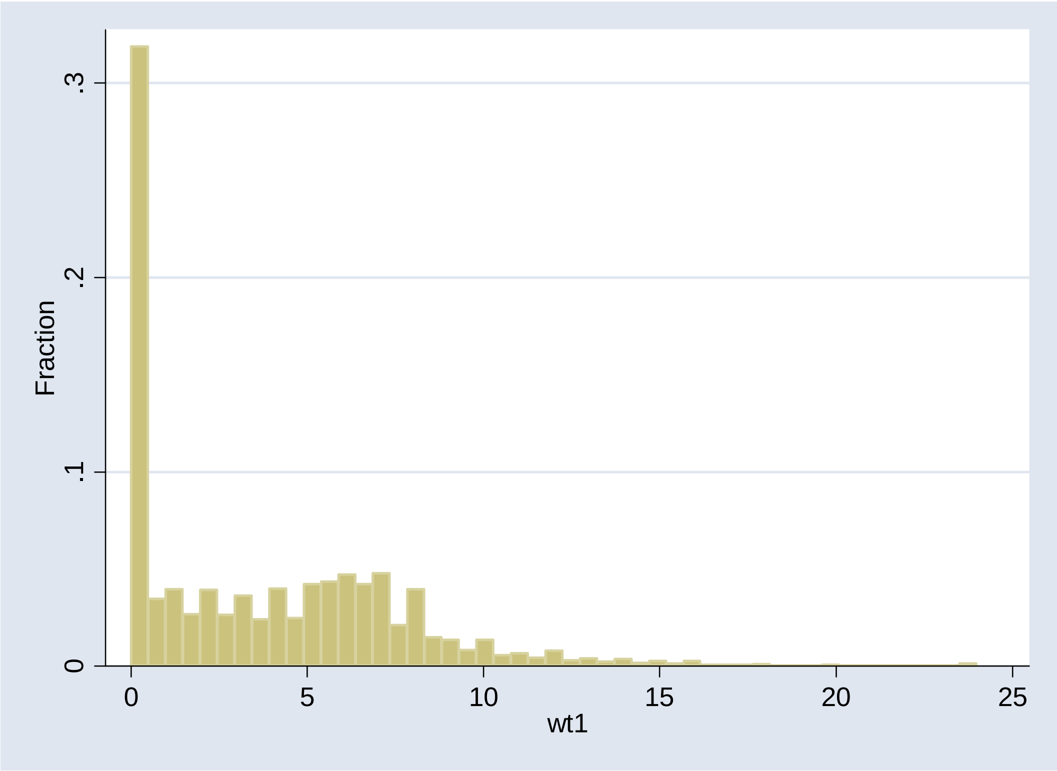


Figure5-3-2: Working-age adults with positive working hours

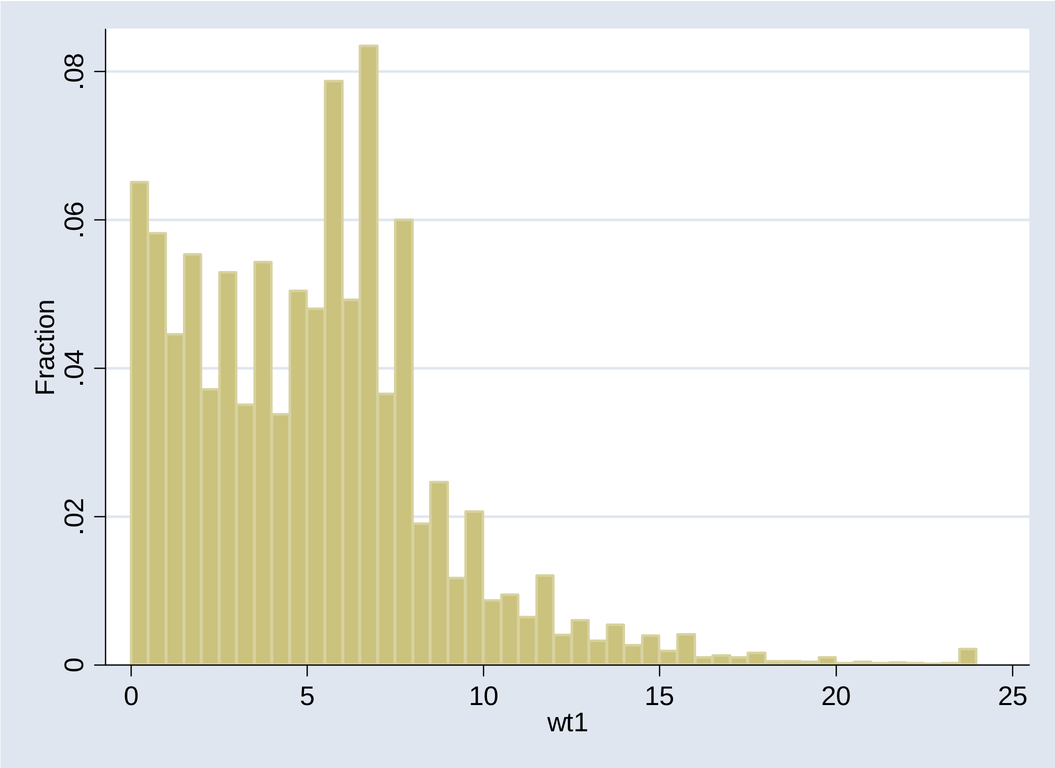


Figure5-4: Elders

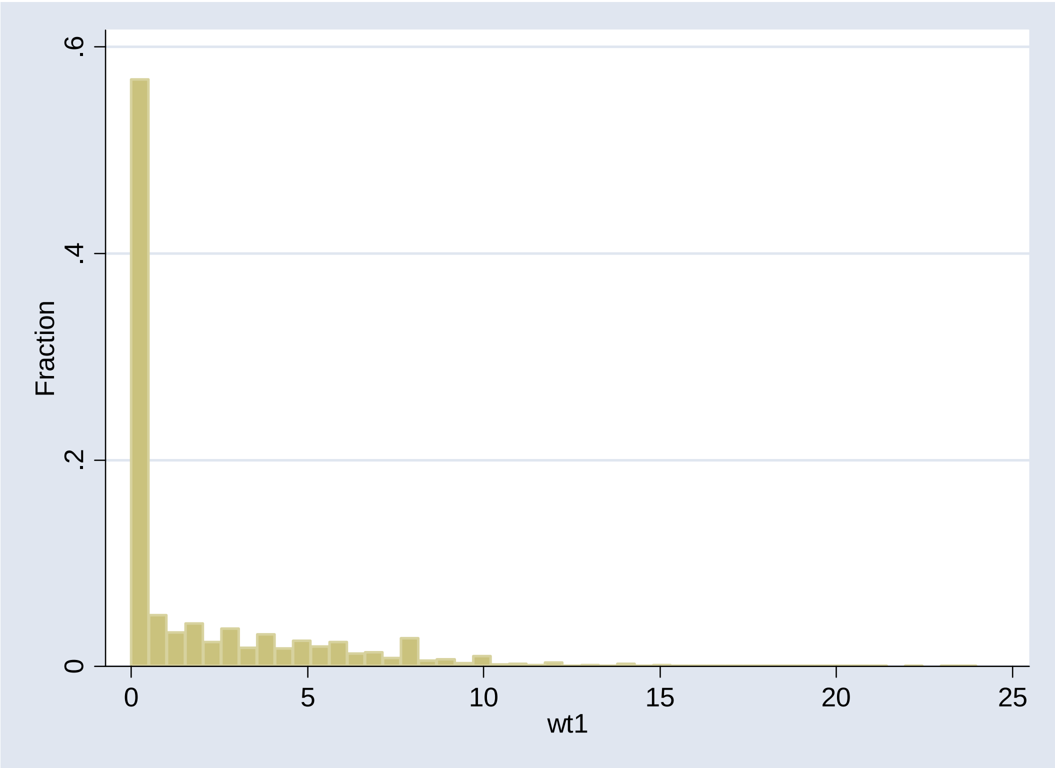


Figure5-4-2: Elders with positive working hours

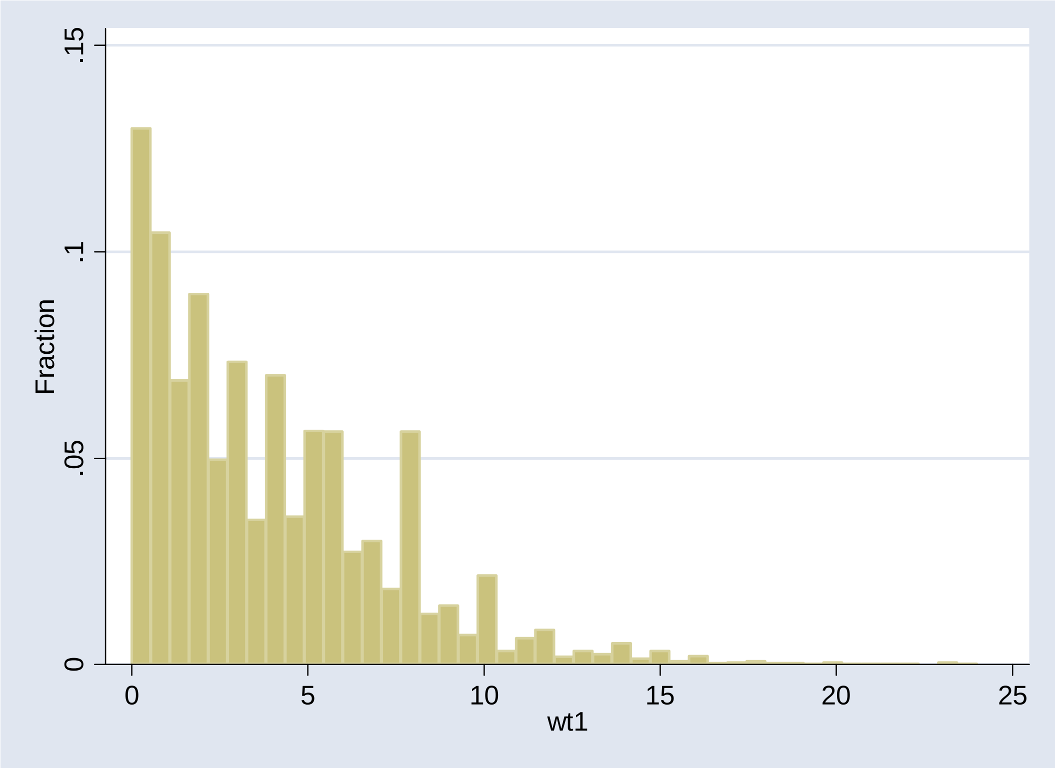


Figure5-5: Edu=1

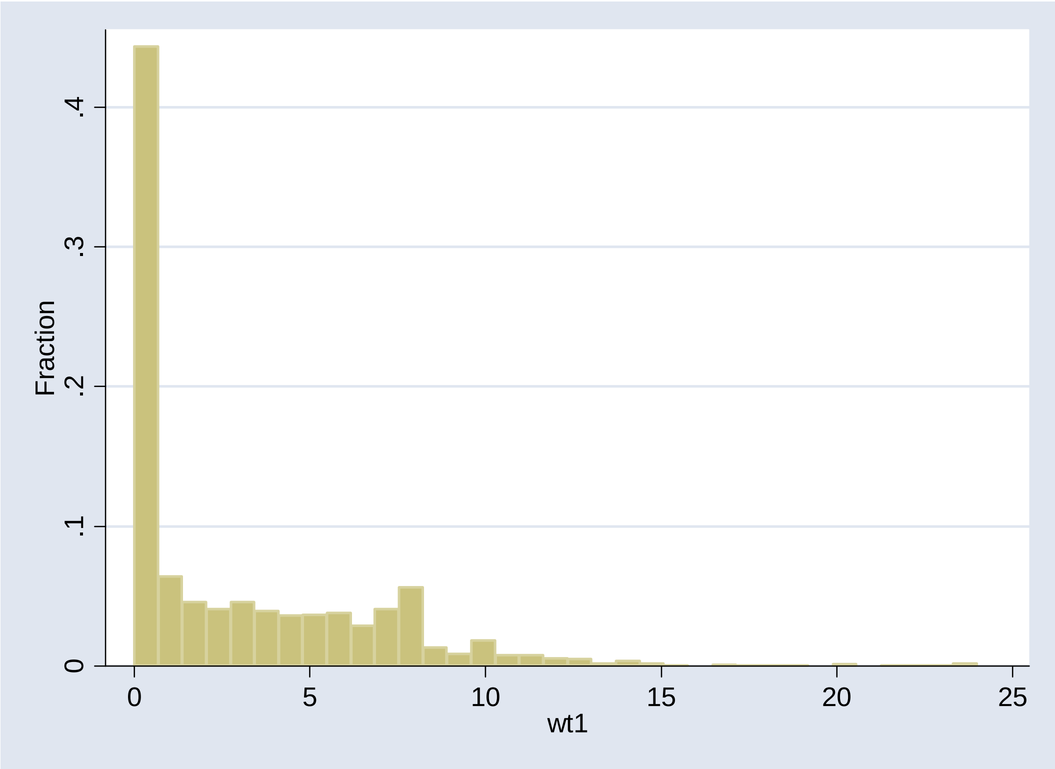


Figure5-6: Edu=2

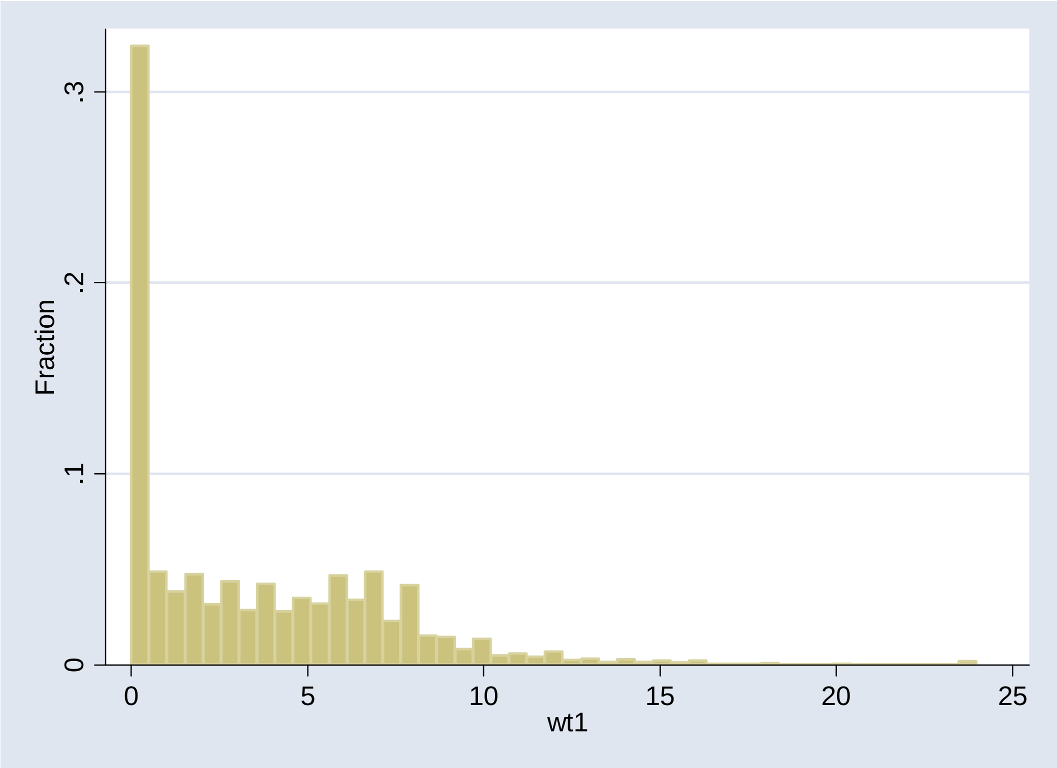


Figure5-7: Edu=3

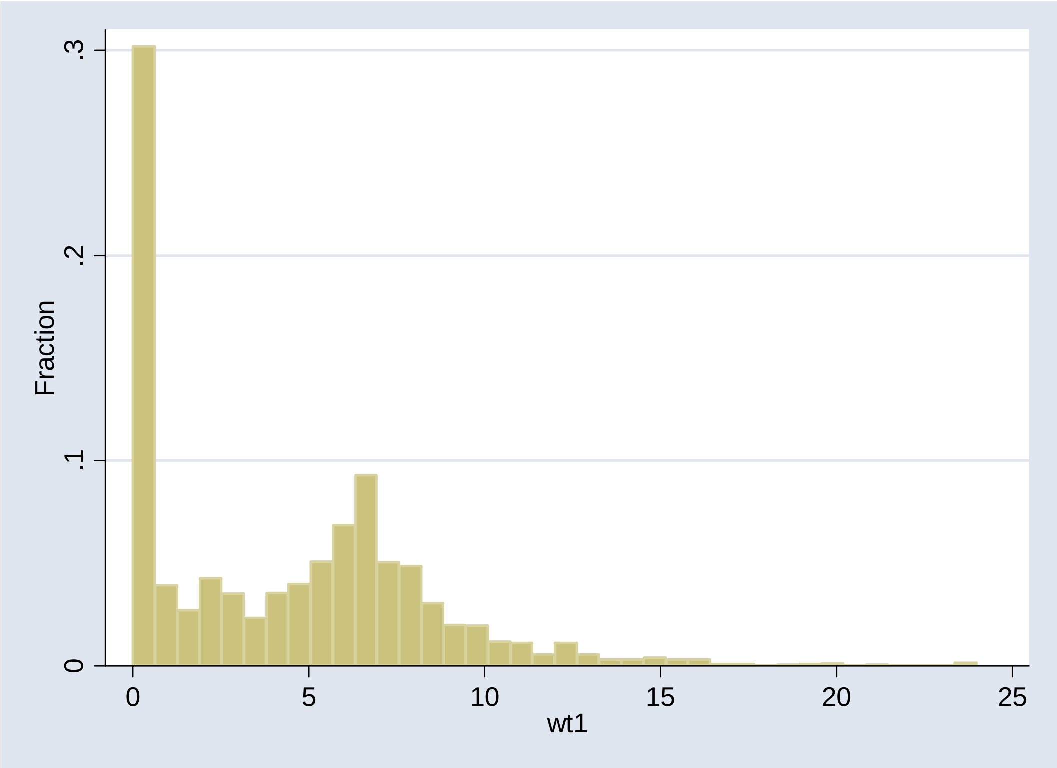


Figure5-8: Edu=4

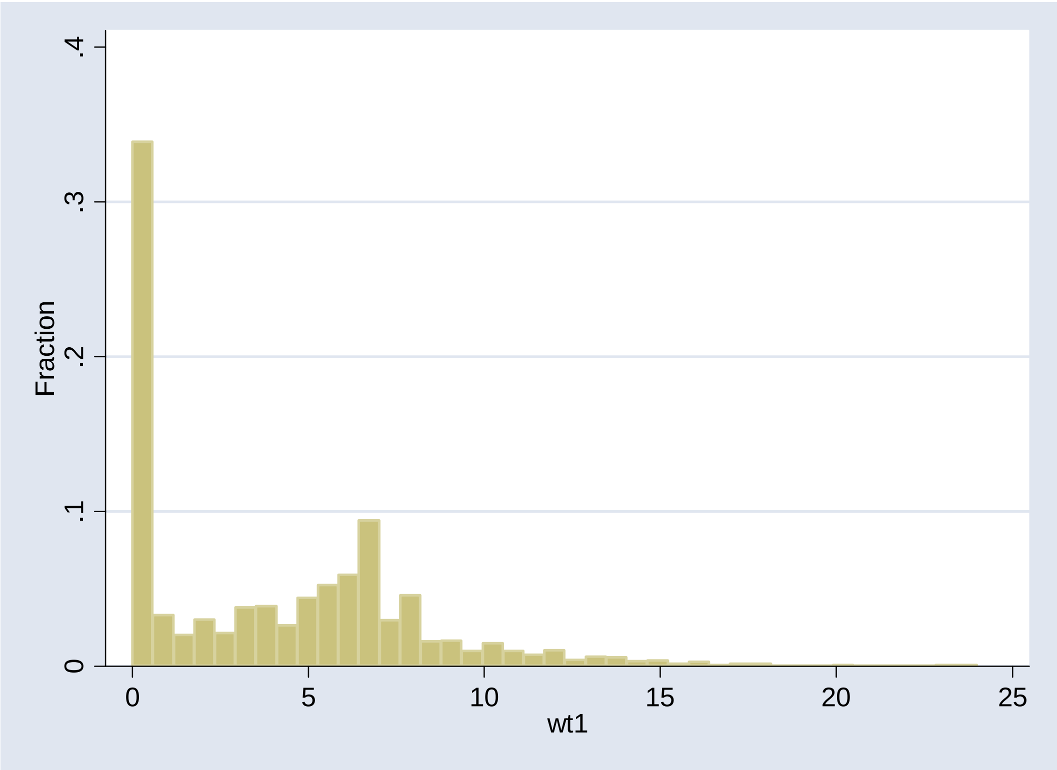


Figure5-9: Edu=5

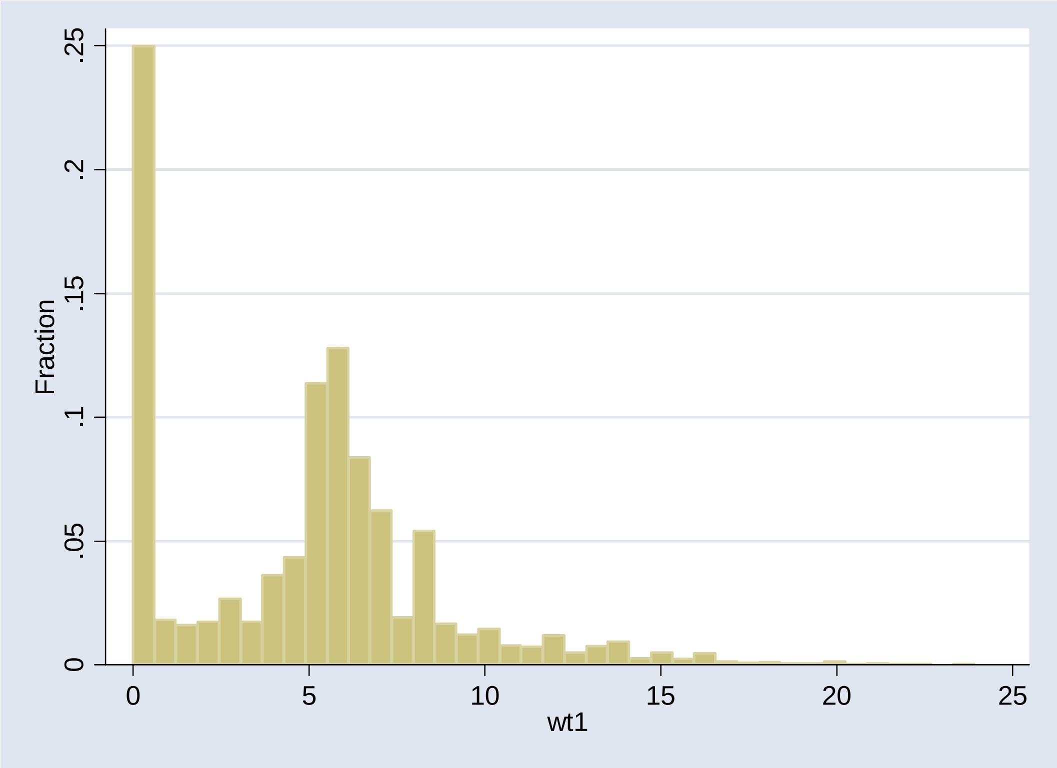


Figure5-10: Male

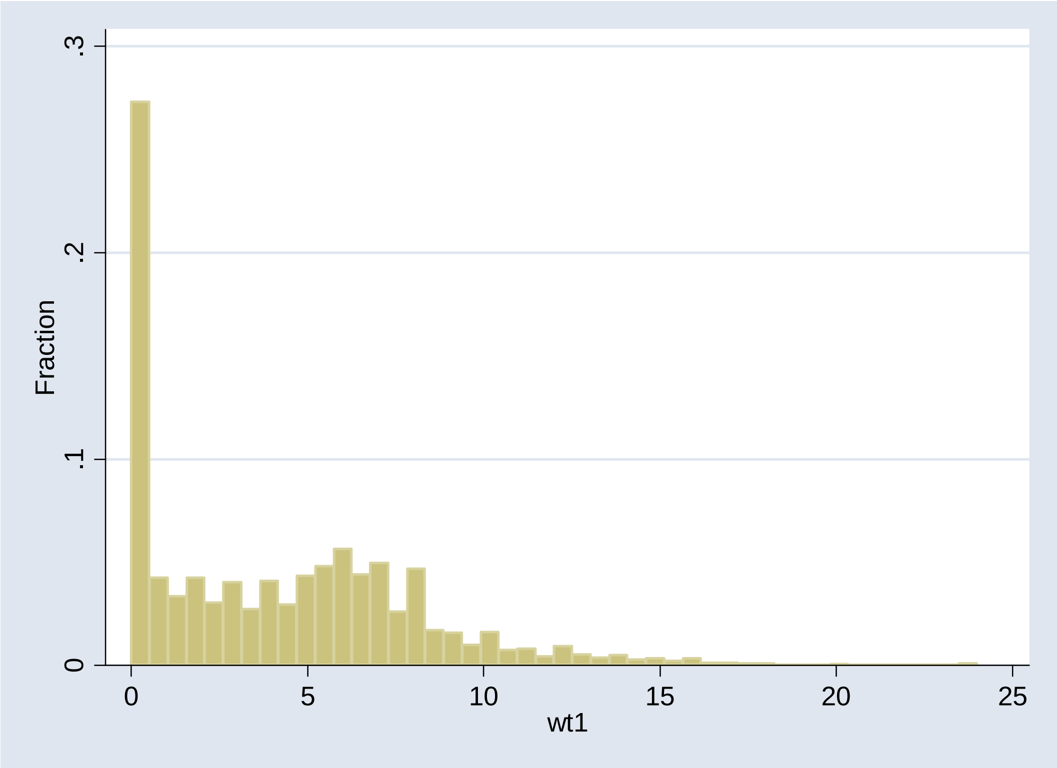


Figure5-11: Female

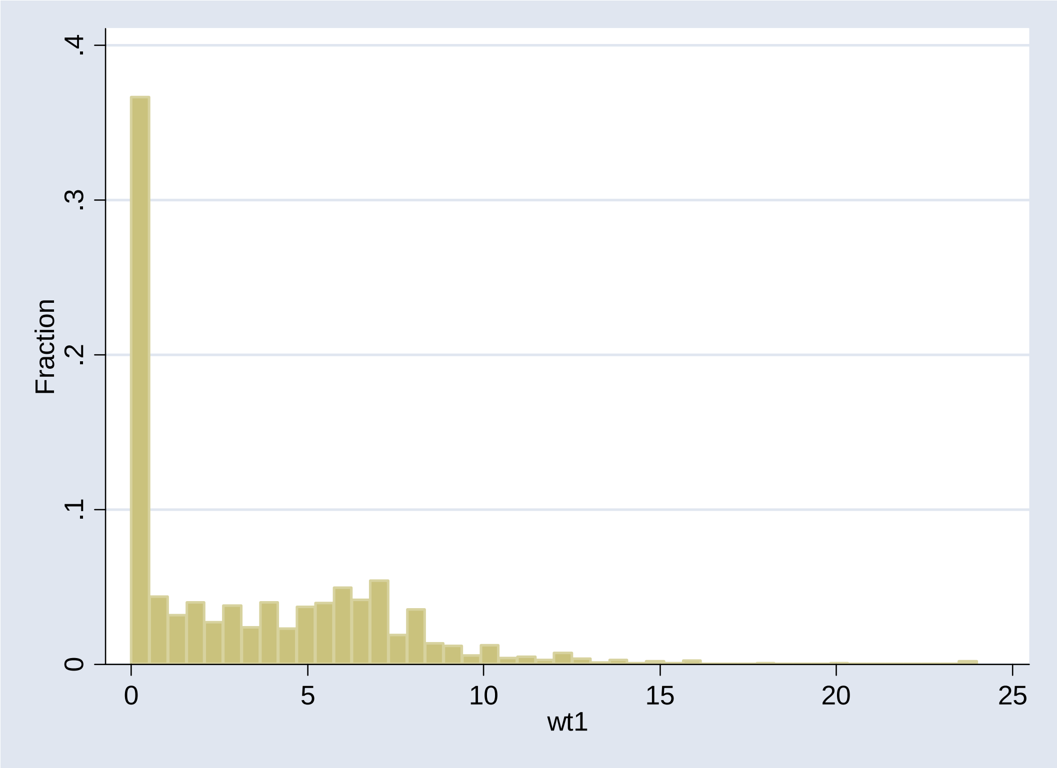


Figure5-12: February

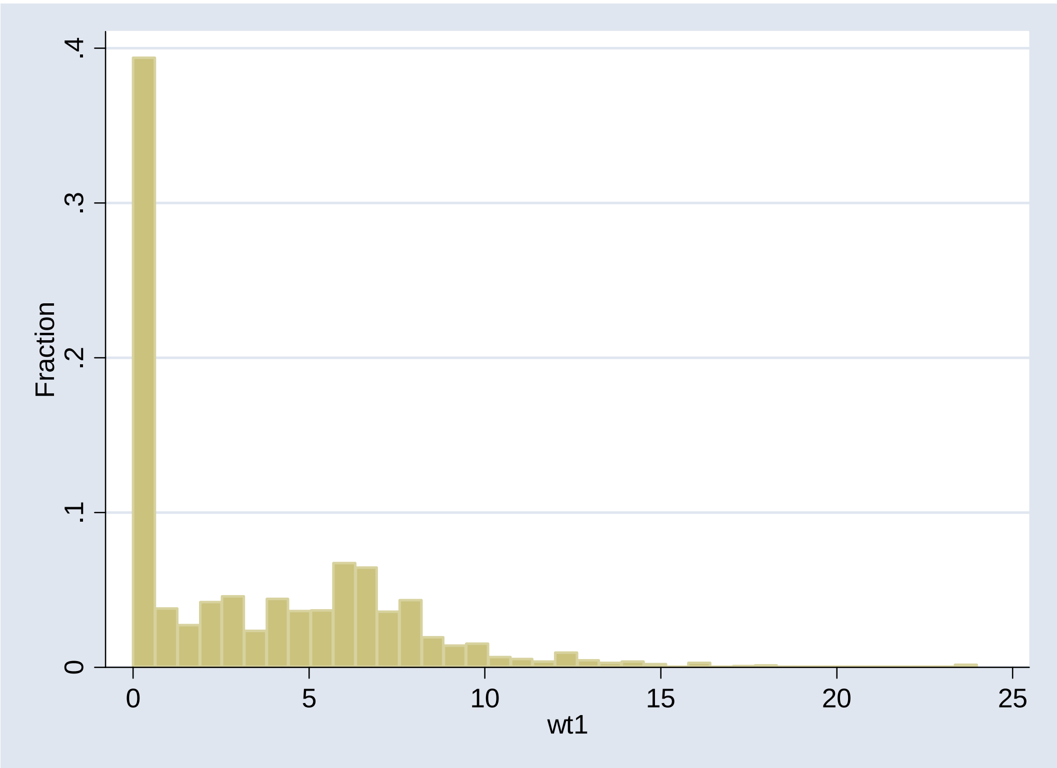


Figure5-13: November

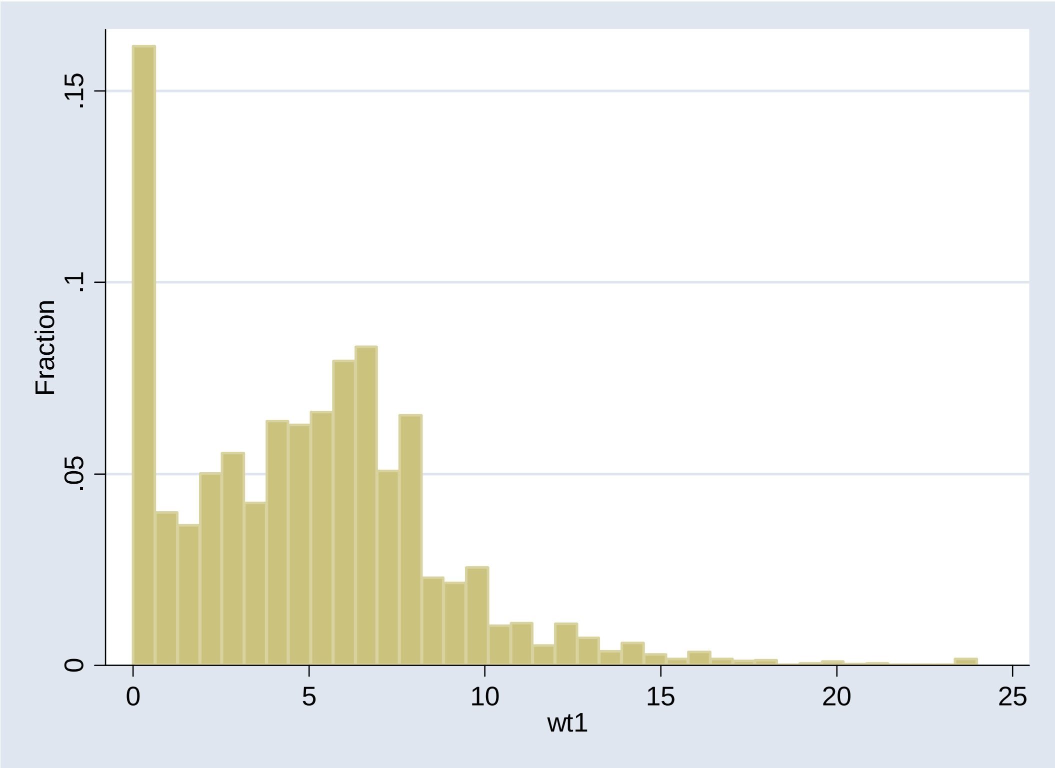


Table5-2: Fixed estimation result on labor supply per day

Number of obs	= 90129
Number of groups	= 1748
R-sq:	
F(22,88359)	= 251.06
Prob > F	= 0.0000

wt1	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
Education level dummies (default: edu=1)						
_Iedu_2	.5848622	.1578389	3.71	0.000	.2754995	.894225
_Iedu_3	1.098459	.1777442	6.18	0.000	.7500824	1.446836
_Iedu_4	.8247486	.1747263	4.72	0.000	.4822867	1.167211
_Iedu_5	.9673176	.1836174	5.27	0.000	.6074291	1.327206
Log(age)	14.08085	1.664907	8.46	0.000	10.81765	17.34405
Log (age) squared	-1.814603	.245492	-7.39	0.000	-2.295766	-1.333441
Gender (=1 if male)	.5997943	.0365102	16.43	0.000	.5282346	.6713541
Ratio of sick days	-.8553114	.1480113	-5.78	0.000	-1.145412	-.5652107
Ratio of housework days	-.079287	.0343997	-2.30	0.021	-.1467101	-.0118638
Ratio of schooling days	-2.975714	.1054364	-28.22	0.000	-3.182369	-2.76906

Time trend	.0101136	.0005171	19.56	0.000	.0091	.0111272
m1	.094262	.0359055	2.63	0.009	.0238875	.1646365
m2	-.0167373	.0353039	-0.47	0.635	-.0859326	.0524579
m4	-.3234182	.0366486	-8.82	0.000	-.395249	-.2515874
m5	-.0103218	.0361848	-0.29	0.775	-.0812438	.0606001
m6	.4977575	.0378428	13.15	0.000	.4235859	.5719291
m7	.6810769	.0395533	17.22	0.000	.6035529	.7586009
m8	.4647787	.0373951	12.43	0.000	.3914846	.5380728
m9	.1941912	.0364008	5.33	0.000	.1228459	.2655364
m10	.3419269	.0356306	9.60	0.000	.2720911	.4117626
m11	1.45102	.0393466	36.88	0.000	1.373901	1.528139
m12	.0897007	.0347043	2.58	0.010	.0216807	.1577208
_cons	-24.74943	2.828187	-8.75	0.000	-30.29265	-19.20621
sigma_u	2.5682887					
sigma_e	2.4425441					
rho	.52507874	(fraction of variance due to u_i)				

Figure5-14: Aggregate hours of family members

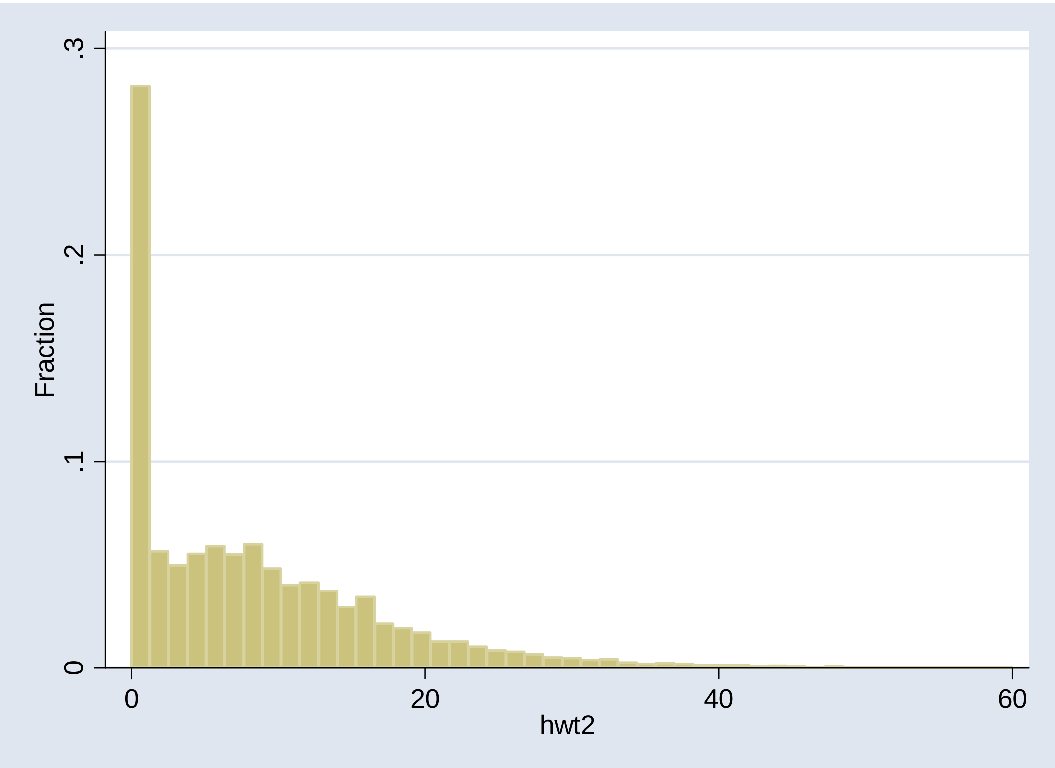


Figure5-15: hours spent on labor supply per adult family member

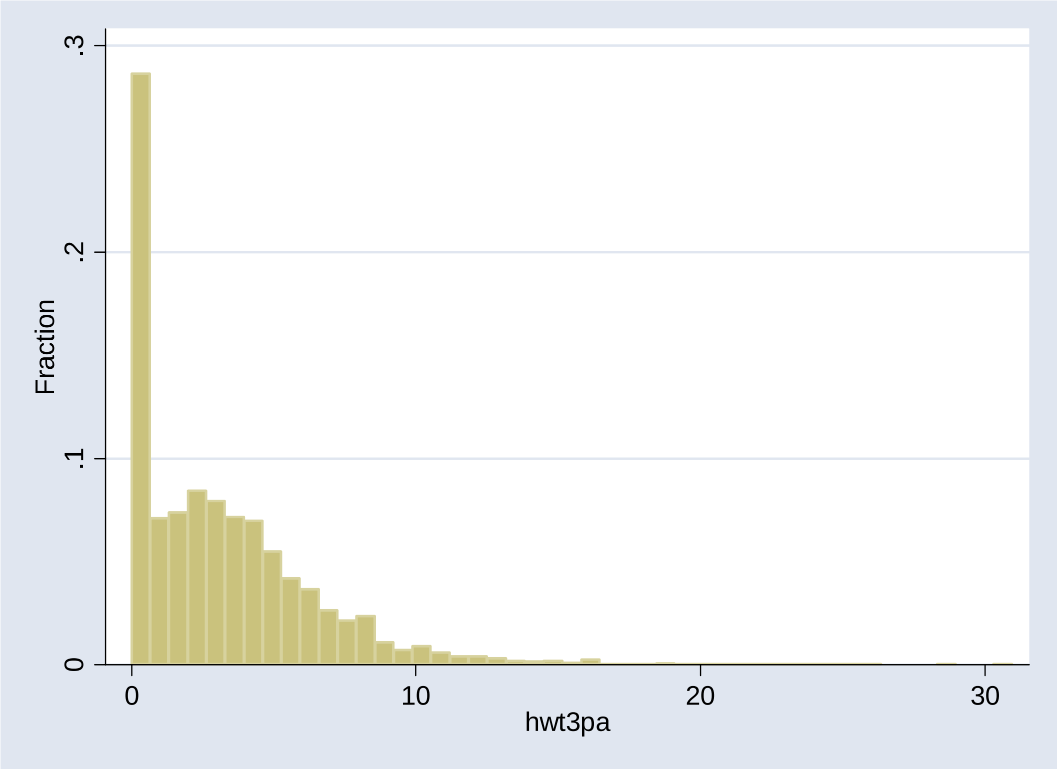


Figure5-16: lowest income quantile

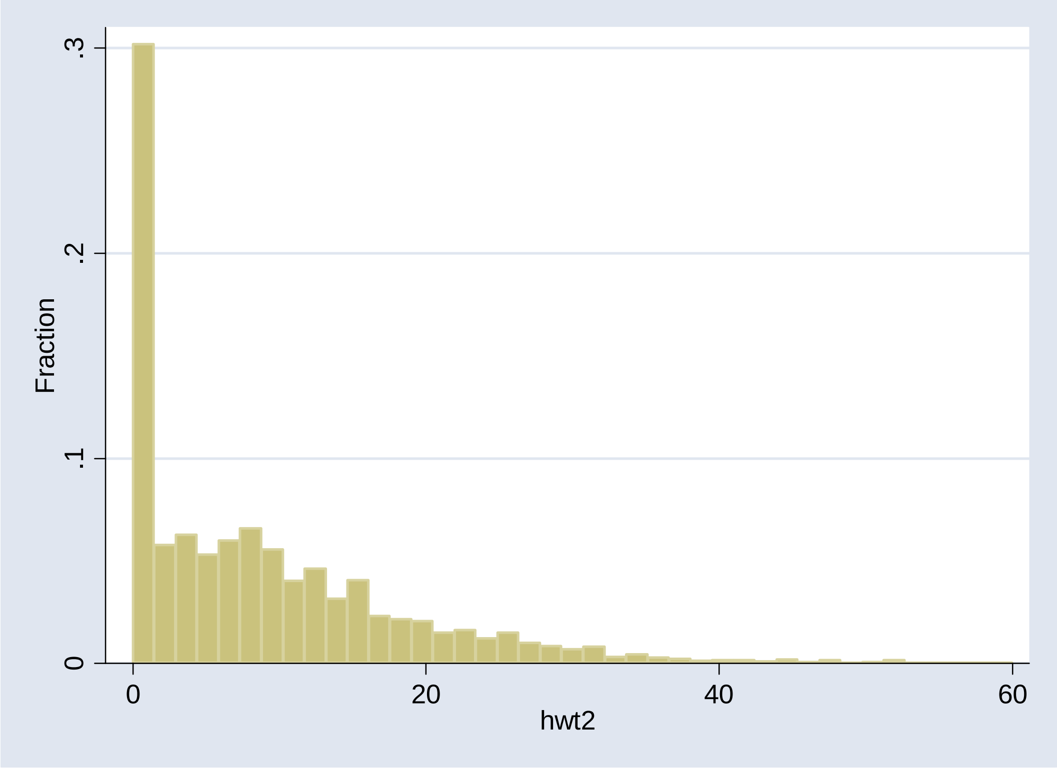


Figure5-17: lower middle income quantile

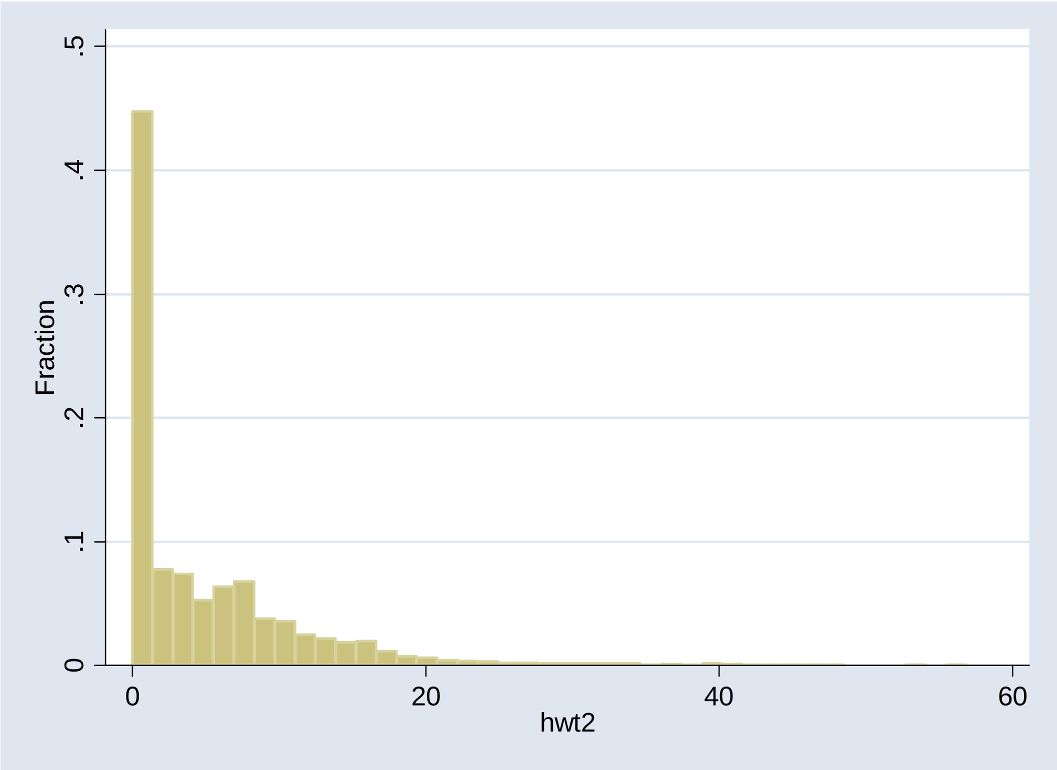


Figure5-18: upper middle quantile

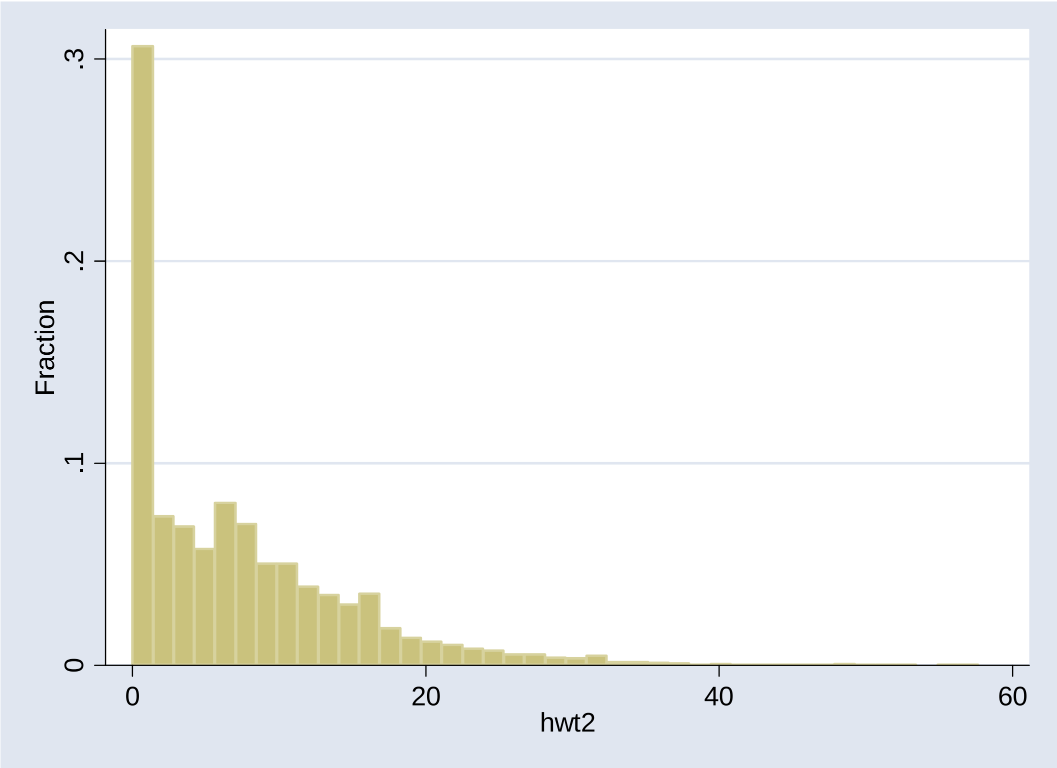


Figure5-19: highest income quantile

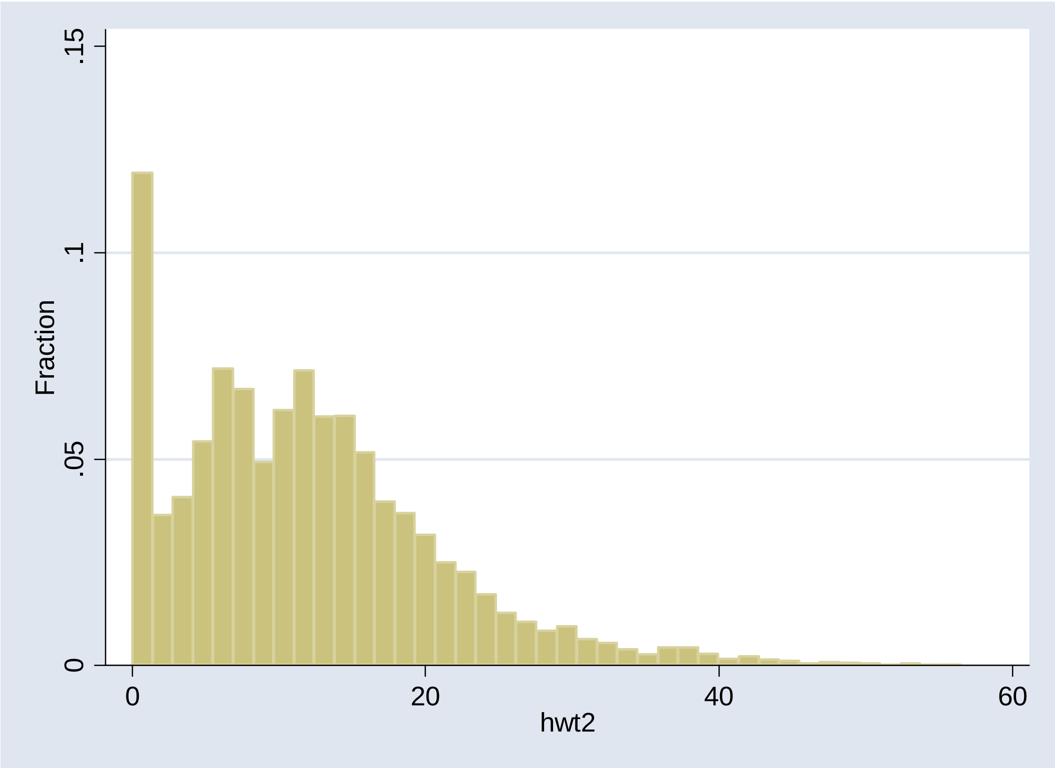


Table5-2: The number of (pooled) HH observations with no labor supply by calendar month

Month	# of HH observations
January	608
February	656
March	706
April	572
May	379
June	182
July	240
August	287
September	532
October	453
November	136
December	478

Figure6-1

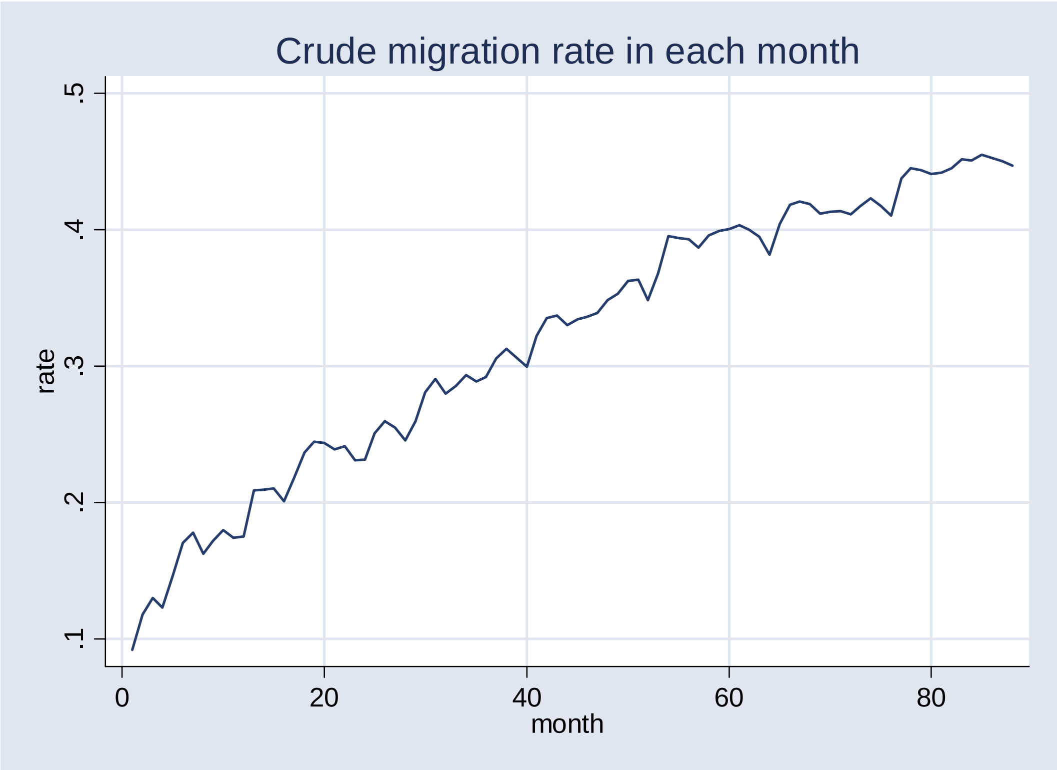


Figure6-2

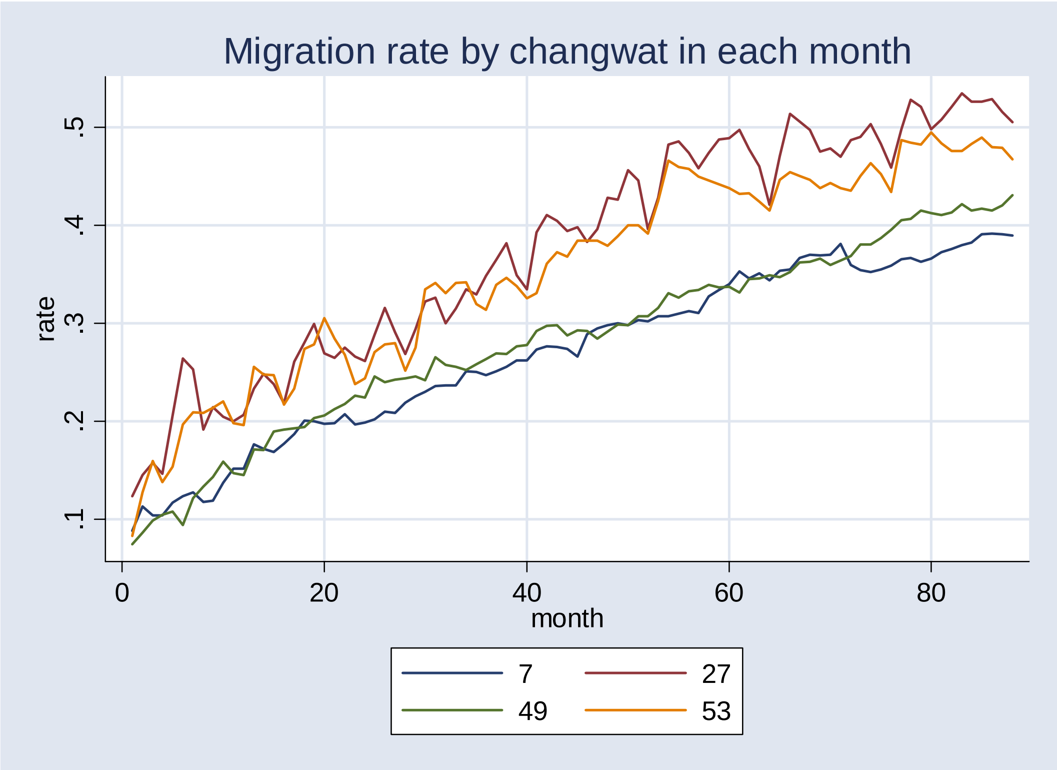


Table6-1: Regression on aggregate migration rate (Chachoengsao, chan=7)

Number of obs = 88
F(12, 67) = 134.35
Prob > F = 0.0000
R-squared = 0.9734
Root MSE = .01479

mrc1	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf. Interval]	
Time trend	.0035426	.000096	36.90	0.000	.0033509	.0037342
m1	.0051509	.0083352	0.62	0.539	-.0114862	.021788
m2	.004395	.0088161	0.50	0.620	-.013202	.021992
m3	.0001267	.009084	0.01	0.989	-.018005	.0182584
m5	.0100482	.0071904	1.40	0.167	-.0043039	.0244003
m6	.0111661	.0064235	1.74	0.087	-.0016554	.0239875
m7	.0054012	.006959	0.78	0.440	-.0084889	.0192914
m8	.0036626	.0092791	0.39	0.694	-.0148585	.0221838
m9	.003311	.0075645	0.44	0.663	-.0117879	.0184099
m10	.0005293	.008232	0.06	0.949	-.015902	.0169605
m11	-.0010503	.0080152	-0.13	0.896	-.0170487	.014948
m12	.0044426	.0078766	0.56	0.575	-.0112792	.0201644
_cons	.1119074	.0072861	15.36	0.000	.0973642	.1264505

Table6-2: Regression on aggregate migration rate (Buriram, chan=27)

Number of obs = 88
F(12, 67) = 104.98
Prob > F = 0.0000
R-squared = 0.9582
Root MSE = .02488

	Robust

mrc2	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
Time trend	.0046424	.0001406	33.01	0.000	.0043617	.0049232
m1	.0319894	.0115727	2.76	0.007	.0088902	.0550885
m2	.0265048	.0115766	2.29	0.025	.0033978	.0496118
m3	-.0025485	.0126071	-0.20	0.840	-.0277123	.0226153
m5	-.0006367	.0096363	-0.07	0.948	-.0198709	.0185975
m6	-.0053729	.0122687	-0.44	0.663	-.0298613	.0191156
m7	.0018942	.0129779	0.15	0.884	-.0240099	.0277982
m8	.001229	.0136582	0.09	0.929	-.0260328	.0284908
m9	.0114499	.0128195	0.89	0.375	-.0141379	.0370377
m10	-.0080311	.0109507	-0.73	0.466	-.0298887	.0138266
m11	-.0384706	.0089594	-4.29	0.000	-.0563537	-.0205874
m12	.0008466	.0098353	0.09	0.932	-.0187849	.020478
_cons	.1734368	.0079223	21.89	0.000	.1576238	.1892497

Table6-3: Regression on aggregate migration rate (Lopburi, chan=49)

Number of obs = 88
F(12, 67) = 117.90
Prob > F = 0.0000
R-squared = 0.9660
Root MSE = .01642

	Robust					
mrc3	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
Time trend	.0036738	.0000705	52.13	0.000	.0035345	.0038131
m1	-.0044287	.0067899	-0.65	0.515	-.0178488	.0089913
m2	.0025472	.0055173	0.46	0.645	-.0083575	.0134518
m3	-.0010227	.0043412	-0.24	0.814	-.009603	.0075576
m5	-.0011208	.0042846	-0.26	0.794	-.0095892	.0073476
m6	-.0052049	.0050497	-1.03	0.304	-.0151854	.0047756
m7	-.0066298	.0048786	-1.36	0.176	-.0162721	.0030125
m8	-.0034138	.006717	-0.51	0.612	-.0166897	.0098621

m9	-.005388	.0055191	-0.98	0.331	-.0162963	.0055202
m10	-.003379	.0056384	-0.60	0.550	-.014523	.007765
m11	-.0039256	.0052897	-0.74	0.459	-.0143806	.0065293
m12	-.0023687	.0056064	-0.42	0.673	-.0134495	.0087121
_cons	.1242625	.0041516	29.93	0.000	.1160571	.1324679

Table6-4: Regression on aggregate migration rate (Sisaket, chan=53)

Number of obs = 88
F(12, 67) = 101.98
Prob > F = 0.0000
R-squared = 0.9478
Root MSE = .02539

mrc4	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf. Interval]	
Time trend	.0042132	.0001465	28.77	0.000	.0039208	.0045055
m1	.0026977	.0140091	0.19	0.848	-.0252645	.03066
m2	.0018579	.0136471	0.14	0.892	-.0253818	.0290977
m3	.0001854	.0137564	0.01	0.989	-.0272724	.0276433
m5	-.0055576	.0121658	-0.46	0.649	-.0298407	.0187255
m6	-.0236675	.0132843	-1.78	0.079	-.0501831	.002848
m7	-.0301965	.0126047	-2.40	0.019	-.0553556	-.0050375
m8	-.0263961	.0179269	-1.47	0.146	-.0621784	.0093861
m9	-.0197223	.0133745	-1.47	0.145	-.0464178	.0069733
m10	-.0232699	.0116073	-2.00	0.049	-.0464381	-.0001016
m11	-.0456188	.0121141	-3.77	0.000	-.0697987	-.021439
m12	-.0244082	.0123142	-1.98	0.052	-.0489874	.0001711
_cons	.1877574	.0099599	18.85	0.000	.1678774	.2076374

.

Figure6-3

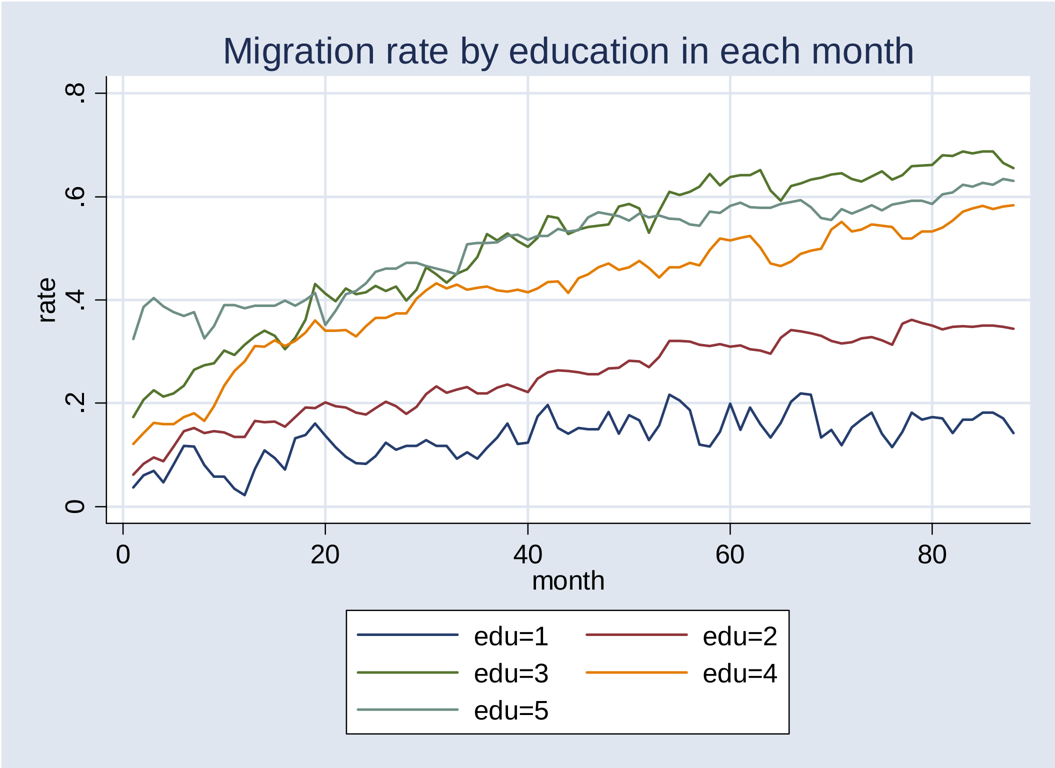


Figure6-4

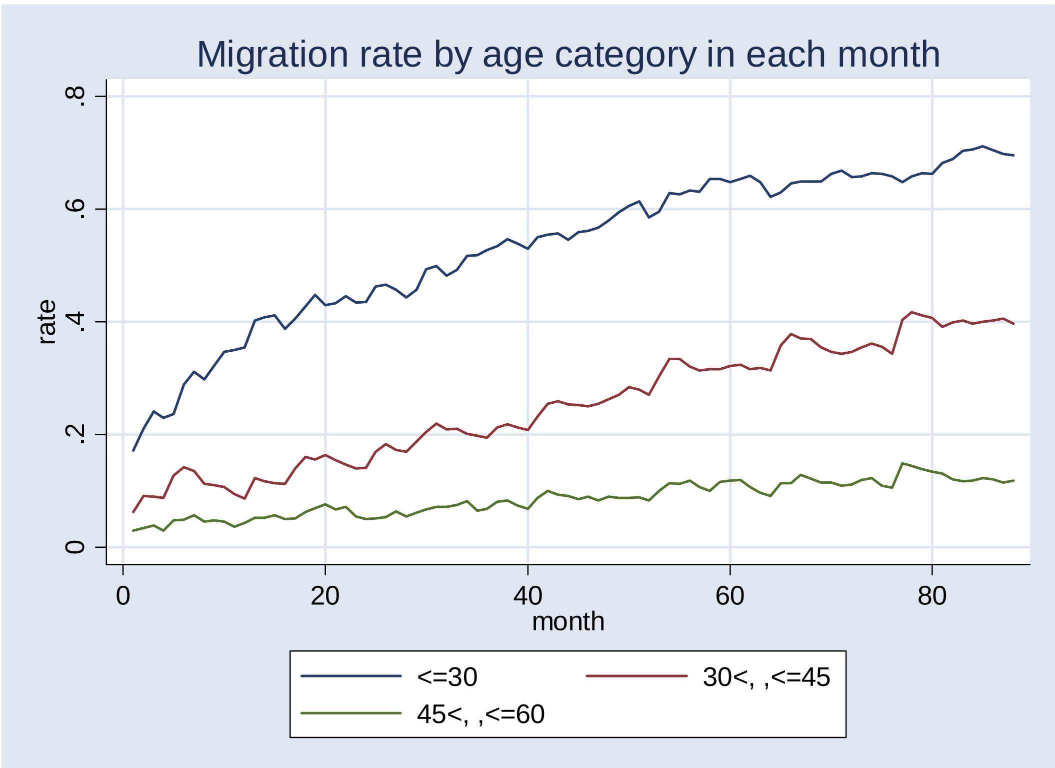


Table6-5: The reasons of migration

Reason	# of observation
Left for temporary employment	1,482
Left for better permanent employment	476
Other	385
Returned to own home	185
Visiting for some other reason	152
Left to go to school	151
Married into another household	77
Left to help other household with work	50
Just visiting other household for marriage, funeral, etc	9
Left because lost job	5

Table6-6: Main occupations of migrants at the destination

Occupation	# of migrants
Agricultural sector	595
Government sector	54
Factory work	450
Construction work	550
Other non-agricultural general work	142
Trader/ shop keeper	162

Table6-7: destination of migration by original changwat

	changwat				
	7	27	49	53	Total
In this village	63	43	71	37	214
Not in the village, but in the tambon	32	29	13	10	84
Not in the tambon, but in the amphoe	105	36	11	16	168
Not in the amphoe, but in the changwat	68	86	111	42	307
In Bangkok	103	489	100	409	1,101
In another changwat	98	510	148	251	1,007
Somewhere else	4	13	5	27	49
Total	473	1,206	459	792	2,930

Table6-8: Frequency of migration by individual

	Freq.	Percent	Cum.
0	1,399	48.06	48.06
1	887	30.47	78.53
2	297	10.20	88.73
3	135	4.64	93.37
4	80	2.75	96.12
5	43	1.48	97.60
6	30	1.03	98.63
7+	18	1.37	100.00
Total	2,911	100.00	

Table6-9: Duration of migration (in months)

	Freq.	Percent	Cum.
1	381	21.39	21.39
2	267	14.99	36.38
3	220	12.35	48.74
4	166	9.32	58.06
5	118	6.63	64.68
6	85	4.77	69.46
7	65	3.65	73.10
8	39	2.44	75.89
9	51	2.86	78.44
10	56	3.14	81.58
11-15	107	6.01	87.59
16-20	58	3.26	90.85
21-25	47	2.64	93.49
26-30	38	2.13	95.62
30-40	37	2.08	97.70
41-50	17	0.95	98.65
50+	24	1.35	100.00
Total	1,781	100.00	

Table6-10: Mean duration of migration by changwat

	Obs	Mean	Std. Dev.	Min	Max	Share of completed return migration
7	194	9.5	9.7	1	70	40.8%
27	812	6.0	8.5	1	63	67.3%
49	210	11.0	11.5	1	61	45.6%
53	565	7.3	11.7	1	85	71.2%

Table7-1: Number of paid job per person by education level

Education level	# of paid job created (A)	# of person in paid job (B)	(A) / (B)
1	989	99	10.0
2	7,995	1337	6.0
3	510	258	2.0
4	547	247	2.2
5	277	153	1.8

Table7-2: Number of paid job per person by changwat

Changwat	# of paid job created (A)	# of person in paid job (B)	(A) / (B)
7	1438	558	2.6
27	3463	607	5.7
49	3406	506	6.7
53	2101	464	4.5

Table7-3: Sectors and education level

Edu level	Agricultural work	Gov't work	Construction	Factory worker	General non-agri	Others	Total
1	735(74%)	0(0%)	116(12%)	1(0%)	77(8%)	59(6%)	988(100%)
2	5049(63%)	67(1%)	1665(21%)	125(2%)	438(5%)	650(8%)	7994(100%)
3	251(49%)	6(1%)	82(16%)	74(15%)	41(8%)	56(11%)	510(100%)
4	200(37%)	26(5%)	95(17%)	70(13%)	45(8%)	111(20%)	547(100%)
5	37(13%)	45(16%)	50(18%)	38(14%)	22(8%)	85(30%)	277(100%)

Table7-4: Sectors and changwat

Changwat	Agricultural work	Gov't work	Construction	Factory worker	General non-agri	Others	Total
7	260(18%)	38(3%)	305(21%)	157(11%	206(14%	471(33%	1437(10

				)	)	)	0%)
27	1967(57%)	29(1%)	959(28%)	5(2%)	252(7%)	350(10%)	3462(100%)
49	2414(71%)	30(1%)	505(15%)	141(4%)	140(4%)	176(5%)	3406(100%)
53	1670(79%)	50(2%)	246(12%)	7(0.1%)	40(2%)	88(4%)	2101(100%)

Table7-5: Sectors and type of employers

	Agricultural work	Gov't work	Construction	Factory worker	General non-agri
Individual	5,217	4	1655	2	418
Business/ organization	63	143	347	308	135
Many different individuals	1000	0	13	0	85

Table7-6: Summary on real wage by education category (pooled)

Edu	Obs	Mean	Std. Dev.	Min	Max
1	1929	18.72222	11.42376	.3918004	176.1127
2	25296	24.3804	21.19475	.0346405	198.7952
3	2291	22.7706	15.94629	.0260146	192.9012
4	5063	33.04596	26.19467	1.004016	199.362
5	4252	55.94383	44.00563	1.187085	200

Figure7-1:

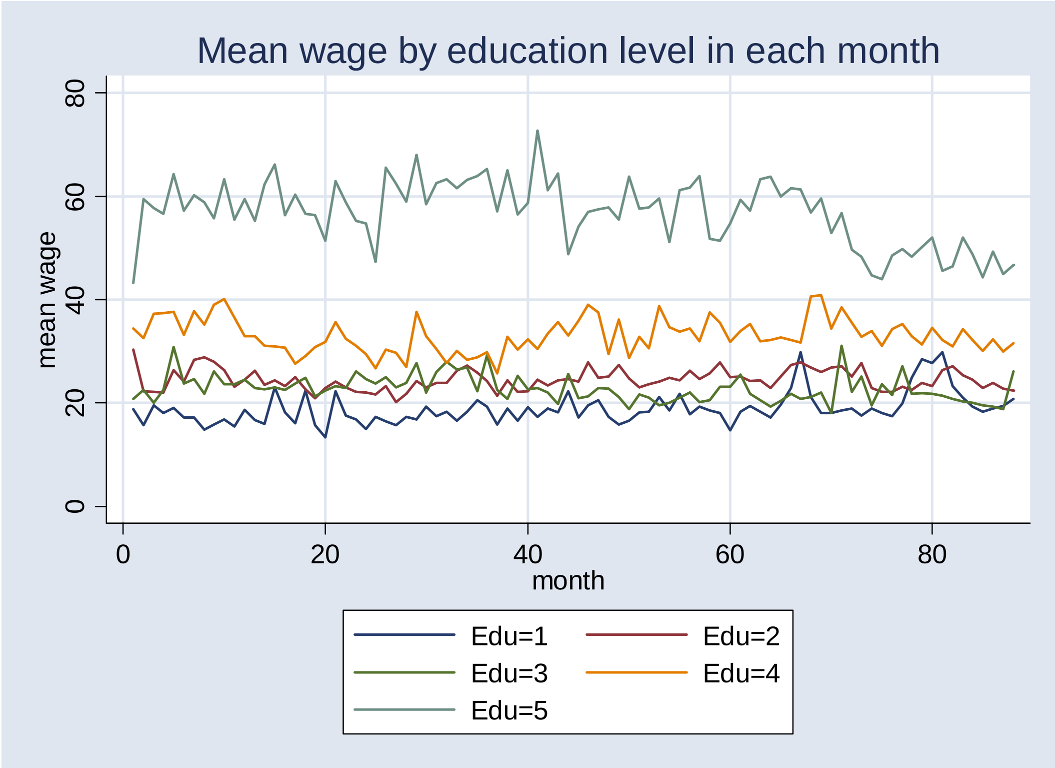


Table7-7: Summary on real wage by changwat (pooled)

changwat	Obs	Mean	Std. Dev.	Min	Max
7	14412	33.57069	25.48556	.1253761	200
27	7746	21.74592	20.04698	.1873477	194.7041
49	11828	24.64029	24.22973	.0346405	198.7952
53	5030	36.71774	41.1964	.0260146	198.7952

Figure7-2:

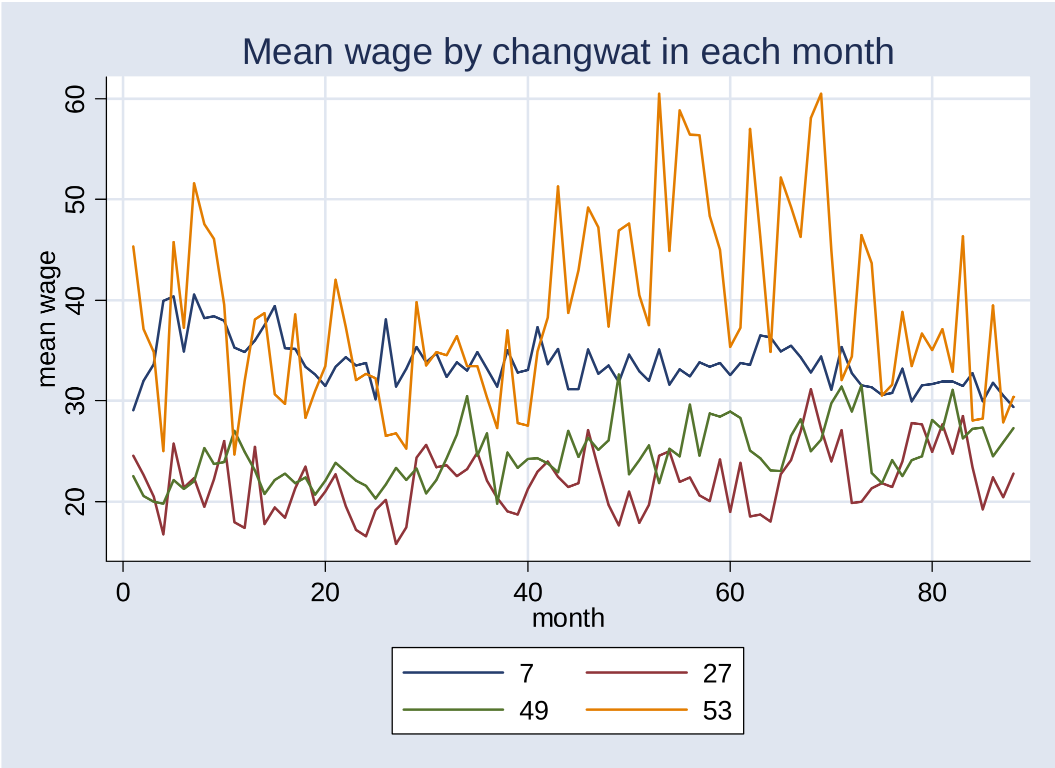

Mean wage by changwat in each month
mean wage
60
50
40
30
20
0
20
40
60
80
month
7
27
49
53

Figure7-3:

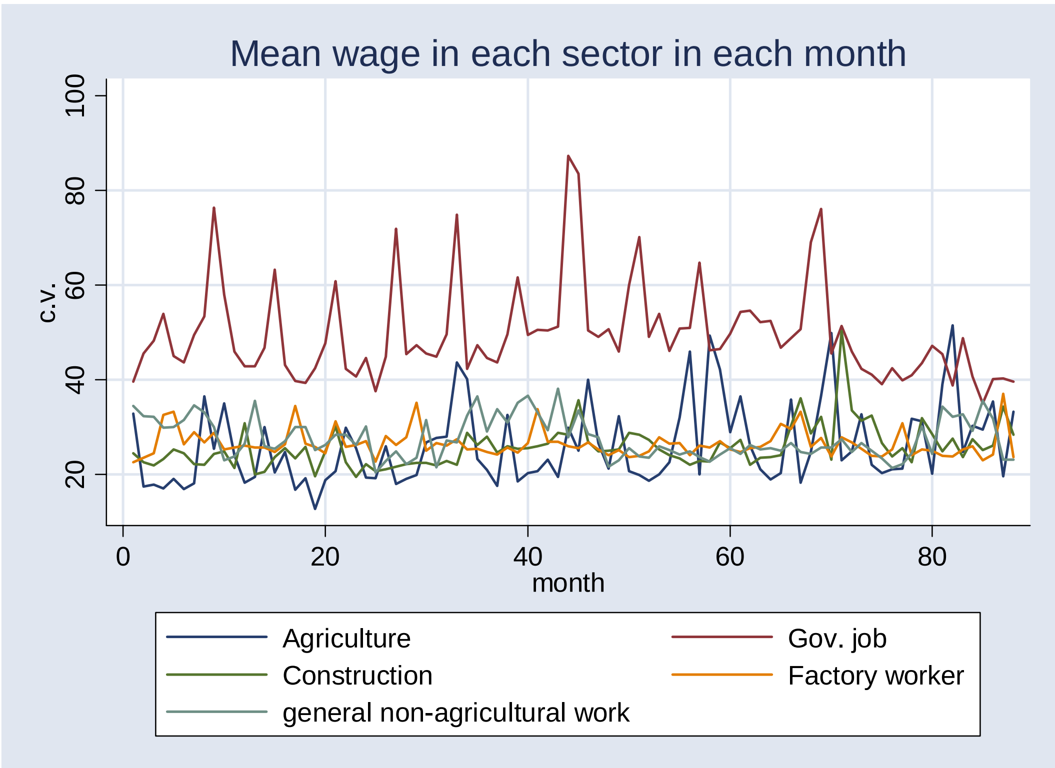

Mean wage in each sector in each month
c.v.
100
80
60
40
20
0
20
40
60
80
month
Agriculture
Gov. job
Construction
Factory worker
general non-agricultural work

Table7-8: Tabulation of weekly hour-worked and wage rate by education level

Edu=1

	hour_rank						
wage_rank	1	2	3	4	5	6	Total
1	42	23	26	7	13	33	144
2	648	310	138	110	171	148	1,525
3	142	70	41	34	62	59	408
4	41	18	15	9	8	13	104
5	21	5	3	0	1	1	31
6	41	7	2	2	0	0	52
Total	935	433	225	162	255	254	2,264

Edu = 2

	hour_rank						
wage_rank	1	2	3	4	5	6	Total
1	270	203	231	211	382	1,748	3,045
2	4,115	2,427	1,260	1,008	1,884	1,757	12,451
3	1,325	930	627	894	1,612	903	6,291
4	527	378	241	420	666	297	2,529
5	295	139	97	205	202	82	1,020
6	1,131	321	139	271	242	132	2,236
Total	7,663	4,398	2,595	3,009	4,988	4,919	27,572

Edu=3

	hour_rank						
wage_rank	1	2	3	4	5	6	Total
1	18	13	23	33	60	199	346
2	181	98	74	115	387	342	1,197
3	44	33	50	135	320	128	710
4	16	18	28	50	117	14	243

5	9	9	8	31	65	23	145
6	43	10	6	31	21	1	112
Total	311	181	189	395	970	707	2,753

Edu = 4

	hour_rank						
wage_rank	1	2	3	4	5	6	Total
1	11	21	33	60	57	316	498
2	87	95	96	160	436	475	1,349
3	61	80	84	312	537	231	1,305
4	46	29	48	195	371	170	859
5	60	40	30	82	173	79	464
6	172	66	61	188	223	73	783
Total	437	331	352	997	1,797	1,344	5,258

Edu = 5

	hour_rank						
wage_rank	1	2	3	4	5	6	Total
1	3	5	2	19	37	79	145
2	22	14	25	77	273	204	615
3	16	27	38	148	413	125	767
4	32	13	32	208	273	85	643
5	16	19	23	193	146	49	446
6	163	117	176	818	395	75	1,744
Total	252	195	296	1,463	1,537	617	4,360

Table7-9: Partial correlation analysis on log wage.

Variable	Correlation.	Significance.
Changwat dummy (default=27)		
7	0.1192	0.000***

49	0.0306	0.000***
53	0.0334	0.000***
Monthly dummy		
Jan	-0.0026	0.598
Feb	0.0028	0.565
Mar	0.0083	0.086*
Apr	0.0160	0.001***
May	0.0177	0.000***
Jun	0.0163	0.001***
Jul	-0.0018	0.710
Aug	0.0007	0.887
Sep	-0.0011	0.820
Nov	-0.0025	0.602
Dec	0.0057	0.243
Trend		
General trend	0.0032	0.514
Changwat specific trend (default=27)		
Trend in 7	-0.0340	0.000***
Trend in 49	0.0175	0.000***
Trend in 53	0.0133	0.006***
Log(age)	0.0422	0.000***
Log(age) squared	-0.0342	0.000***
Education level dummy (default=edu=1)		
Edu=2	-0.0053	0.276
Edu=3	0.0080	0.097*
Edu=4	0.0713	0.000***
Edu=5	0.1913	0.000***
Sector dummy (default=construction)		
Agriculture	-0.0610	0.000***
Government	-0.0753	0.000***
Factory	-0.0315	0.000***
General non-agricultural work	-0.0298	0.000***
All other sectors		

| -0.0417 0.000***

Type of employers (default=individual)

Business/organization

| 0.0181 0.000***

Many individuals

| 0.0575 0.000***

Figure7-4

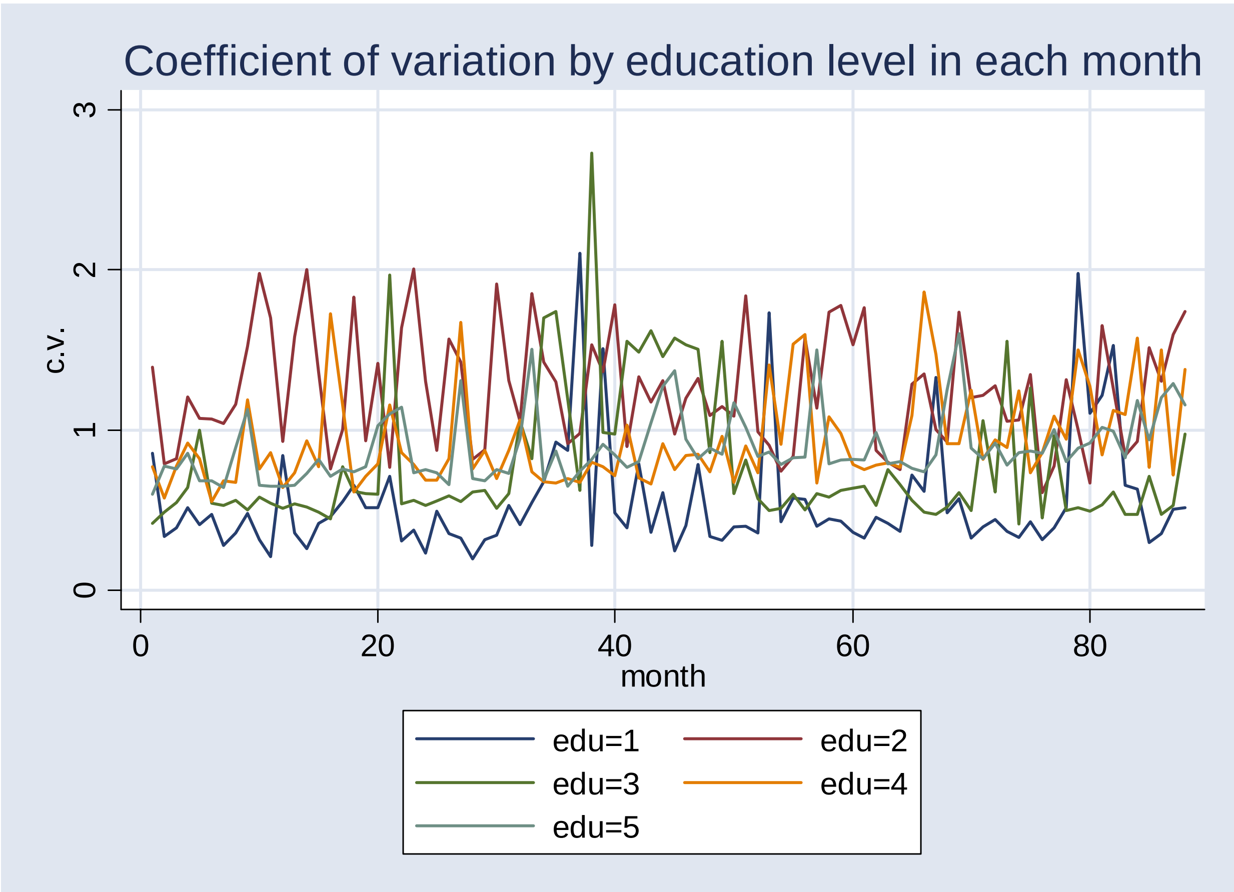
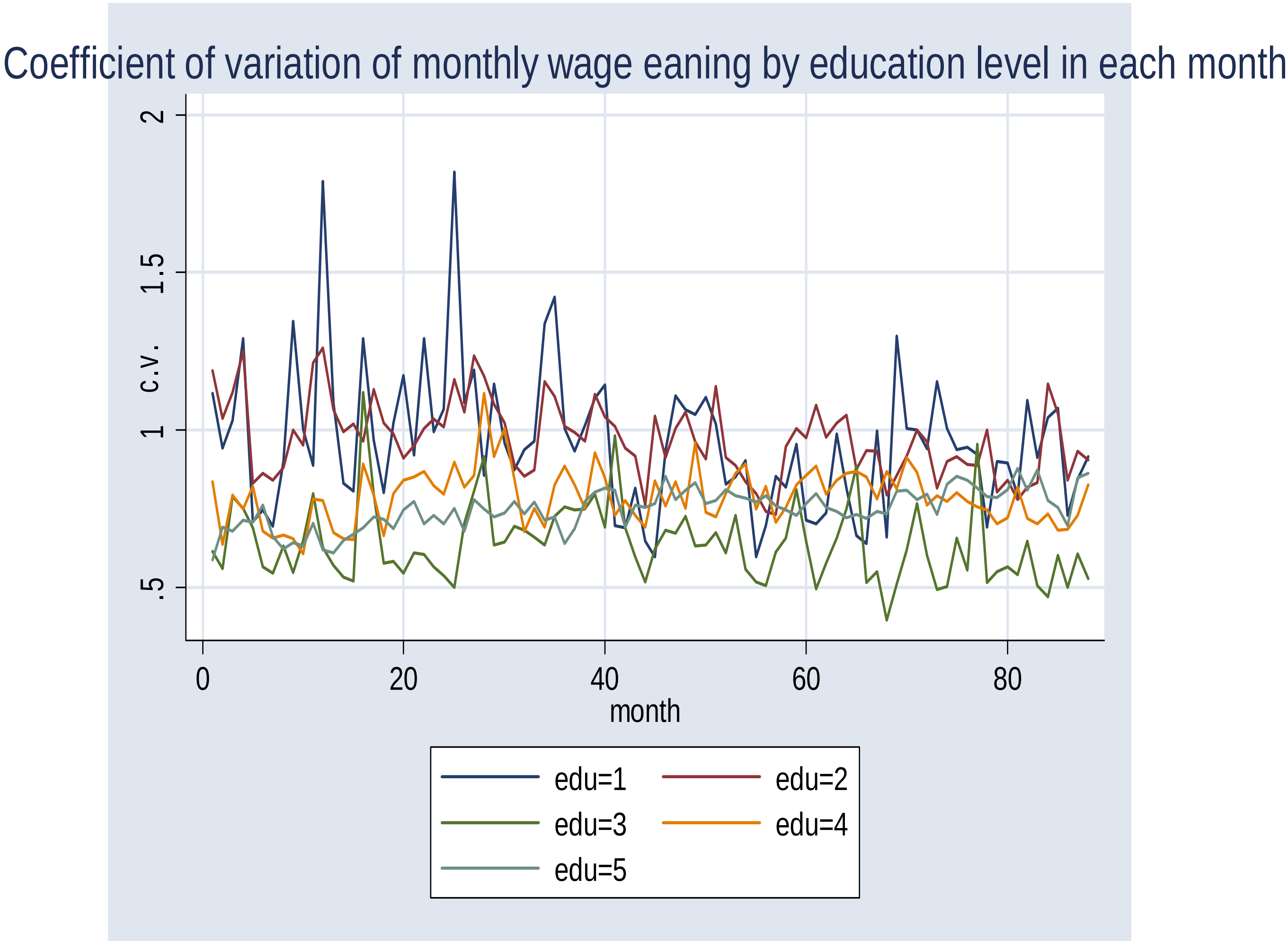
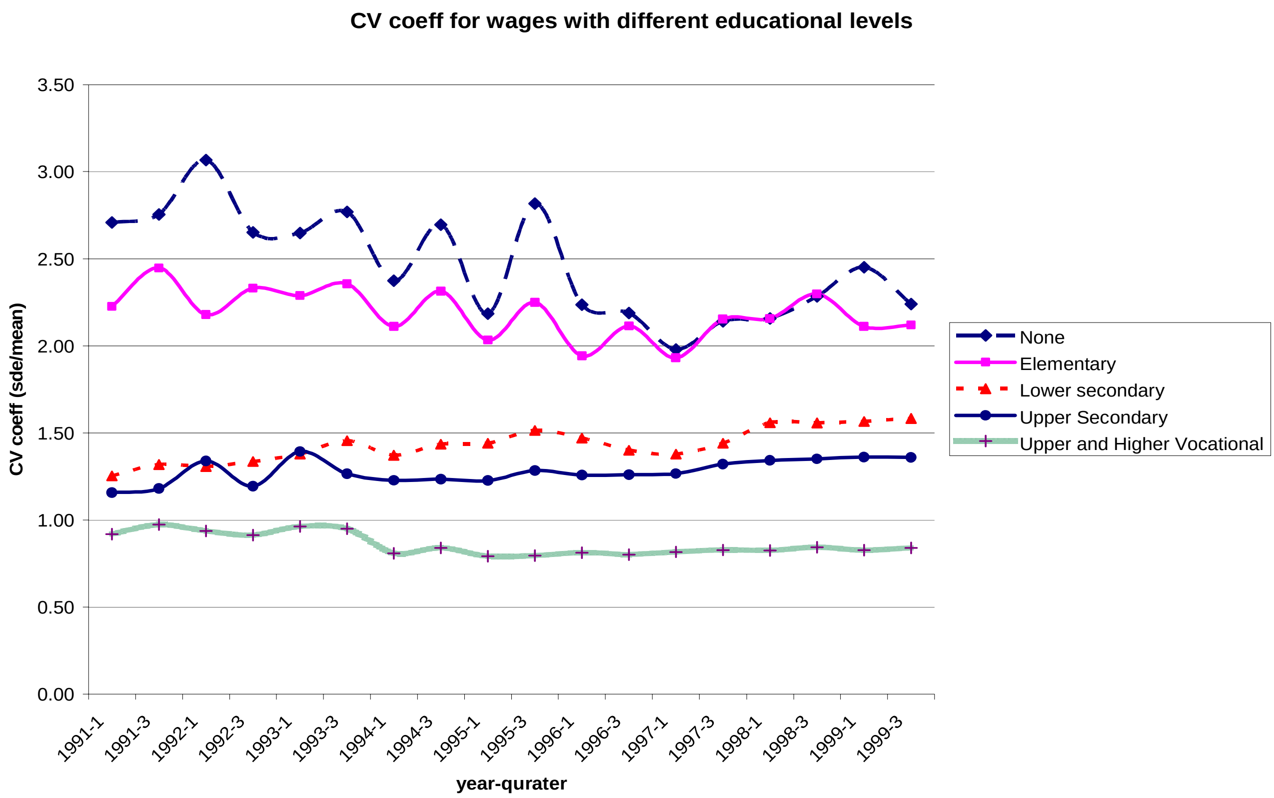


Figure7-5



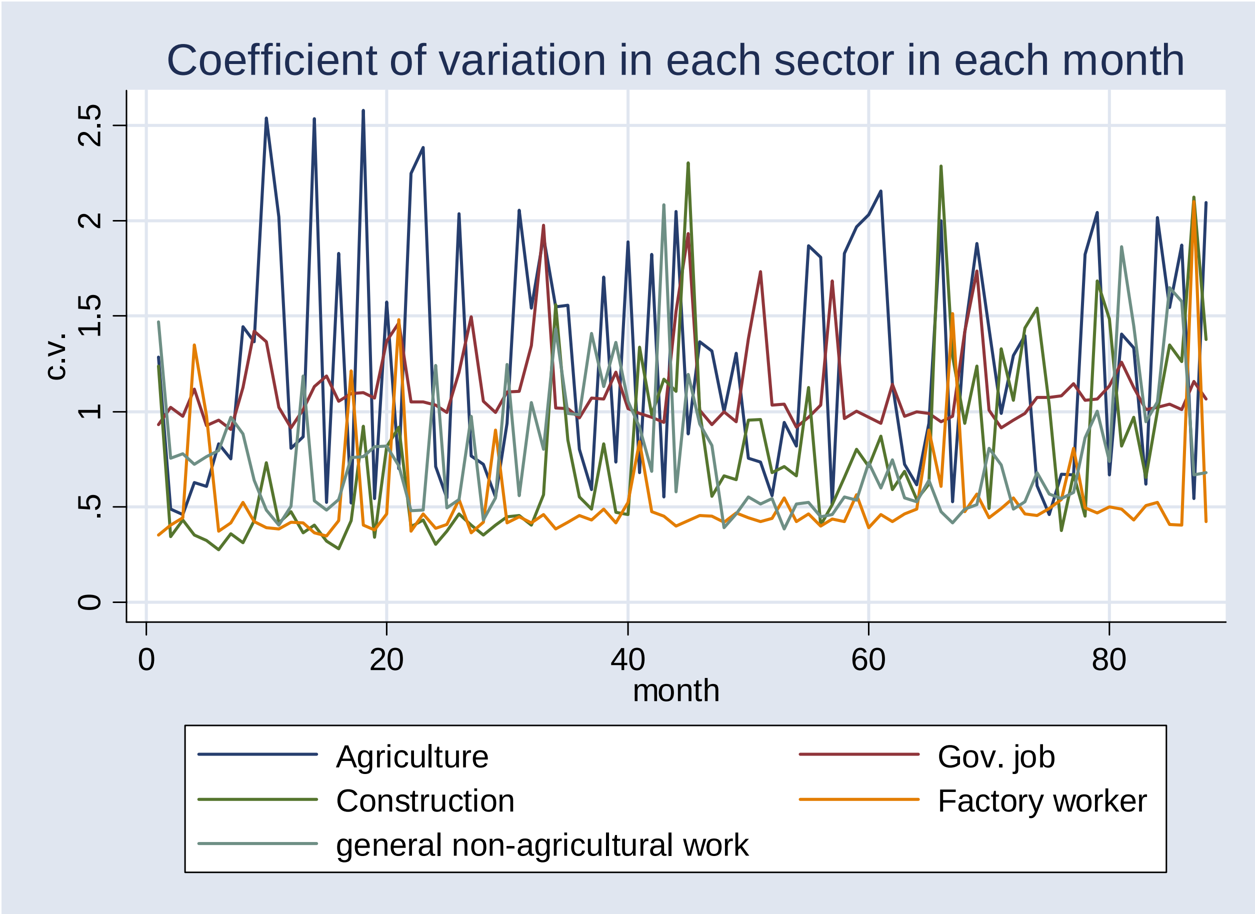
Coefficient of variation of monthly wage eaning by education level in each month
c.v.
.5
1
1.5
2
0
20
40
60
80
month
edu=1
edu=2
edu=3
edu=4
edu=5

Figure7-6



CV coeff for wages with different educational levels
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
CV coeff (sde/mean)
1991-1
1991-3
1992-1
1992-3
1993-1
1993-3
1994-1
1994-3
1995-1
1995-3
1996-1
1996-3
1997-1
1997-3
1998-1
1998-3
1999-1
1999-3
year-qurater
None
Elementary
Lower secondary
Upper Secondary
Upper and Higher Vocational

Figure7-7



Coefficient of variation in each sector in each month
c.v.
0
.5
1
1.5
2
2.5
0
20
40
60
80
month
Agriculture
Gov. job
Construction
Factory worker
general non-agricultural work

Figure7-8

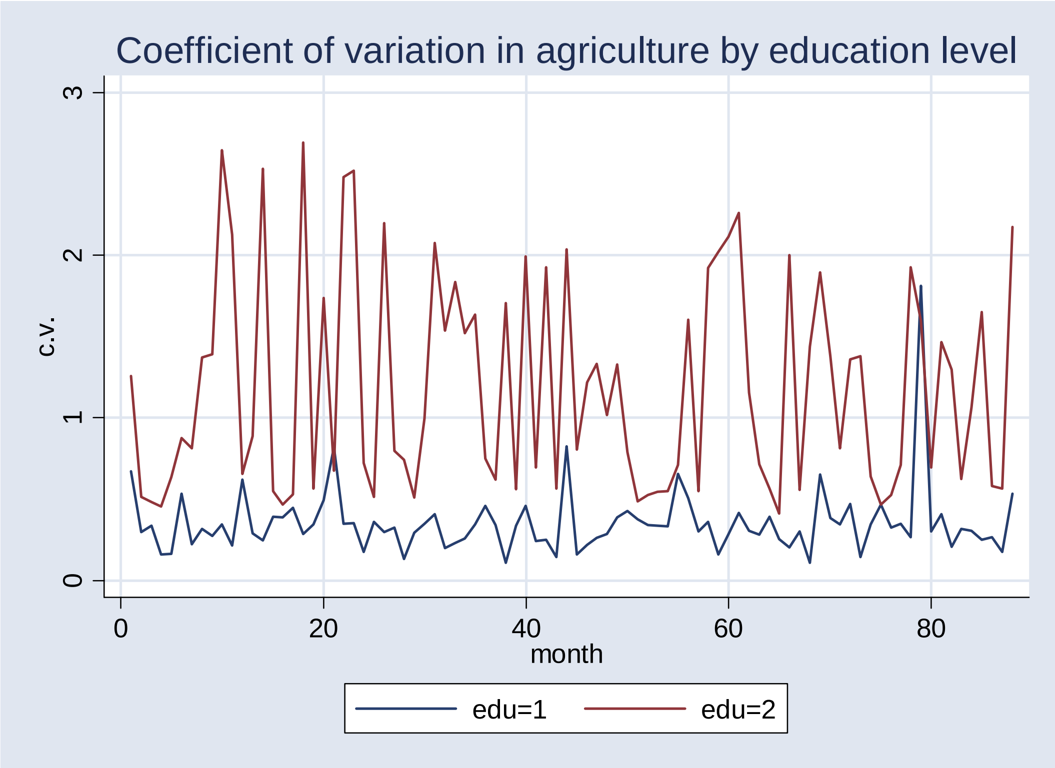
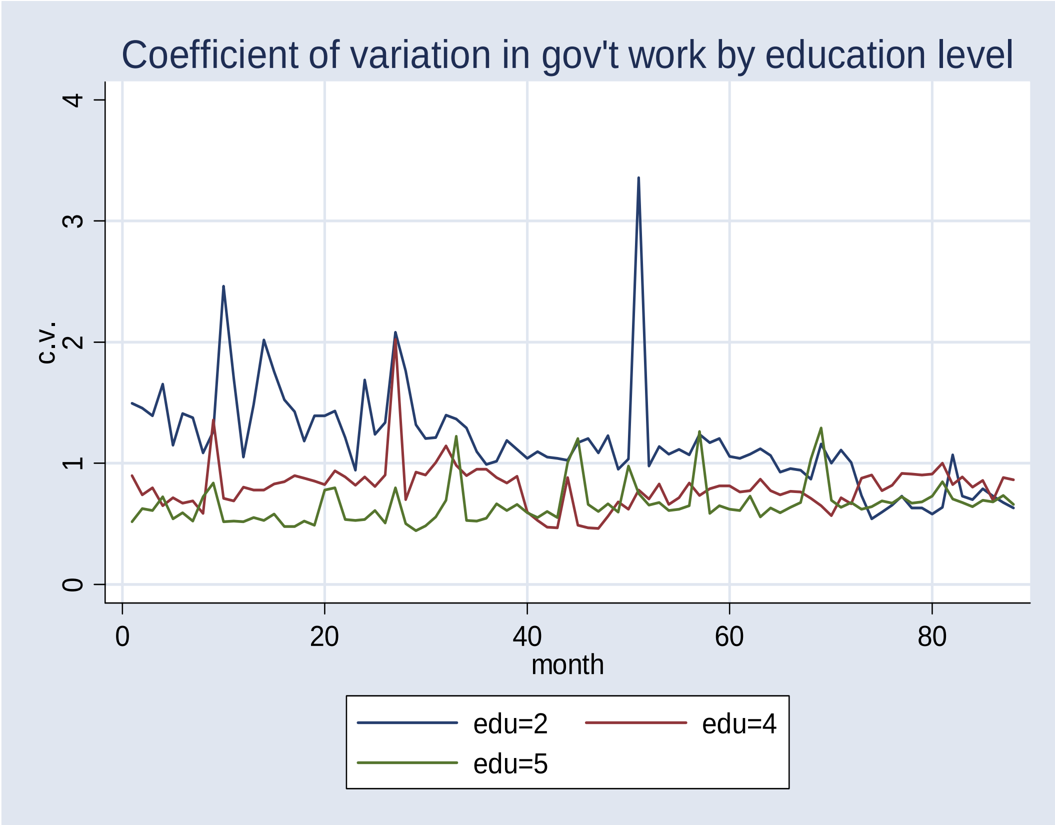

Coefficient of variation in agriculture by education level
c.v.
0
1
2
3
0
20
40
60
80
month
edu=1
edu=2

Figure7-9



Coefficient of variation in gov't work by education level
c.v.
0
1
2
3
4
0
20
40
60
80
month
edu=2
edu=4
edu=5

Figure7-10

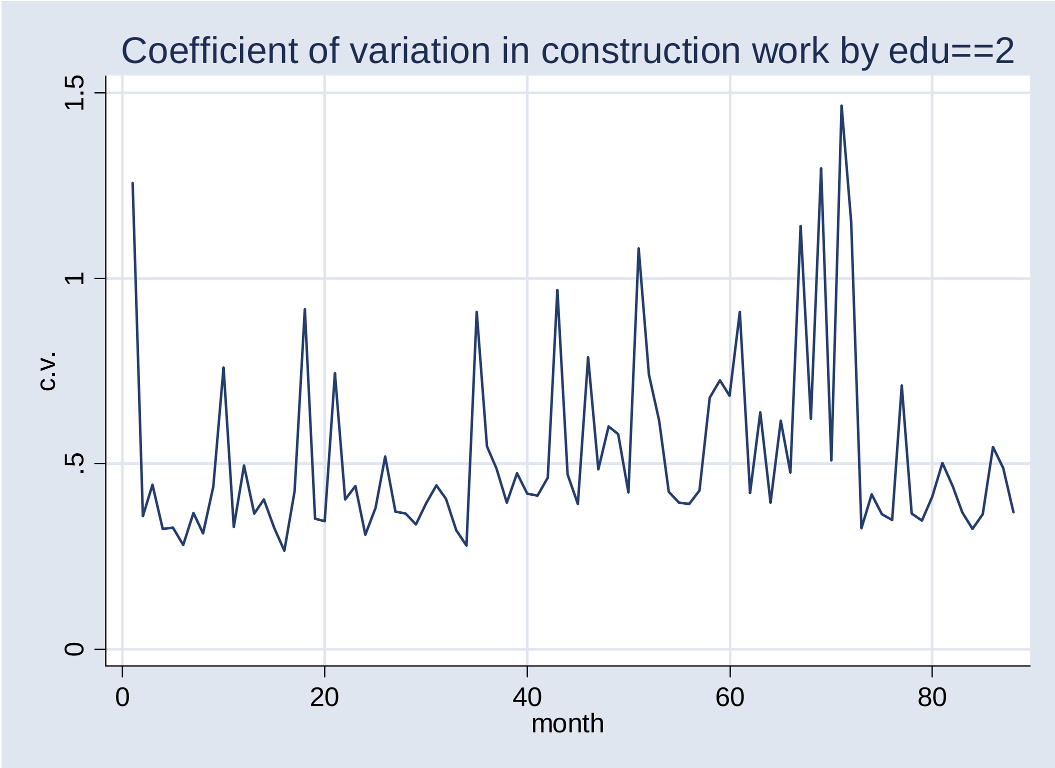


Table7-10: summary of c.v. of each individual by education level

Education	Obs	Mean	Std. Dev.	Min	Max
1	86	.3317789	.2430622	.0248278	1.422751
2	906	.2985541	.309962	.0014531	2.755606
3	83	.2736157	.2459283	.0160748	1.342546
4	136	.3551017	.362378	.0252825	1.726164
5	112	.311759	.2773076	.060007	1.555151

Table7-11: summary of c.v. of each individual by changwat

changwat	Obs	Mean	Std. Dev.	Min	Max
7	456	.2925098	.3327822	.004375	2.755606
27	258	.3536365	.328589	.010314	2.479949
49	523	.2680276	.2524361	.0014531	1.845385
53	95	.4328671	.3220895	.0223586	1.843903

Table7-12: OLS regression of c.v. of individual on characteristics

Linear regression

Number of obs =	1322
F(19, 1302) =	7.53
Prob > F =	0.0000
R-squared =	0.0780
Root MSE =	.29596

cvi	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf. Interval]	
Years of educatin	.0051962	.0027335	1.90	0.058	-.0001664	.0105587
Log(age)	-.2862784	.2109482	-1.36	0.175	-.7001141	.1275572
Log(age) squared	.0558324	.0331255	1.69	0.092	-.0091527	.1208176
Gender(male=1)	.0472707	.0168014	2.81	0.005	.0143099	.0802315
Village dummies						
_Ivilid_704	.0370275	.0444763	0.83	0.405	-.0502255	.1242804
_Ivilid_707	-.0203901	.0401496	-0.51	0.612	-.0991551	.058375
_Ivilid_708	-.0251039	.0415532	-0.60	0.546	-.1066225	.0564147
_Ivilid_2702	.0519379	.0564165	0.92	0.357	-.0587394	.1626151
_Ivilid_2710	.1177222	.0780013	1.51	0.131	-.0352999	.2707442
_Ivilid_2713	.0574388	.0514875	1.12	0.265	-.0435687	.1584462
_Ivilid_2714	.0745226	.0395656	1.88	0.060	-.0030967	.1521418
_Ivilid_4901	-.0987047	.0317478	-3.11	0.002	-.1609871	-.0364223
_Ivilid_4903	-.0211136	.0328027	-0.64	0.520	-.0854655	.0432383
_Ivilid_4904	.0317855	.0380121	0.84	0.403	-.0427863	.1063572
_Ivilid_4906	.1295445	.0510746	2.54	0.011	.0293471	.229742
_Ivilid_5301	.1345606	.0696299	1.93	0.054	-.0020385	.2711596
_Ivilid_5306	.3117275	.0946547	3.29	0.001	.126035	.49742
_Ivilid_5309	-.0204905	.0494534	-0.41	0.679	-.1175077	.0765266
_Ivilid_5310	.1890493	.0448216	4.22	0.000	.1011189	.2769797
_cons	.5428247	.3265305	1.66	0.097	-.0977589	1.183408

Table8-1: Probit estimation of the wage job market participation

Probit regression, reporting marginal effects Number of obs = 56992

Wald chi2(35) =11496.51

Prob > chi2 = 0.0000

Log pseudolikelihood = -29774.878 Pseudo R2 = 0.2237

choice	dF/dx	Robust Std. Err.	z	P>|z|	x-bar	[95% C.I.	]
Log(age)	6.607446	.1706121	38.49	0.000	3.66575	6.27305	6.94184
Log(age)squared	-.9296876	.0236935	-38.98	0.000	13.5333	-.976126	-.883249
Education level dummies							
_Iedu_2*	-.0592451	.0107419	-5.56	0.000	.703379	-.080299	-.038191
_Iedu_3*	.1083169	.0158062	6.98	0.000	.049621	.077337	.139297
_Iedu_4*	.1102667	.0135036	8.31	0.000	.119087	.0838	.136733
_Iedu_5*	.3559472	.0134306	24.06	0.000	.081362	.329624	.382271
Changwat dummies							
_Icha~27*	-.2503667	.0094386	-22.16	0.000	.170077	-.268866	-.231867
_Icha~49*	-.1243427	.010332	-11.55	0.000	.264634	-.144593	-.104092
_Icha~53*	-.375286	.0072143	-35.11	0.000	.17527	-.389426	-.361146
Calendar month dummies							
m1*	.0218277	.0112361	1.96	0.050	.081134	-.000195	.04385
m2*	.0184945	.0112009	1.66	0.097	.081625	-.003459	.040448
m4*	-.0057929	.0110925	-0.52	0.602	.079801	-.027534	.015948
m5*	-.013436	.0110962	-1.20	0.228	.076888	-.035184	.008312
m6*	-.0182776	.0110397	-1.64	0.100	.077028	-.039915	.00336
m7*	-.0026966	.0111594	-0.24	0.809	.078801	-.024569	.019175
m8*	-.0353259	.0106118	-3.28	0.001	.089328	-.056125	-.014527
m9*	-.0234336	.0106492	-2.18	0.029	.089486	-.044306	-.002562
m10*	.0173001	.0108926	1.60	0.110	.093329	-.004049	.038649
m11*	-.0180182	.0106463	-1.68	0.093	.091364	-.038885	.002848
m12*	-.0133246	.0110244	-1.20	0.229	.080713	-.034932	.008283
time trend	.000926	.0001466	6.32	0.000	43.7372	.000639	.001213
Changwat specific time trend							
chan27m	.0013614	.0002478	5.49	0.000	7.1712	.000876	.001847

chan49m	-.0004194	.0002157	-1.94	0.052	11.4293	-.000842	3.3e-06
chan53m	.0001516	.0002655	0.57	0.568	7.46743	-.000369	.000672
gender(=1,male)	.1025986	.0048203	21.29	0.000	.439342	.093151	.112046
Log of real household asset	-.1507933	.0021646	-69.89	0.000	13.8245	-.155036	-.146551
Household size	.041307	.0038543	10.73	0.000	4.78048	.033753	.048861
# of working age male	-.0157163	.0052238	-3.01	0.003	1.24237	-.025955	-.005478
# of working age female	.0126305	.00571	2.21	0.027	1.41653	.001439	.023822
# of elder male	-.1150097	.0058245	-19.76	0.000	.371631	-.126426	-.103594
# of elder female	-.021614	.0054487	-3.97	0.000	.477278	-.032293	-.010935
# of children male (12<,<=18)	-.0202608	.0063031	-3.22	0.001	.207345	-.032615	-.007907
# of children female (12<,<=18)	.0108196	.0057868	1.87	0.062	.21782	-.000522	.022161
# of children male (6<,<=12)	-.0029206	.0061485	-0.48	0.635	.234647	-.014971	.00913
# of children female (6<,<=12)	-.0584109	.0062058	-9.41	0.000	.243789	-.070574	-.046248

---------+--

obs. P | .3999333

pred. P | .3724688 (at x-bar)

(*) dF/dx is for discrete change of dummy variable from 0 to 1

z and P>|z| correspond to the test of the underlying coefficient being 0

Table8-2: Estimation result of selection corrected wage equation

Linear regression Number of obs = 22793

F(34, 22758) = 223.83

Prob > F = 0.0000

R-squared = 0.2654

Root MSE = .63686

lwage	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
Log (age)	1.345295	.3822316	3.52	0.000	.596095	2.094495
Log (age) squared	-.131363	.0539061	-2.44	0.015	-.2370226	-.0257035
Education level dummies						
_Iedu_2	.0681073	.0167601	4.06	0.000	.0352564	.1009582
_Iedu_3	.1944101	.0251672	7.72	0.000	.1450806	.2437396
_Iedu_4	.4103696	.0216535	18.95	0.000	.3679272	.452812
_Iedu_5	.949913	.0260674	36.44	0.000	.8988192	1.001007
Changwat dummies						
_Ichan_27	-.6006899	.0263217	-22.82	0.000	-.6522822	-.5490975
_Ichan_49	-.4209353	.0193983	-21.70	0.000	-.4589574	-.3829133
_Ichan_53	-.5317499	.0472726	-11.25	0.000	-.6244075	-.4390924
Calendar month dummies						
m1	-.0188351	.0218768	-0.86	0.389	-.0617151	.0240449
m2	-.0007599	.021963	-0.03	0.972	-.0438088	.042289
m4	.0444383	.023613	1.88	0.060	-.0018448	.0907213
m5	-.0044953	.0215287	-0.21	0.835	-.046693	.0377024
m6	.0039817	.0211497	0.19	0.851	-.0374731	.0454364
m7	-.0114767	.0208411	-0.55	0.582	-.0523268	.0293733
m8	-.0406665	.0209114	-1.94	0.052	-.0816543	.0003213
m9	-.0465161	.0216316	-2.15	0.032	-.0889154	-.0041167
m10	.0044871	.0210138	0.21	0.831	-.0367013	.0456756
m11	.0162523	.0200419	0.81	0.417	-.0230311	.0555358
m12	.0099448	.0220676	0.45	0.652	-.0333091	.0531987
time trend	-.0021346	.000207	-10.31	0.000	-.0025404	-.0017288
changwat specific time trend						
chan27m	.001997	.0004867	4.10	0.000	.001043	.002951
chan49m	.00215	.0003903	5.51	0.000	.001385	.002915
chan53m	.0045793	.0008411	5.44	0.000	.0029308	.0062278

gender (=1 male)	.1554678	.0096994	16.03	0.000	.1364562	.1744793
Sector dummies						
Gov't work	.1326102	.0253249	5.24	0.000	.0829717	.1822487
Construction	.1210936	.0154376	7.84	0.000	.0908347	.1513524
Factory work	.0807785	.0152785	5.29	0.000	.0508315	.1107255
General work	-.0074431	.0171711	-0.43	0.665	-.0410996	.0262134
Others	.0214183	.0161615	1.33	0.185	-.0102594	.053096
Polynomial of propensity score						
p^1	3.102838	.6929579	4.48	0.000	1.744593	4.461082
p^2	-1.126454	.2265389	-4.97	0.000	-1.570486	-.6824221
p^3	1.679781	.3017276	5.57	0.000	1.088374	2.271187
p^4	-.0000902	.000014	-6.45	0.000	-.0001176	-.0000628
_cons	-.2346851	.6621469	-0.35	0.723	-1.532538	1.063168

Table8-3: Comparison of mean of imputed wage and actual wage used in the wage regression by education level (wage is less than 200bahts/hour)

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Edu=1

Variable	Obs	Mean	Std. Dev.	Min	Max
imputed	1426	10.57308	2.575171	4.863661	17.61904
Actual	1630	19.17793	12.38838	.4179204	176.1127

Edu=2

Variable	Obs	Mean	Std. Dev.	Min	Max
imputed	26265	14.04579	3.913424	4.854242	193.8936
Actual	20964	25.28172	21.57119	.0346405	198.7952

Edu=3

Variable	Obs	Mean	Std. Dev.	Min	Max
imputed	1526	13.27156	6.483667	5.693158	121.9578

Actual	1756	24.09804	17.04287	.0260146	192.9012

Edu=4

Variable	Obs	Mean	Std. Dev.	Min	Max
imputed	3559	16.88321	7.295033	6.190153	151.6935
Actual	4391	34.72973	26.60083	1.004016	199.362

Edu=5

Variable	Obs	Mean	Std. Dev.	Min	Max
imputed	1322	27.76005	14.00353	12.11534	181.4185
Actual	3881	58.31829	44.2367	1.187085	198.1132

Figure8-1

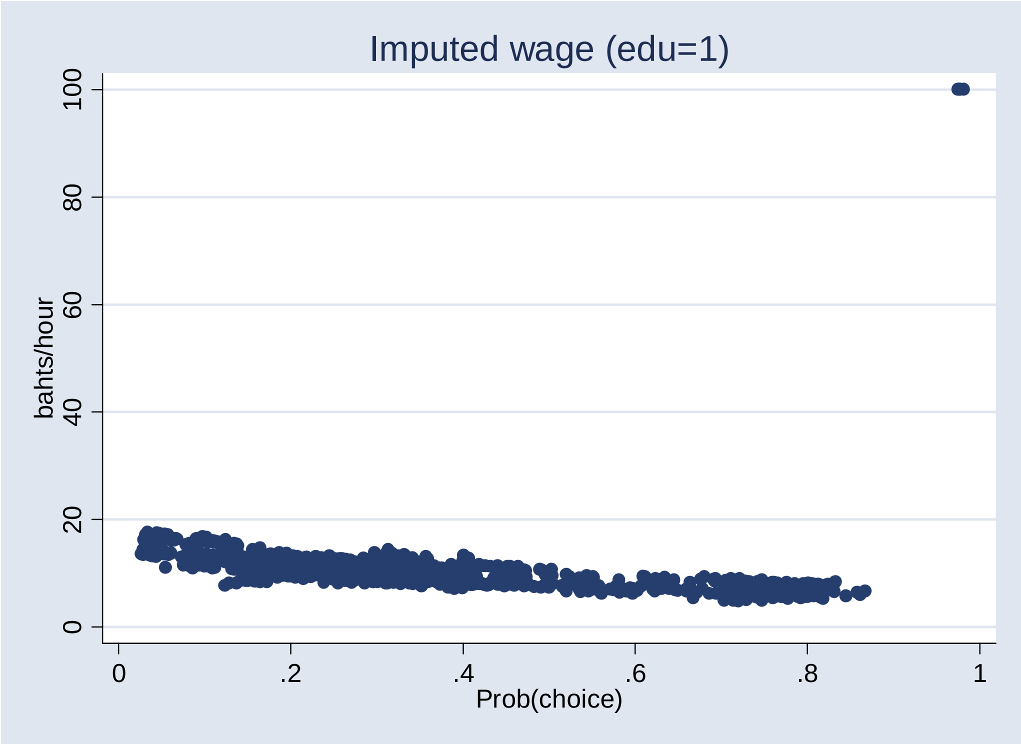


Figure8-2

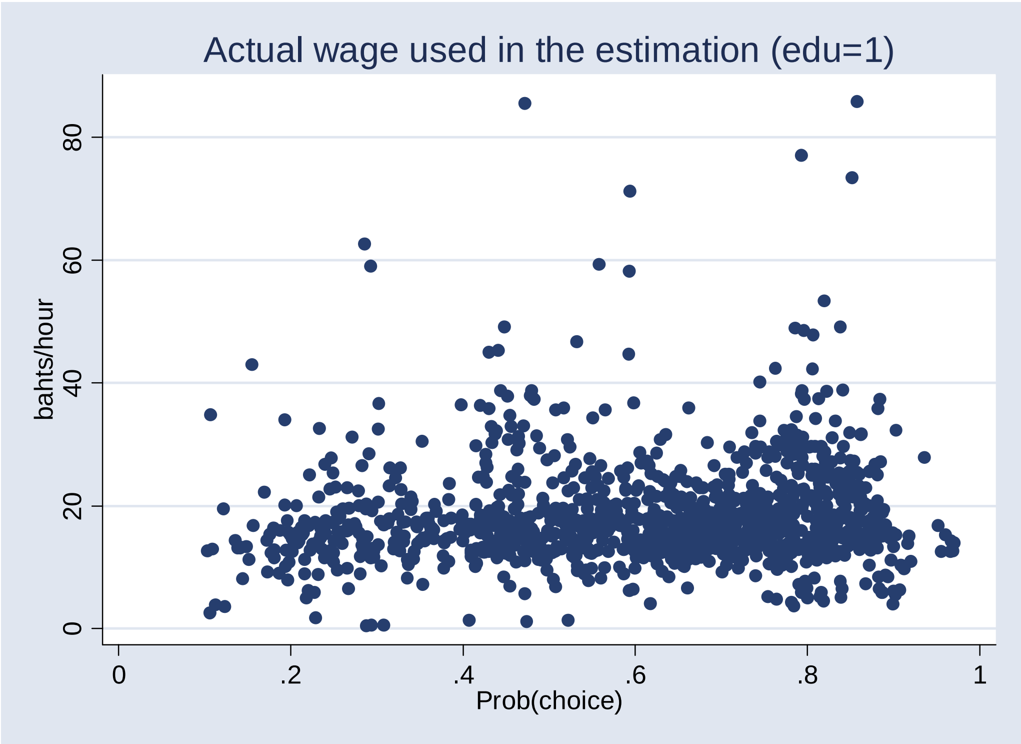


Figure8-3

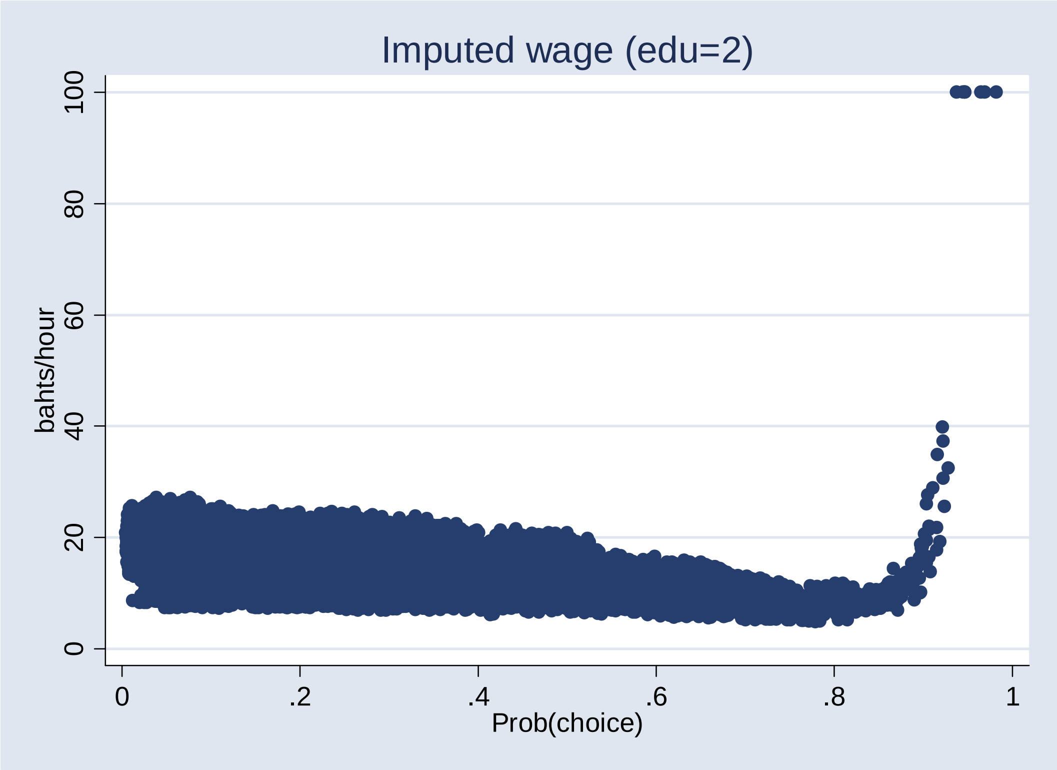


Figure8-4

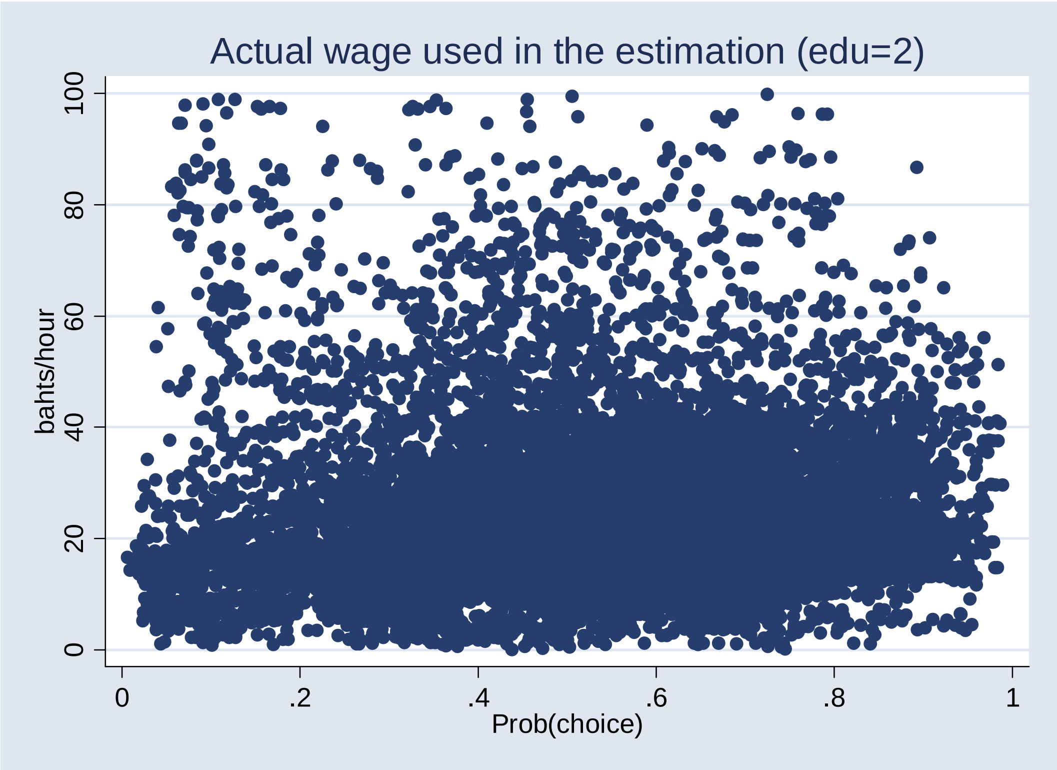


Figure8-5

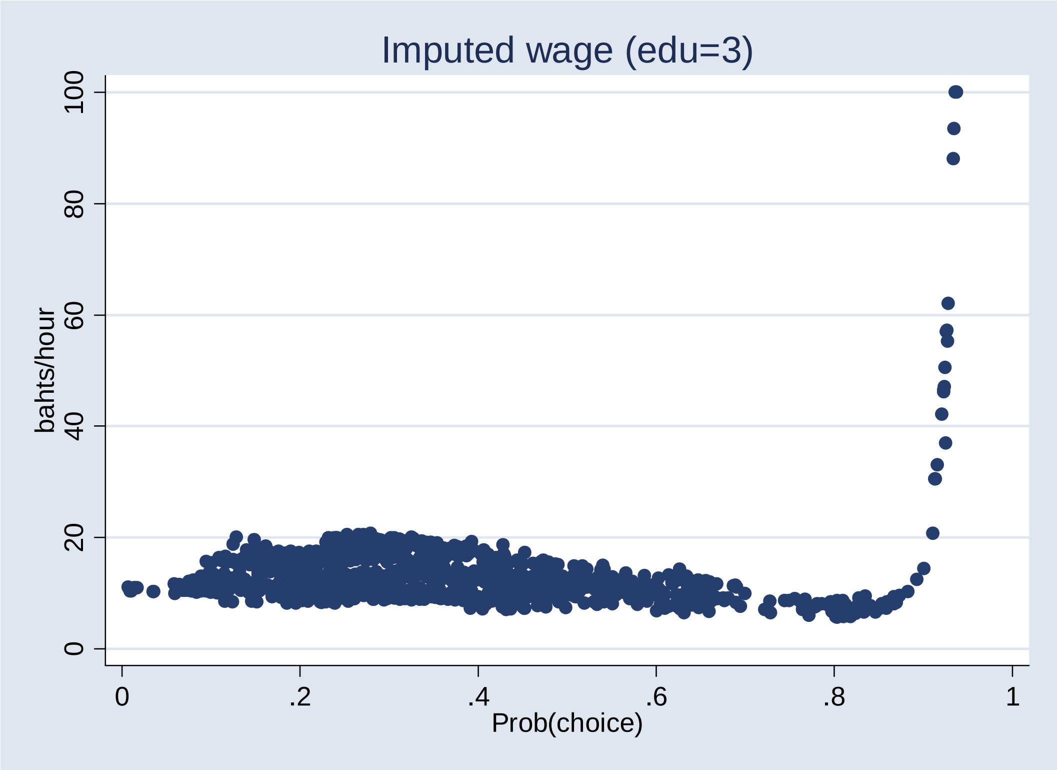


Figure8-6

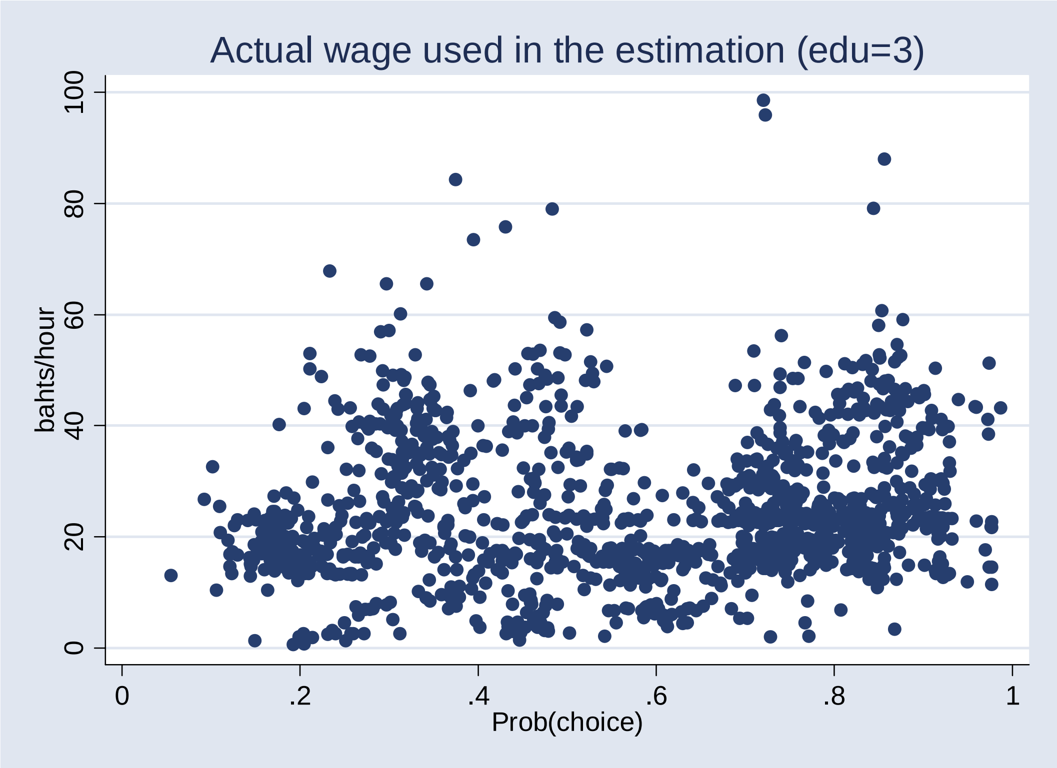


Figure8-7

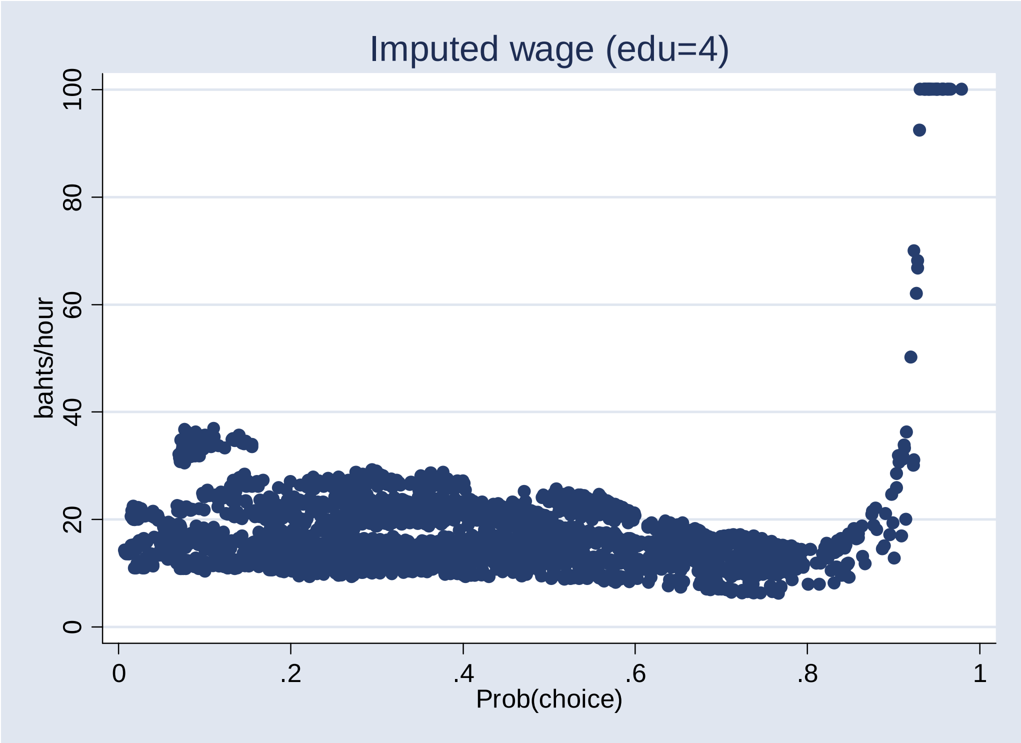


Figure8-8

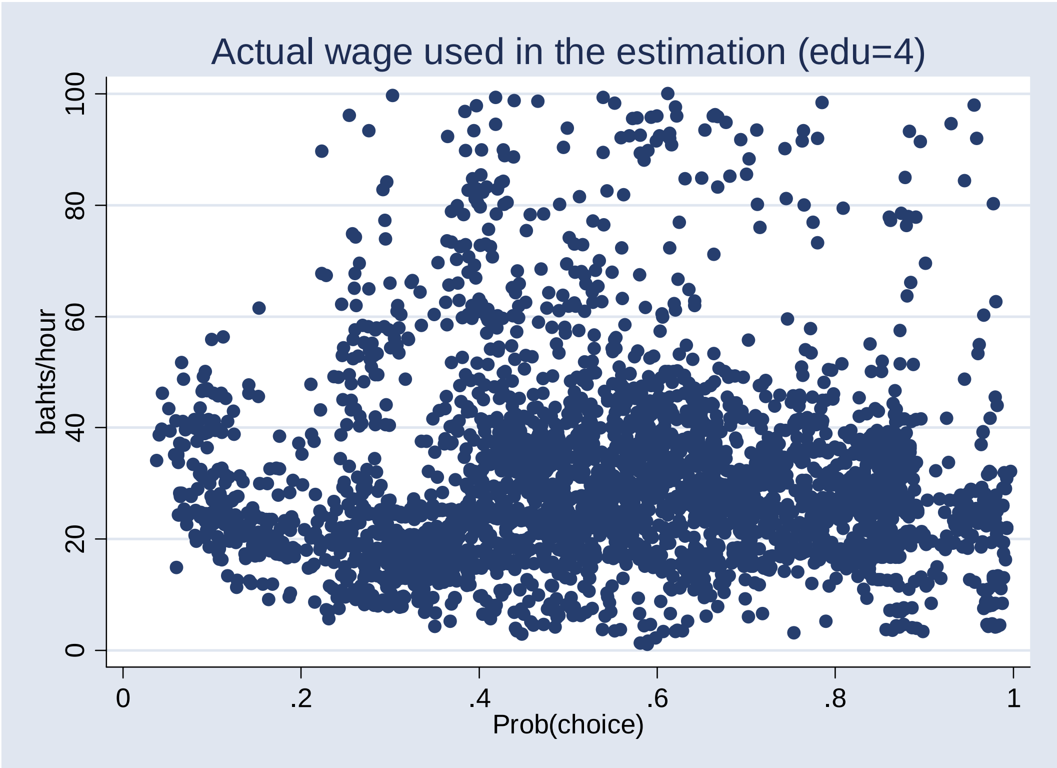


Figure8-9

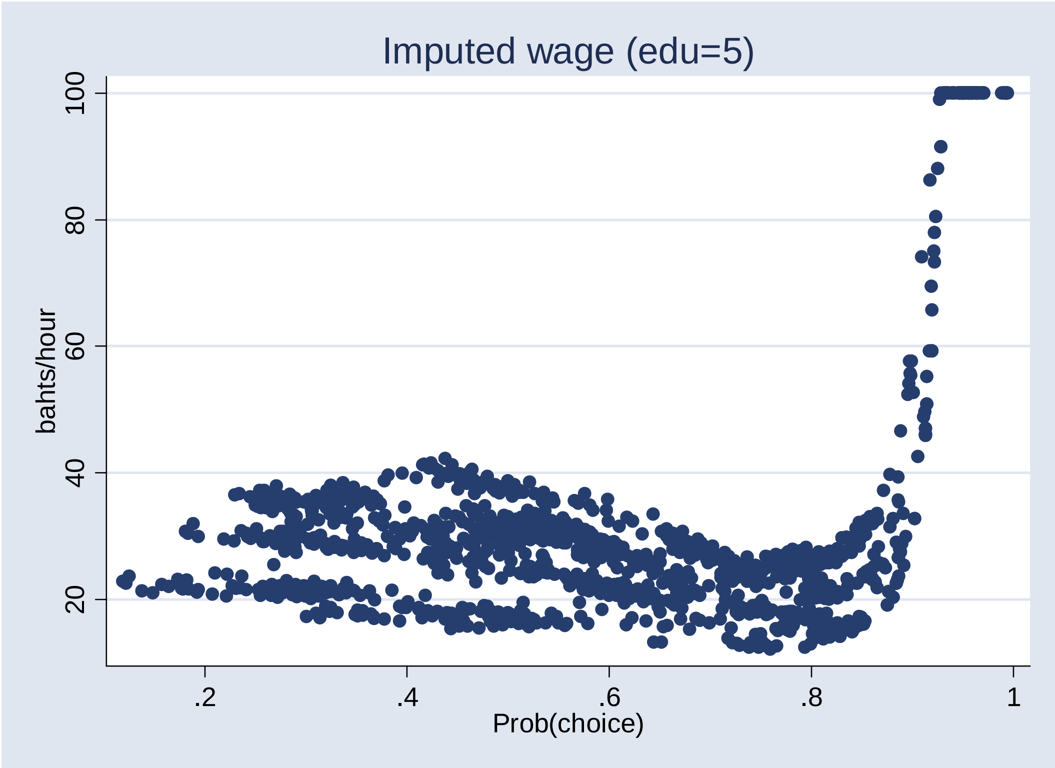
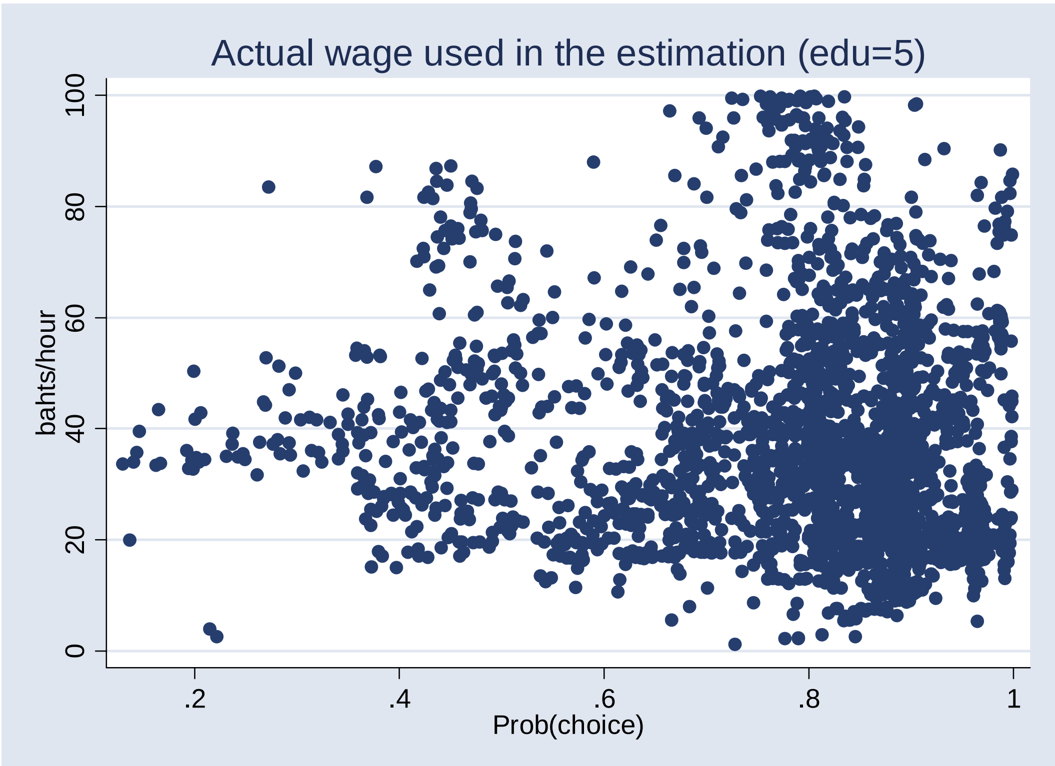


Figure8-10



Business

Figure9-1: Distribution of true profit (pooled)

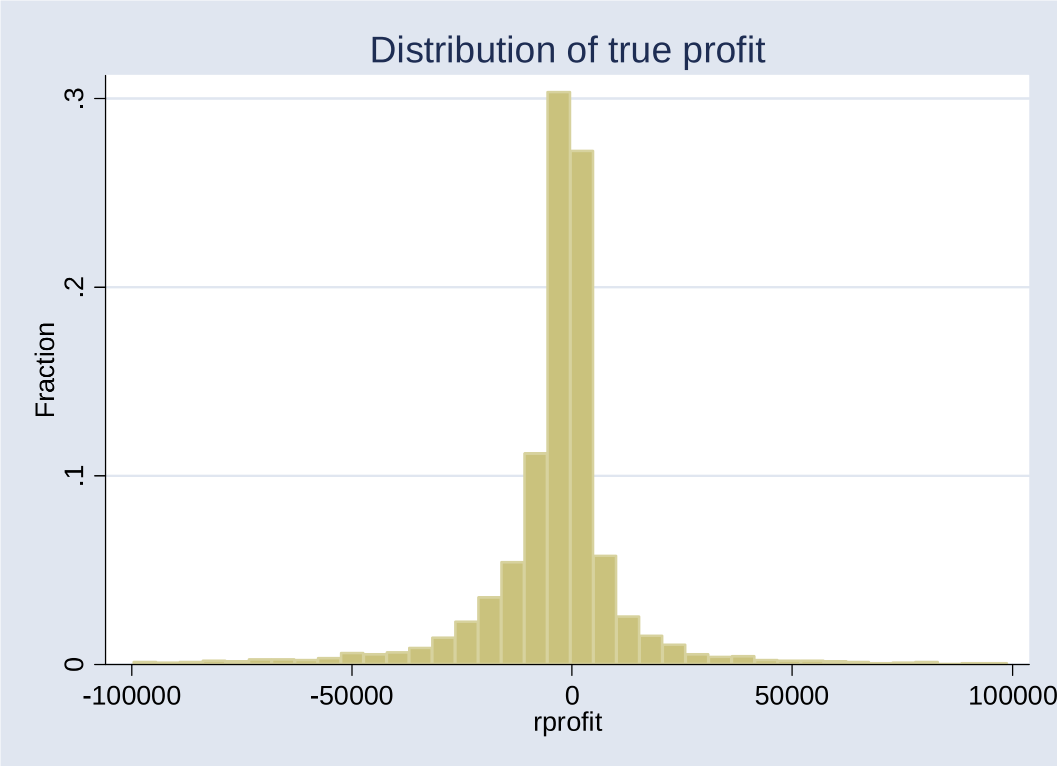


Figure9-2

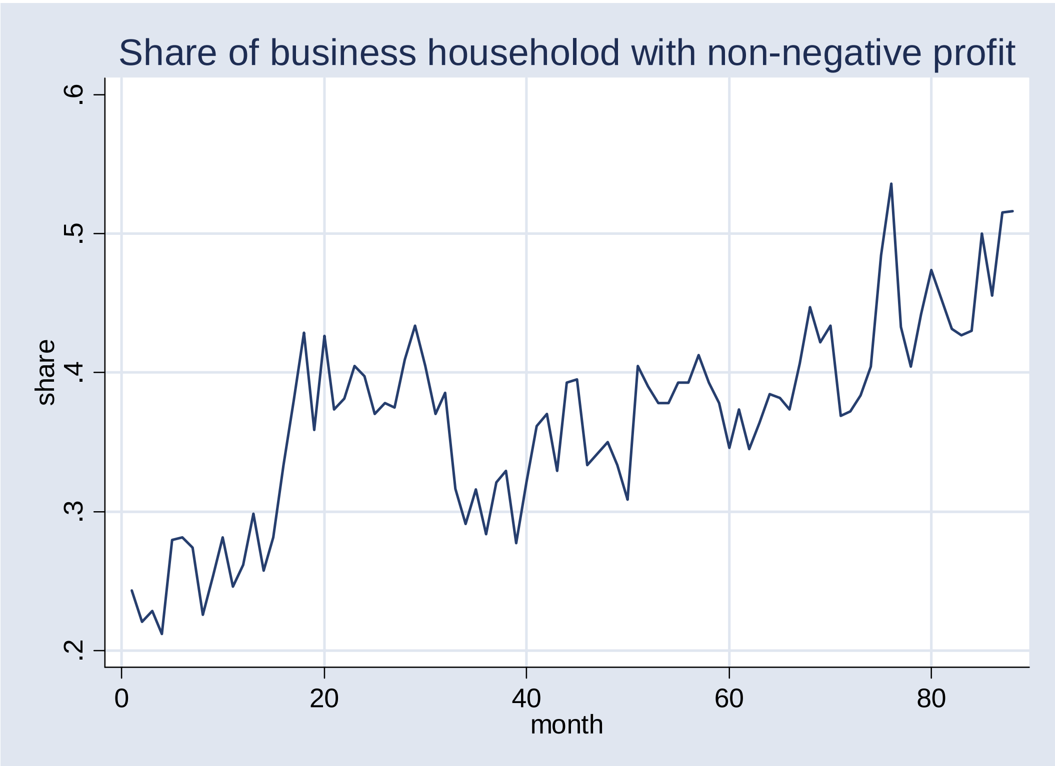


Table9-1:

Linear regression

Number of obs = 88
F(12, 75) = 12.91
Prob > F = 0.0000
R-squared = 0.6316
Root MSE = .04613

spp	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf. Interval]	
Time trend	.0021111	.0002014	10.48	0.000	.0017099	.0025123
m1	-.0105762	.0294363	-0.36	0.720	-.0692164	.048064
m2	-.0221508	.02241	-0.99	0.326	-.0667938	.0224922
m4	-.0190465	.0231902	-0.82	0.414	-.0652438	.0271508
m5	-.0326508	.0242775	-1.34	0.183	-.081014	.0157124
m6	-.0436924	.0264594	-1.65	0.103	-.0964022	.0090173
m7	-.0518744	.0265047	-1.96	0.054	-.1046746	.0009257
m8	-.0369993	.0239994	-1.54	0.127	-.0848085	.0108099
m9	-.0546924	.0243183	-2.25	0.027	-.1031369	-.006248
m10	-.0278499	.0274847	-1.01	0.314	-.0826022	.0269024
m11	-.0083958	.0290289	-0.29	0.773	-.0662243	.0494328
m12	-.0075342	.026838	-0.28	0.780	-.0609983	.0459299
_cons	.2991794	.0243484	12.29	0.000	.2506748	.3476839

Table9-2

Linear regression

Number of obs = 6852
F(25, 6826) = 11.22
Prob > F = 0.0000
R-squared = 0.0428
Root MSE = 16944

rprofit	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf. Interval]	
l_heage	28423.38	15903.16	1.79	0.074	-2751.775	59598.53
l_heage_sq	-4672.904	2202.515	-2.12	0.034	-8990.52	-355.2891
_Ihhedu_2	-2352.233	724.5082	-3.25	0.001	-3772.494	-931.9708
_Ihhedu_3	-3932.008	1245.526	-3.16	0.002	-6373.627	-1490.389
_Ihhedu_4	-4246.929	862.2428	-4.93	0.000	-5937.193	-2556.664
_Ihhedu_5	-3642.099	873.7445	-4.17	0.000	-5354.911	-1929.287
_Ichan_27	1382.241	1573.95	0.88	0.380	-1703.192	4467.674
_Ichan_49	5661.12	1421.93	3.98	0.000	2873.694	8448.546
_Ichan_53	4355.047	1373.536	3.17	0.002	1662.489	7047.605
m1	751.6387	1030.351	0.73	0.466	-1268.17	2771.447
m2	-97.74819	1023.304	-0.10	0.924	-2103.744	1908.247
m4	-548.6387	1043.616	-0.53	0.599	-2594.45	1497.173
m5	-652.3632	1060.01	-0.62	0.538	-2730.314	1425.588
m6	-200.8196	1026.713	-0.20	0.845	-2213.497	1811.858
m7	-871.5125	1048.811	-0.83	0.406	-2927.51	1184.485
m8	-1535.19	981.4802	-1.56	0.118	-3459.197	388.8168
m9	-1417.486	992.6348	-1.43	0.153	-3363.36	528.3872
m10	-2516.924	1047.246	-2.40	0.016	-4569.852	-463.9959
m11	-1060.083	1064.031	-1.00	0.319	-3145.915	1025.75
m12	-836.2404	1093.997	-0.76	0.445	-2980.816	1308.335
time trend	164.9792	19.17865	8.60	0.000	127.3831	202.5754

chan27m |	-2.780641	26.73921	-0.10	0.917	-55.19783	49.63655
chan49m |	-128.2319	26.02293	-4.93	0.000	-179.2449	-77.2188
chan53m |	-100.8143	24.06418	-4.19	0.000	-147.9876	-53.64098
nib |	-870.2642	285.905	-3.04	0.002	-1430.727	-309.8013
_cons |	-46985.27	29154.33	-1.61	0.107	-104136.8	10166.3

--1.17

Figure9-3

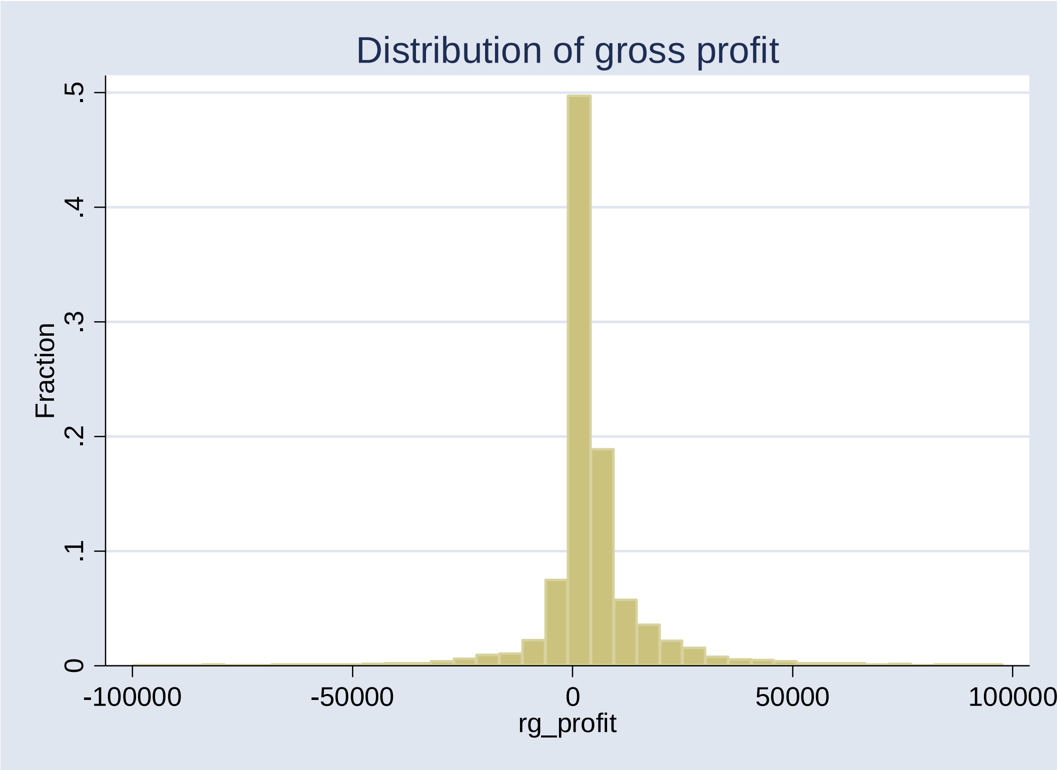


Figure9-4

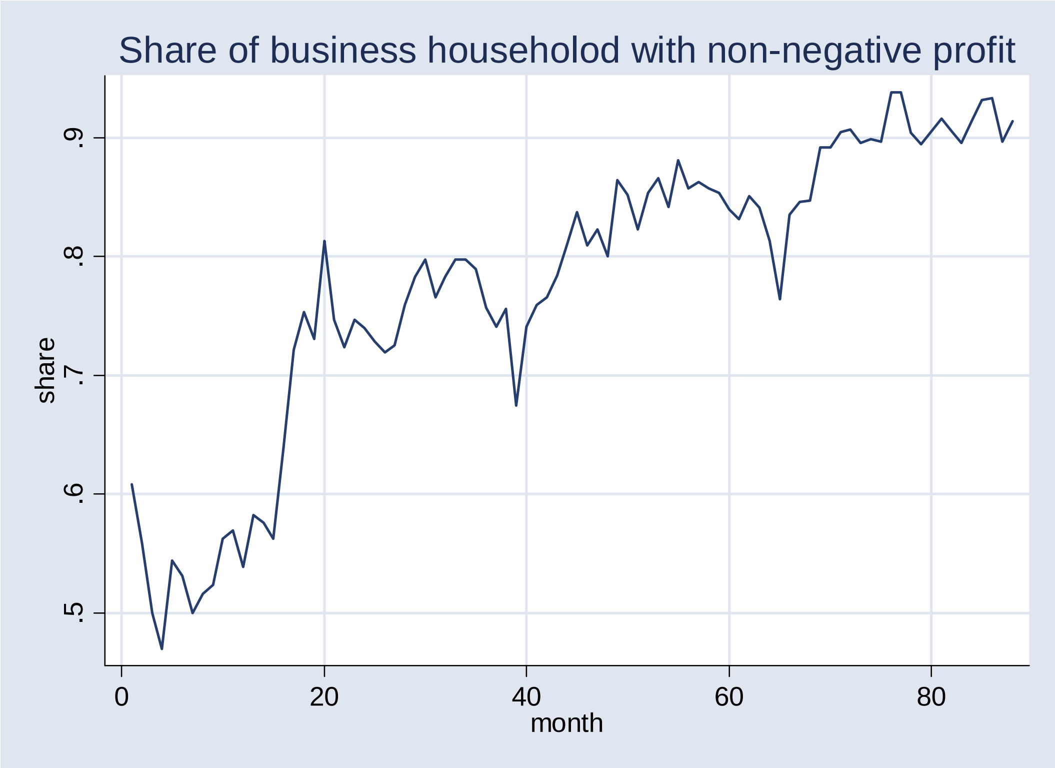


Table9-3

Linear regression

Number of obs = 88
F(12, 75) = 28.38
Prob > F = 0.0000
R-squared = 0.8273
Root MSE = .05594

gspp	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
Time trend	.0044182	.0002666	16.57	0.000	.0038871	.0049493
m1	-.0058996	.0380298	-0.16	0.877	-.0816588	.0698596
m2	-.0140744	.0384519	-0.37	0.715	-.0906746	.0625258
m4	.0017855	.0377139	0.05	0.962	-.0733445	.0769155
m5	-.0066128	.0342747	-0.19	0.848	-.0748916	.0616659
m6	-.0059697	.0348498	-0.17	0.864	-.0753941	.0634548
m7	-.0228411	.0345682	-0.66	0.511	-.0917046	.0460223
m8	-.0130551	.0328965	-0.40	0.693	-.0785882	.052478
m9	-.0221228	.0324011	-0.68	0.497	-.0866692	.0424236
m10	-.0546811	.0341884	-1.60	0.114	-.1227878	.0134257
m11	-.0331463	.0366732	-0.90	0.369	-.106203	.0399104
m12	-.0089933	.0392307	-0.23	0.819	-.0871449	.0691583
_cons	.5958248	.0349858	17.03	0.000	.5261295	.6655202

Table9-4

Linear regression

Number of obs = 6894
F(25, 6868) = 23.51
Prob > F = 0.0000
R-squared = 0.0950
Root MSE = 14079

rg_profit	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
l_heage	72964.69	13689.07	5.33	0.000	46129.87	99799.5
l_heage_sq	-10107.5	1891.352	-5.34	0.000	-13815.13	-6399.864
_Ihhedu_2	-215.3485	639.1167	-0.34	0.736	-1468.215	1037.518
_Ihhedu_3	302.0598	1050.019	0.29	0.774	-1756.303	2360.422
_Ihhedu_4	1077.844	703.4046	1.53	0.125	-301.0464	2456.735
_Ihhedu_5	2418.219	747.9013	3.23	0.001	952.101	3884.337
_Ichan_27	1164.145	1440.388	0.81	0.419	-1659.461	3987.751
_Ichan_49	7016.924	1365.301	5.14	0.000	4340.512	9693.336
_Ichan_53	9218.449	1250.761	7.37	0.000	6766.569	11670.33
m1	1339.943	831.2515	1.61	0.107	-289.567	2969.453
m2	-100.3259	832.2703	-0.12	0.904	-1731.833	1531.181
m4	544.8519	787.6162	0.69	0.489	-999.1196	2088.823
m5	516.4498	795.6686	0.65	0.516	-1043.307	2076.207
m6	-139.7489	810.6305	-0.17	0.863	-1728.836	1449.338
m7	142.5113	789.59	0.18	0.857	-1405.329	1690.352
m8	-572.0921	750.5263	-0.76	0.446	-2043.356	899.1718
m9	-1272.746	791.5662	-1.61	0.108	-2824.461	278.9686
m10	-1932.758	784.5553	-2.46	0.014	-3470.729	-394.787
m11	-109.739	835.12	-0.13	0.895	-1746.833	1527.355
m12	445.3093	842.9242	0.53	0.597	-1207.083	2097.702
time trend	201.8643	17.67137	11.42	0.000	167.223	236.5057
chan27m	-17.93197	23.51936	-0.76	0.446	-64.0372	28.17326
chan49m	-129.5404	22.94842	-5.64	0.000	-174.5264	-84.55439
chan53m	-178.2029	21.30717	-8.36	0.000	-219.9716	-136.4343
nib	1879.347	263.9195	7.12	0.000	1361.984	2396.711
_cons	-141054.4	25116.64	-5.62	0.000	-190290.8	-91818.03

Fish/shrimp

Figure9-5

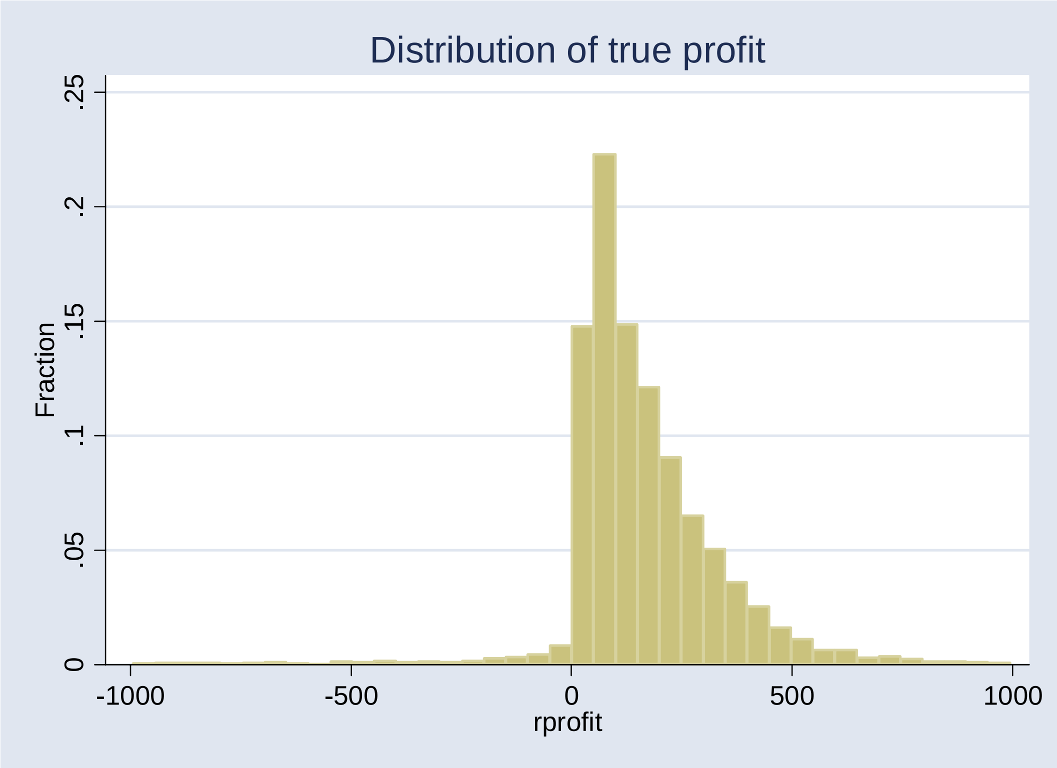


Figure9-6

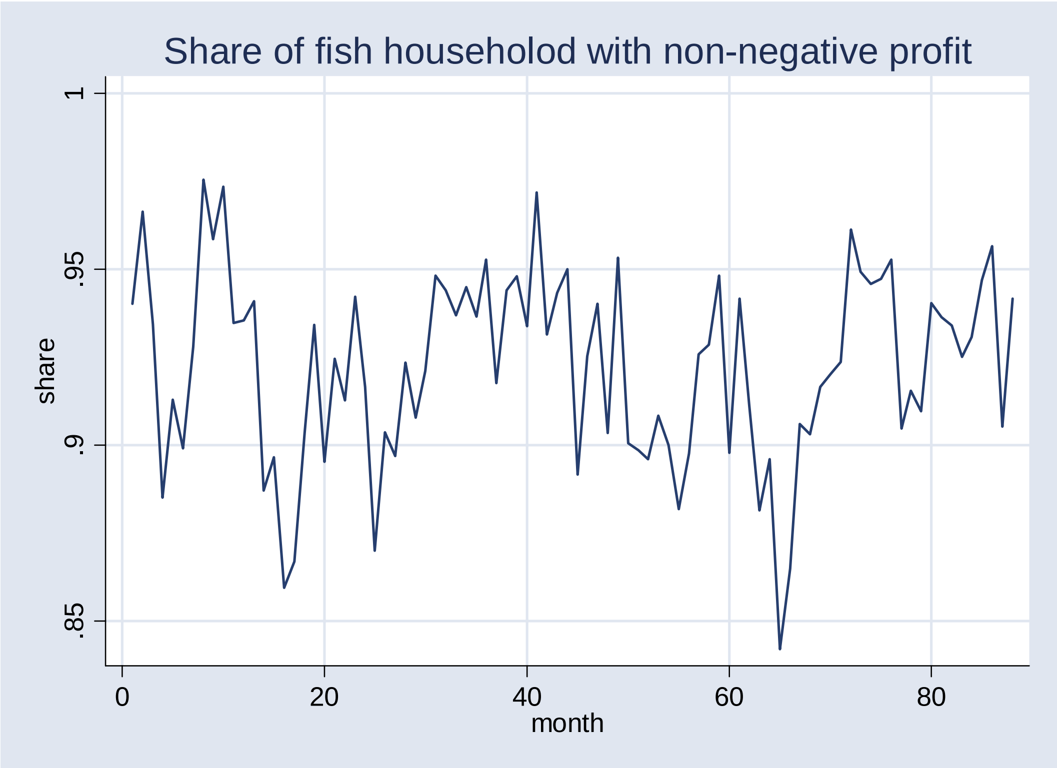


Table9-5

Linear regression

Number of obs =	88
F(12, 75) =	1.90
Prob > F =	0.0472
R-squared =	0.1649
Root MSE =	.02676

spp	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf. Interval]	
Time trend	-.0000136	.0001089	-0.13	0.901	-.0002306	.0002034
m1	-.0243772	.0142305	-1.71	0.091	-.0527257	.0039714
m2	-.0078651	.0146723	-0.54	0.594	-.0370937	.0213636
m4	-.0021806	.0140087	-0.16	0.877	-.0300874	.0257261
m5	.0047743	.0139002	0.34	0.732	-.0229165	.032465
m6	.0064205	.0120796	0.53	0.597	-.0176434	.0304843
m7	-.001104	.0147045	-0.08	0.940	-.0303969	.0281889
m8	.0030306	.0152892	0.20	0.843	-.027427	.0334882
m9	-.0025077	.0157932	-0.16	0.874	-.0339693	.028954
m10	-.0158716	.0148606	-1.07	0.289	-.0454755	.0137322
m11	-.0183679	.0163817	-1.12	0.266	-.0510019	.0142662
m12	-.0273545	.0193595	-1.41	0.162	-.0659205	.0112116
_cons	.930068	.013346	69.69	0.000	.9034815	.956654

Table9-6

Linear regression

Number of obs = 12837
F(25, 12811) = 4.39
Prob > F = 0.0000
R-squared = 0.0513
Root MSE = 9844.5

rprofit	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf. Interval]	
l_heage	8267.1	5866.157	1.41	0.159	-3231.444	19765.64
l_heage_sq	-1140.941	808.2391	-1.41	0.158	-2725.21	443.3287
_Ihhedu_2	-338.4269	146.0526	-2.32	0.021	-624.7119	-52.14194
_Ihhedu_3	-931.812	373.8129	-2.49	0.013	-1664.541	-199.0829
_Ihhedu_4	-79.78818	388.3609	-0.21	0.837	-841.0335	681.4572
_Ihhedu_5	-1104.493	482.1569	-2.29	0.022	-2049.593	-159.3941
_Ichan_27	-7178.13	1633.06	-4.40	0.000	-10379.17	-3977.089
_Ichan_49	-6801.887	1622.861	-4.19	0.000	-9982.936	-3620.838
_Ichan_53	-6897.28	1629.169	-4.23	0.000	-10090.69	-3703.866
m1	160.0366	459.883	0.35	0.728	-741.4026	1061.476
m2	392.3163	410.2237	0.96	0.339	-411.7834	1196.416
m4	-570.738	344.339	-1.66	0.097	-1245.694	104.2177
m5	-366.9933	348.8779	-1.05	0.293	-1050.846	316.8594
m6	-590.2588	369.7652	-1.60	0.110	-1315.054	134.536
m7	-341.7065	446.5821	-0.77	0.444	-1217.074	533.6611
m8	316.5595	413.349	0.77	0.444	-493.6663	1126.785
m9	43.74277	380.0901	0.12	0.908	-701.2906	788.7761
m10	-113.6122	372.9981	-0.30	0.761	-844.7442	617.5198
m11	-171.2266	379.232	-0.45	0.652	-914.5779	572.1248
m12	165.5616	413.8457	0.40	0.689	-645.6376	976.7609
time trend	-16.08518	31.84689	-0.51	0.614	-78.50983	46.33947
chan27m	14.6281	31.74409	0.46	0.645	-47.59506	76.85126
chan49m	-4.036471	32.2412	-0.13	0.900	-67.23402	59.16108
chan53m	17.48026	31.89765	0.55	0.584	-45.04389	80.00442
nif	805.5652	331.8259	2.43	0.015	155.1369	1455.993
_cons	-7417.021	10791.39	-0.69	0.492	-28569.76	13735.72

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Figure9-7

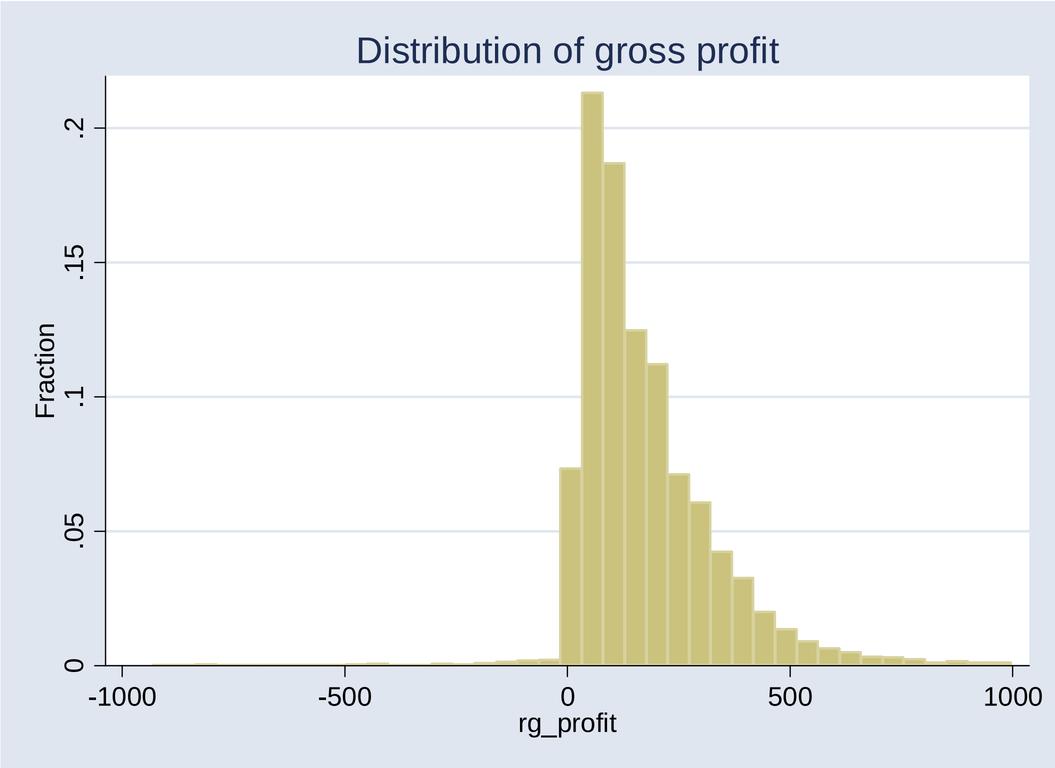

Figure9-8

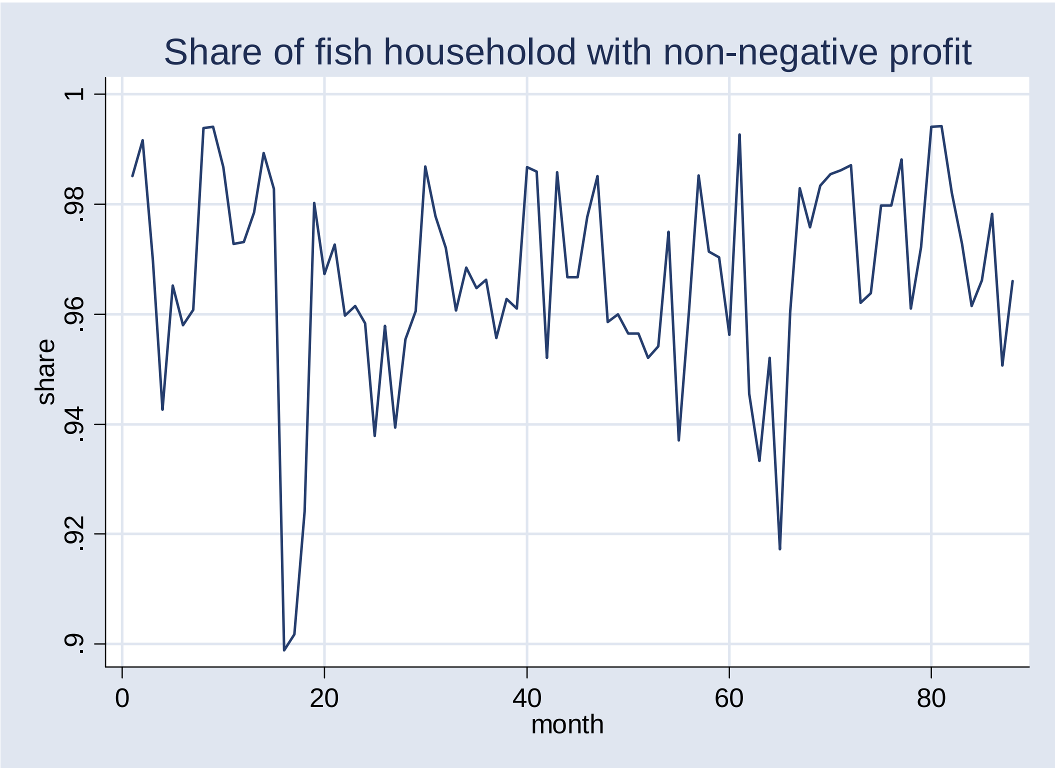

Table9-7

Linear regression

Number of obs = 88
F(12, 75) = 1.64
Prob > F = 0.0989
R-squared = 0.2011
Root MSE = .01843

gspp	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf. Interval]	
Time trend	.000073	.0000776	0.94	0.350	-.0000815	.0002276
m1	-.0159953	.0088278	-1.81	0.074	-.0335811	.0015906
m2	-.0047251	.0082638	-0.57	0.569	-.0211874	.0117372
m4	.0036922	.0070166	0.53	0.600	-.0102857	.01767
m5	.0000268	.0062109	0.00	0.997	-.012346	.0123996
m6	-.0026285	.0060267	-0.44	0.664	-.0146342	.0093773
m7	-.010183	.0065383	-1.56	0.124	-.0232079	.0028419
m8	-.0084397	.0081632	-1.03	0.305	-.0247016	.0078222
m9	-.0075632	.0080746	-0.94	0.352	-.0236486	.0085222
m10	-.0166996	.0083611	-2.00	0.049	-.0333557	-.0000434
m11	-.0217352	.010548	-2.06	0.043	-.0427478	-.0007225
m12	-.0222643	.0132764	-1.68	0.098	-.0487121	.0041836
_cons	.9725525	.0062042	156.76	0.000	.9601932	.9849119

Table9-8

Linear regression

Number of obs = 12831
F(25, 12805) = 11.55
Prob > F = 0.0000
R-squared = 0.1676
Root MSE = 9142.3

rg_profit	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf. Interval]	
l_heage	5904.411	5540.144	1.07	0.287	-4955.098	16763.92
l_heage_sq	-799.8833	764.0778	-1.05	0.295	-2297.59	697.8233
_Ihhedu_2	-294.9319	124.0433	-2.38	0.017	-538.0752	-51.78856
_Ihhedu_3	-752.6538	337.1753	-2.23	0.026	-1413.568	-91.73985
_Ihhedu_4	57.86229	363.1728	0.16	0.873	-654.0106	769.7351
_Ihhedu_5	-519.2332	439.5202	-1.18	0.237	-1380.758	342.292
_Ichan_27	-10113.85	1603.754	-6.31	0.000	-13257.45	-6970.256
_Ichan_49	-9830.058	1601.677	-6.14	0.000	-12969.58	-6690.531
_Ichan_53	-10059.85	1600.16	-6.29	0.000	-13196.4	-6923.299
m1	21.7084	423.6805	0.05	0.959	-808.7687	852.1855
m2	365.3796	387.4631	0.94	0.346	-394.106	1124.865
m4	-395.7405	328.5752	-1.20	0.228	-1039.797	248.3159
m5	-163.6489	352.0662	-0.46	0.642	-853.7512	526.4534
m6	-625.7967	363.6136	-1.72	0.085	-1338.534	86.94021
m7	-429.478	361.4148	-1.19	0.235	-1137.905	278.949
m8	220.389	384.5976	0.57	0.567	-533.4798	974.2577

m9	.1694052	372.2694	0.00	1.000	-729.5343	729.8731
m10	-267.6626	363.2283	-0.74	0.461	-979.6443	444.319
m11	-131.2495	356.1524	-0.37	0.712	-829.3613	566.8622
m12	177.2604	404.1329	0.44	0.661	-614.9003	969.4212
time trend	21.50412	30.45224	0.71	0.480	-38.18681	81.19506
chan27m	-24.5173	30.40592	-0.81	0.420	-84.11743	35.08284
chan49m	-42.27538	30.17502	-1.40	0.161	-101.4229	16.87216
chan53m	-20.38487	30.55968	-0.67	0.505	-80.28639	39.51666
nif	1516.802	319.7131	4.74	0.000	890.117	2143.488
_cons	-347.1619	10109.42	-0.03	0.973	-20163.13	19468.81

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Cultivation

Figure9-9

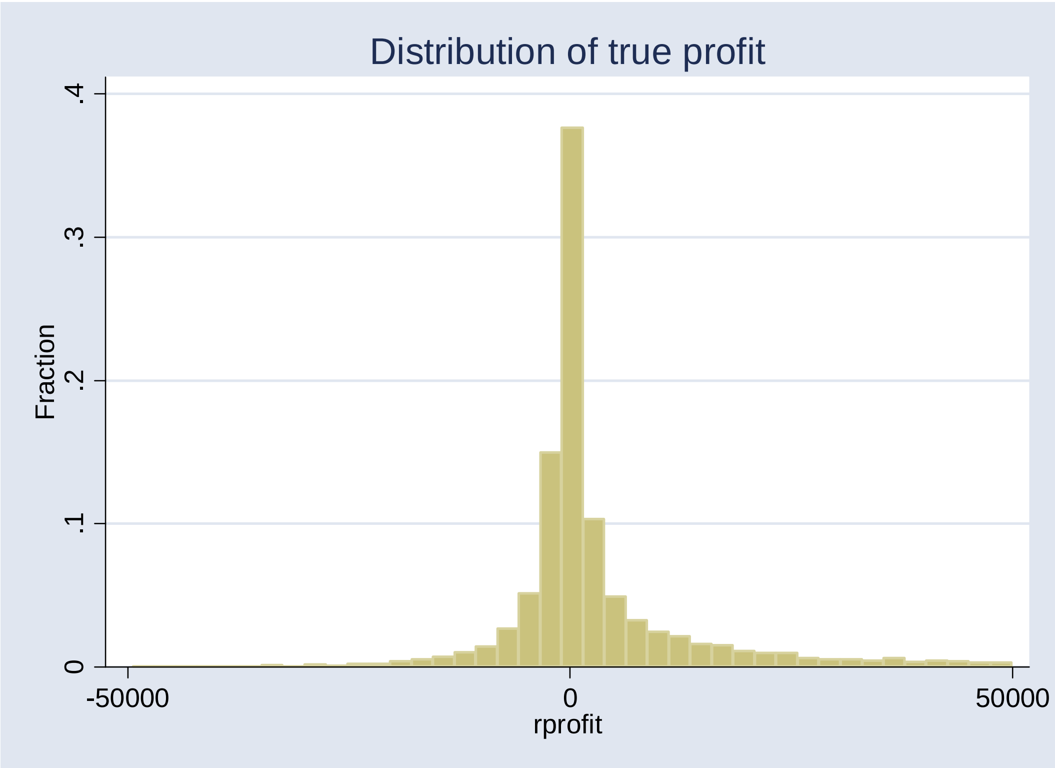

Figure9-10

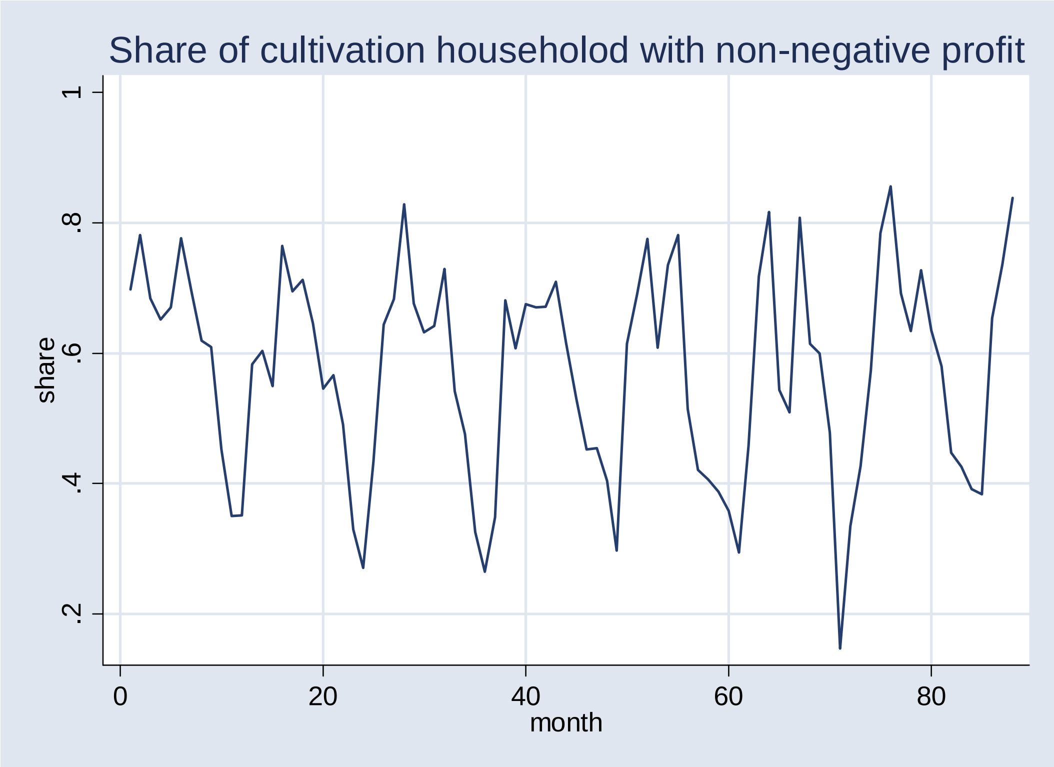

Table9-9

Linear regression

Number of obs = 88
F(12, 75) = 31.69
Prob > F = 0.0000
R-squared = 0.7743
Root MSE = .08134

spp	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf. Interval]	
Time trend	-.0002724	.0003793	-0.72	0.475	-.0010279	.0004832
m1	.0560376	.0409303	1.37	0.175	-.0254998	.137575
m2	.1048062	.0366948	2.86	0.006	.0317063	.1779061
m4	-.0604205	.0353411	-1.71	0.091	-.1308236	.0099826
m5	-.152404	.0279419	-5.45	0.000	-.2080671	-.0967408
m6	-.2636315	.0457707	-5.76	0.000	-.3548114	-.1724516
m7	-.2699635	.0341801	-7.90	0.000	-.3380539	-.2018732
m8	-.177747	.0550286	-3.23	0.002	-.2873697	-.0681243
m9	.0156534	.0410823	0.38	0.704	-.0661868	.0974936
m10	.071204	.0385281	1.85	0.069	-.005548	.1479559
m11	.1657782	.0391962	4.23	0.000	.0876953	.2438611
m12	.0394997	.0329569	1.20	0.234	-.0261538	.1051533
_cons	.6224736	.0315447	19.73	0.000	.5596334	.6853138

Table9-10

Linear regression

Number of obs = 14068
F(25, 14042) = 59.14
Prob > F = 0.0000
R-squared = 0.0799
Root MSE = 15697

rprofit	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf. Interval]	
l_heage	-48700.06	8803.81	-5.53	0.000	-65956.69	-31443.42
l_heage_sq	7157.614	1239.546	5.77	0.000	4727.939	9587.289
_Ihhedu_2	3365.814	854.948	3.94	0.000	1690.002	5041.626
_Ihhedu_3	5329.665	972.5968	5.48	0.000	3423.246	7236.084
_Ihhedu_4	3255.983	916.8358	3.55	0.000	1458.863	5053.103
_Ihhedu_5	5033.872	952.6935	5.28	0.000	3166.466	6901.277
_Ichan_27	-2097.263	805.9617	-2.60	0.009	-3677.055	-517.471
_Ichan_49	-1175.265	783.2058	-1.50	0.133	-2710.453	359.9222
_Ichan_53	-7220.406	646.7819	-11.16	0.000	-8488.184	-5952.628
m1	5120.395	796.4359	6.43	0.000	3559.275	6681.515
m2	7123.97	951.6377	7.49	0.000	5258.633	8989.306
m4	-3062.383	621.7892	-4.93	0.000	-4281.172	-1843.594
m5	-4336.25	633.7629	-6.84	0.000	-5578.509	-3093.99
m6	-3147.501	660.0335	-4.77	0.000	-4441.254	-1853.747
m7	-939.4571	668.0167	-1.41	0.160	-2248.859	369.9445
m8	234.9378	705.5026	0.33	0.739	-1147.941	1617.817
m9	6187.664	835.1674	7.41	0.000	4550.625	7824.703
m10	6824.203	723.7424	9.43	0.000	5405.571	8242.834
m11	6621.755	614.5614	10.77	0.000	5417.133	7826.377
m12	1882.586	653.2332	2.88	0.004	602.1625	3163.01
time trend	7.448552	11.63537	0.64	0.522	-15.35832	30.25542
chan27m	-9.721046	15.69649	-0.62	0.536	-40.48825	21.04615
chan49m	16.20695	15.66194	1.03	0.301	-14.49254	46.90644
chan53m	47.16815	13.17109	3.58	0.000	21.35106	72.98524
nic	503.2644	145.3343	3.46	0.001	218.3899	788.139
_cons	79920.19	15533.76	5.14	0.000	49471.95	110368.4

Figure9-11

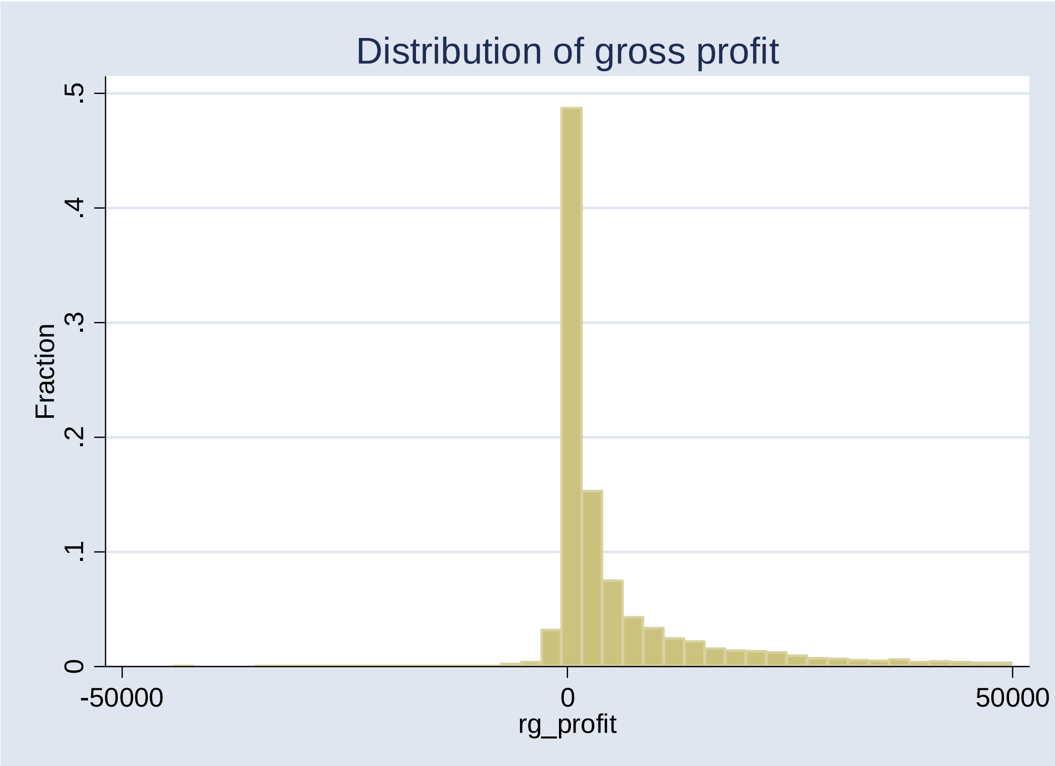

Figure9-12

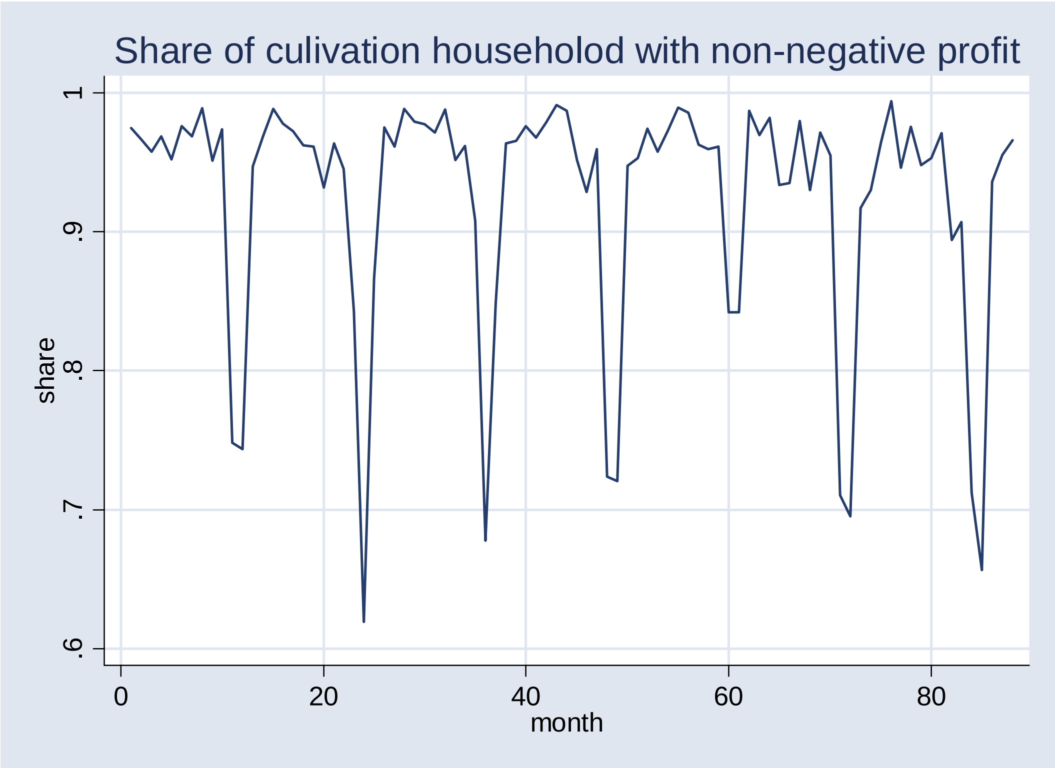

Table9-11

Linear regression

Number of obs =	88
F(12, 75) =	10.02
Prob > F =	0.0000
R-squared =	0.7279
Root MSE =	.04954

gspp	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
Time trend	-.000313	.0002372	-1.32	0.191	-.0007855	.0001595
m1	.0013319	.0114546	0.12	0.908	-.0214869	.0241507
m2	.0062626	.0118096	0.53	0.597	-.0172632	.0297885
m4	-.0055576	.0115354	-0.48	0.631	-.0285373	.0174221
m5	-.0202863	.01295	-1.57	0.121	-.046084	.0055114
m6	-.1030465	.0397861	-2.59	0.012	-.1823044	-.0237885
m7	-.2488493	.0286189	-8.70	0.000	-.3058612	-.1918375
m8	-.1200476	.0383869	-3.13	0.003	-.1965183	-.0435769
m9	-.0071154	.011447	-0.62	0.536	-.0299189	.0156881
m10	-.0016354	.0107403	-0.15	0.879	-.0230312	.0197604
m11	.0126226	.0110432	1.14	0.257	-.0093767	.0346219
m12	-.0089114	.011056	-0.81	0.423	-.0309362	.0131134
_cons	.9801779	.0145643	67.30	0.000	.9511643	1.009191

Table9-12

Linear regression

Number of obs =	14159
F(25, 14133) =	75.58

Prob > F = 0.0000
R-squared = 0.0905
Root MSE = 14547

rg_profit	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf. Interval]	
l_heage	-38320.94	8301.446	-4.62	0.000	-54592.87	-22049.01
l_heage_sq	5599.479	1169.577	4.79	0.000	3306.955	7892.004
_Ihhedu_2	5001.258	818.1849	6.11	0.000	3397.508	6605.009
_Ihhedu_3	5593.104	930.3749	6.01	0.000	3769.446	7416.761
_Ihhedu_4	4862.435	870.3492	5.59	0.000	3156.436	6568.434
_Ihhedu_5	5854.298	901.7895	6.49	0.000	4086.671	7621.924
_Ichan_27	-2125.929	787.5798	-2.70	0.007	-3669.689	-582.1684
_Ichan_49	874.535	741.5063	1.18	0.238	-578.915	2327.985
_Ichan_53	-5937.422	616.3901	-9.63	0.000	-7145.628	-4729.217
m1	4726.102	753.9101	6.27	0.000	3248.338	6203.865
m2	7004.465	904.5638	7.74	0.000	5231.401	8777.53
m4	-2855.969	529.9731	-5.39	0.000	-3894.787	-1817.152
m5	-3551.937	540.7553	-6.57	0.000	-4611.888	-2491.985
m6	-1228.858	565.0637	-2.17	0.030	-2336.457	-121.2587
m7	385.5436	595.8746	0.65	0.518	-782.4493	1553.536
m8	717.7223	639.5455	1.12	0.262	-535.8712	1971.316
m9	6634.014	761.7719	8.71	0.000	5140.841	8127.188
m10	6467.9	671.0448	9.64	0.000	5152.564	7783.236
m11	7652.129	565.2867	13.54	0.000	6544.092	8760.165
m12	2347.073	589.4809	3.98	0.000	1191.612	3502.533
time trend	4.58842	11.28968	0.41	0.684	-17.54083	26.71767
chan27m	-3.458089	15.38956	-0.22	0.822	-33.62366	26.70748
chan49m	10.68372	14.8361	0.72	0.471	-18.39699	39.76443
chan53m	43.3303	12.64276	3.43	0.001	18.54883	68.11178
nic	1822.841	136.1866	13.38	0.000	1555.897	2089.785
_cons	60855.65	14648.57	4.15	0.000	32142.52	89568.77

Livestock

Figure9-13

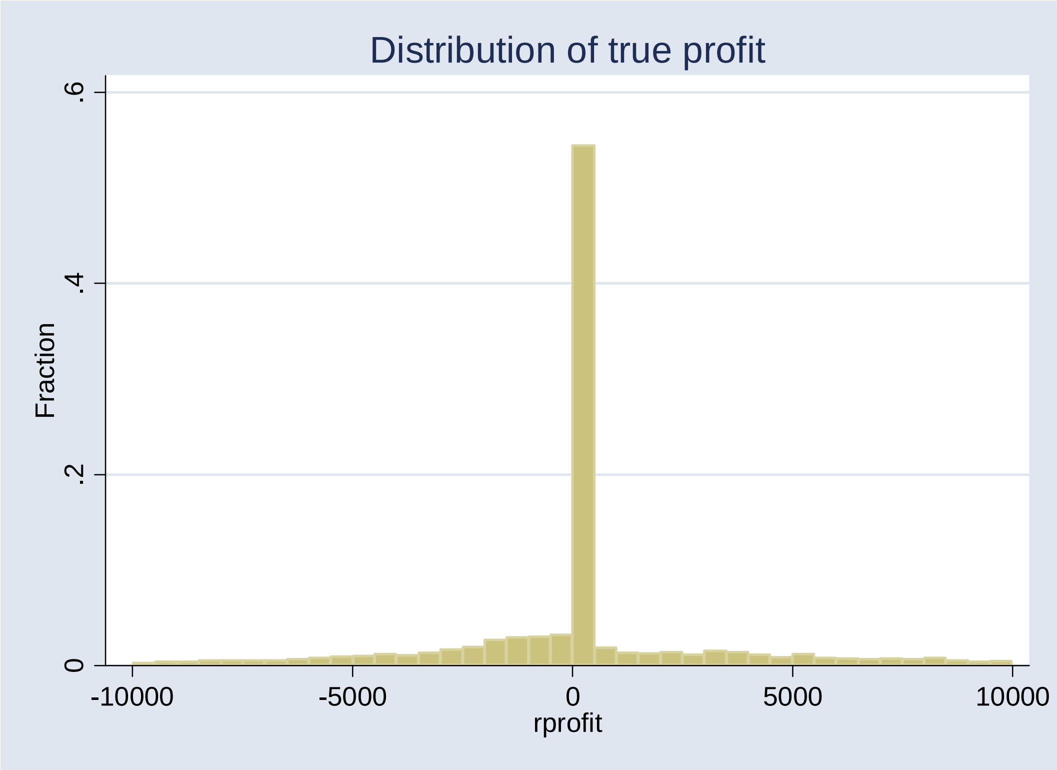

Figure9-14

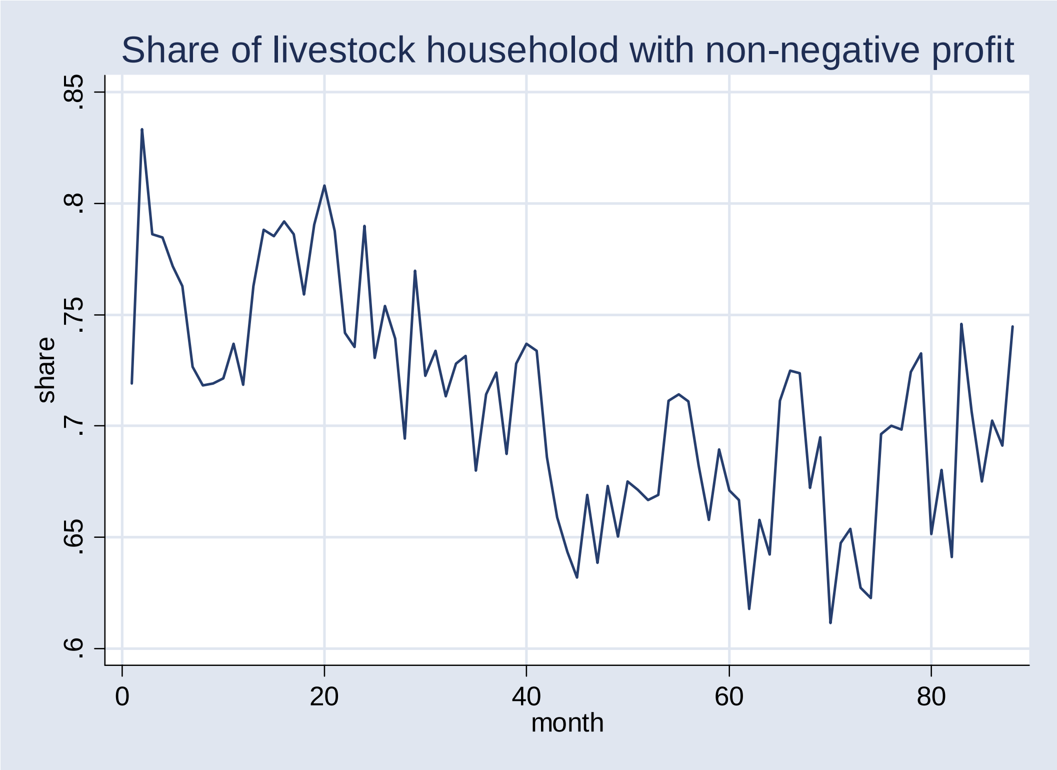

Table9-13

Linear regression	Number of obs =	88
	F(12, 75) =	7.32

Prob > F = 0.0000
R-squared = 0.4738
Root MSE = .03824

spp	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf. Interval]	
Time trend	-.0011875	.0001682	-7.06	0.000	-.0015225	-.0008524
m1	.0224184	.0191288	1.17	0.245	-.0156881	.0605249
m2	.0220851	.0227202	0.97	0.334	-.0231758	.0673461
m4	.0021717	.0222402	0.10	0.922	-.0421331	.0464766
m5	-.0180538	.0189354	-0.95	0.343	-.0557751	.0196675
m6	-.0026355	.0238898	-0.11	0.912	-.0502264	.0449555
m7	.0061398	.0210847	0.29	0.772	-.0358631	.0481427
m8	-.0091737	.0191025	-0.48	0.632	-.0472278	.0288805
m9	.0076183	.0245695	0.31	0.757	-.0413266	.0565631
m10	.0181116	.0187368	0.97	0.337	-.019214	.0554371
m11	.0201259	.0229767	0.88	0.384	-.025646	.0658978
m12	.0282856	.0187239	1.51	0.135	-.0090143	.0655855
_cons	.7547194	.0188418	40.06	0.000	.7171847	.7922541

Table9-14

Linear regression

Number of obs = 12127
F(25, 12101) = 28.28
Prob > F = 0.0000
R-squared = 0.0557
Root MSE = 10259

rprofit	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf. Interval]	
l_heage	5105.963	5811.784	0.88	0.380	-6286.065	16497.99
l_heage_sq	-676.9388	806.4615	-0.84	0.401	-2257.732	903.8549
_Ihhedu_2	-1465.782	323.3078	-4.53	0.000	-2099.517	-832.0465
_Ihhedu_3	404.0691	495.678	0.82	0.415	-567.539	1375.677
_Ihhedu_4	358.847	443.834	0.81	0.419	-511.1387	1228.833
_Ihhedu_5	-1365.254	540.373	-2.53	0.012	-2424.471	-306.0362
_Ichan_27	-8002.726	2087.646	-3.83	0.000	-12094.85	-3910.606
_Ichan_49	-4399.168	2127.228	-2.07	0.039	-8568.875	-229.4609
_Ichan_53	-9064.86	2082.898	-4.35	0.000	-13147.67	-4982.046
m1	948.2267	482.0828	1.97	0.049	3.267276	1893.186
m2	637.7046	489.0047	1.30	0.192	-320.8229	1596.232
m4	73.71975	489.3021	0.15	0.880	-885.3906	1032.83
m5	-645.9495	516.3658	-1.25	0.211	-1658.109	366.21
m6	-712.9991	508.987	-1.40	0.161	-1710.695	284.697
m7	-581.89	494.3371	-1.18	0.239	-1550.87	387.0898
m8	-331.0218	487.1693	-0.68	0.497	-1285.952	623.908
m9	-482.5702	490.7652	-0.98	0.325	-1444.549	479.4081
m10	303.9526	455.5382	0.67	0.505	-588.9752	1196.88
m11	197.3622	489.5104	0.40	0.687	-762.1566	1156.881
m12	386.0141	466.5193	0.83	0.408	-528.4384	1300.467
time trend	-3.984248	59.59382	-0.07	0.947	-120.7977	112.8292
chan27m	-36.19805	59.86402	-0.60	0.545	-153.5411	81.14501

chan49m	-25.81644	60.01418	-0.43	0.667	-143.4538	91.82097
chan53m	-21.20449	59.77976	-0.35	0.723	-138.3824	95.9734
nil	-973.2913	106.2929	-9.16	0.000	-1181.642	-764.9403
_cons	113.8433	10513.42	0.01	0.991	-20494.14	20721.83

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Figure9-15

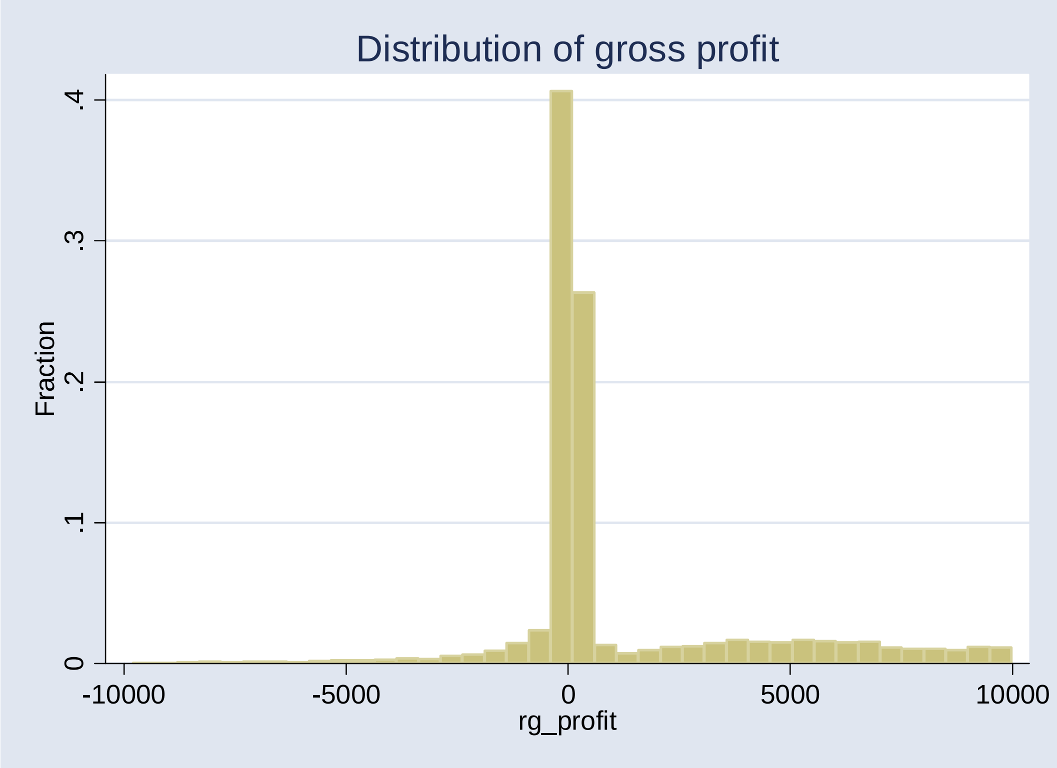

Figure9-16

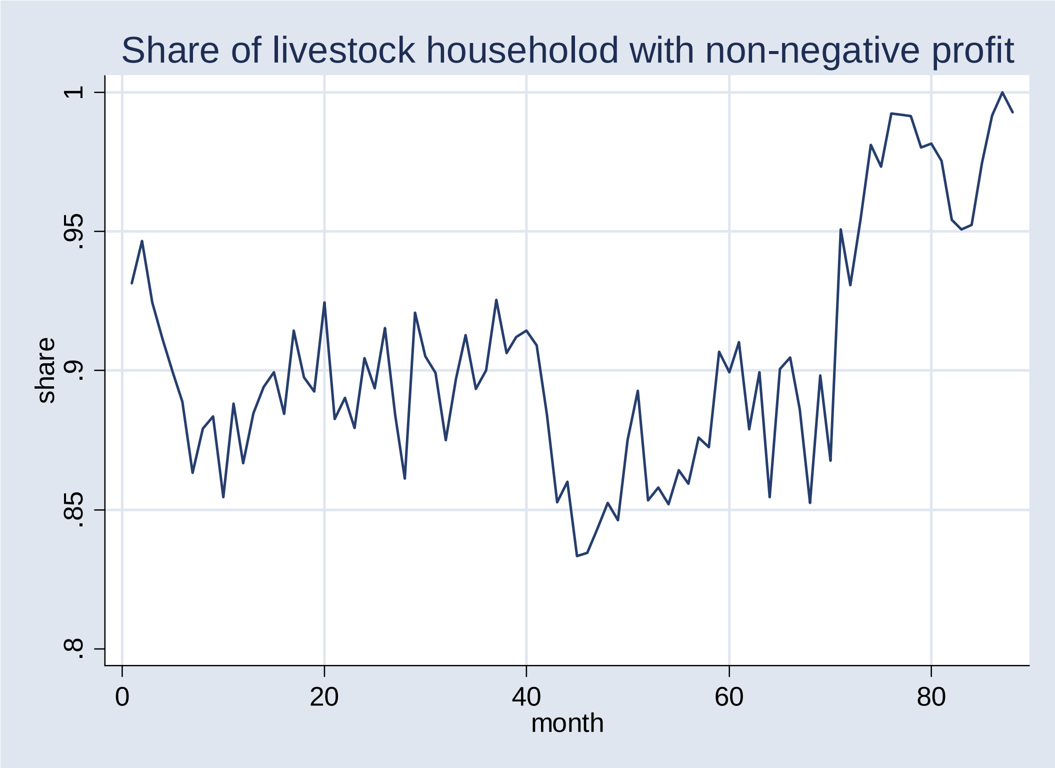

Table9-15

Linear regression

Number of obs =	88
F(12, 75) =	3.21
Prob > F =	0.0009
R-squared =	0.3084
Root MSE =	.03795

gspp	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf. Interval]	
Time trend	.0007766	.0001626	4.78	0.000	.0004527	.0011006
m1	.014682	.0225599	0.65	0.517	-.0302596	.0596237
m2	.0016624	.0222195	0.07	0.941	-.0426012	.045926
m4	.0012349	.0223401	0.06	0.956	-.0432688	.0457387
m5	-.0081266	.022341	-0.36	0.717	-.0526322	.036379
m6	.009157	.020743	0.44	0.660	-.0321652	.0504793
m7	.0074549	.0200259	0.37	0.711	-.0324387	.0473486
m8	.0255102	.0219121	1.16	0.248	-.0181409	.0691613
m9	.0333289	.0229822	1.45	0.151	-.0124541	.0791119
m10	.032068	.0209573	1.53	0.130	-.009681	.0738171
m11	.0161851	.0248807	0.65	0.517	-.0333798	.0657499
m12	.0254945	.0226686	1.12	0.264	-.0196636	.0706525
_cons	.8561486	.017777	48.16	0.000	.820735	.8915622

Table9-16

Linear regression

Number of obs =	12173
F(25, 12147) =	218.75
Prob > F =	0.0000

R-squared = 0.3219
Root MSE = 7142.9

rg_profit	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
l_heage	49322.3	3919.474	12.58	0.000	41639.51	57005.1
l_heage_sq	-6987.143	542.9887	-12.87	0.000	-8051.487	-5922.799
_Ihhedu_2	1049.475	259.2601	4.05	0.000	541.2841	1557.666
_Ihhedu_3	1639.337	388.8942	4.22	0.000	877.0428	2401.632
_Ihhedu_4	2837.296	331.4106	8.56	0.000	2187.678	3486.914
_Ihhedu_5	1580.988	381.8144	4.14	0.000	832.5714	2329.405
_Ichan_27	-4799.922	1826.504	-2.63	0.009	-8380.16	-1219.684
_Ichan_49	2293.069	1857.62	1.23	0.217	-1348.162	5934.299
_Ichan_53	-5648.246	1822.439	-3.10	0.002	-9220.516	-2075.975
m1	452.8389	336.0271	1.35	0.178	-205.8277	1111.505
m2	311.6976	351.4624	0.89	0.375	-377.2247	1000.62
m4	-112.4491	366.3882	-0.31	0.759	-830.6284	605.7302
m5	-173.5572	353.0028	-0.49	0.623	-865.499	518.3845
m6	-398.331	346.5373	-1.15	0.250	-1077.599	280.9372
m7	-396.649	336.5996	-1.18	0.239	-1056.438	263.1397
m8	-444.4206	331.2411	-1.34	0.180	-1093.706	204.8648
m9	-646.6095	349.0459	-1.85	0.064	-1330.795	37.57593
m10	-8.344167	327.5018	-0.03	0.980	-650.2998	633.6114
m11	187.6239	338.734	0.55	0.580	-476.3488	851.5965
m12	512.3887	334.0807	1.53	0.125	-142.4627	1167.24
time trend	53.47693	57.88294	0.92	0.356	-59.98286	166.9367
chan27m	-63.85343	57.99676	-1.10	0.271	-177.5363	49.82946
chan49m	-67.65455	58.20473	-1.16	0.245	-181.7451	46.43599
chan53m	-59.00991	57.99853	-1.02	0.309	-172.6963	54.67645
nil	1365.215	70.27515	19.43	0.000	1227.465	1502.966
_cons	-83301.46	7325.609	-11.37	0.000	-97660.82	-68942.1

Table10-1: Number of individuals by each cohort

Age at baseline	# of individuals
-1	118
0	87
1	95
2	70
3	67
4	88
5	88
6	77
7	75
8	74
9	75
10	76
11	83
12	84
13	96
14	72
15	85
16	61
17	76
18	89
Total	1,636

Note: Age ”-1” means the individuals had not been born at the time of the initial baseline survey.

Figure10-1

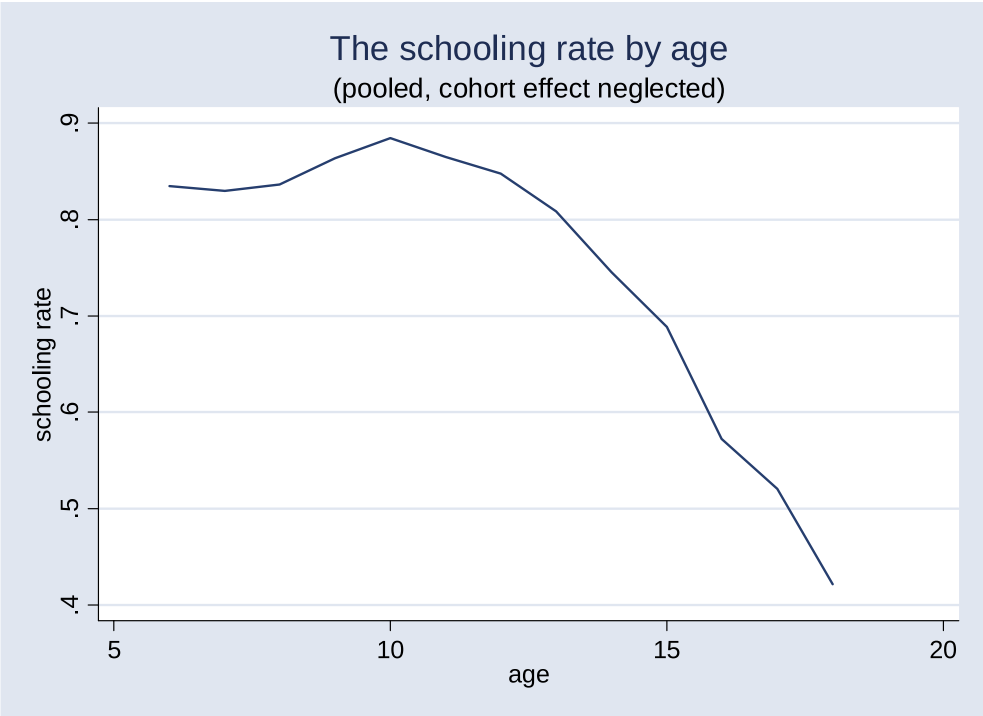

Figure10-2

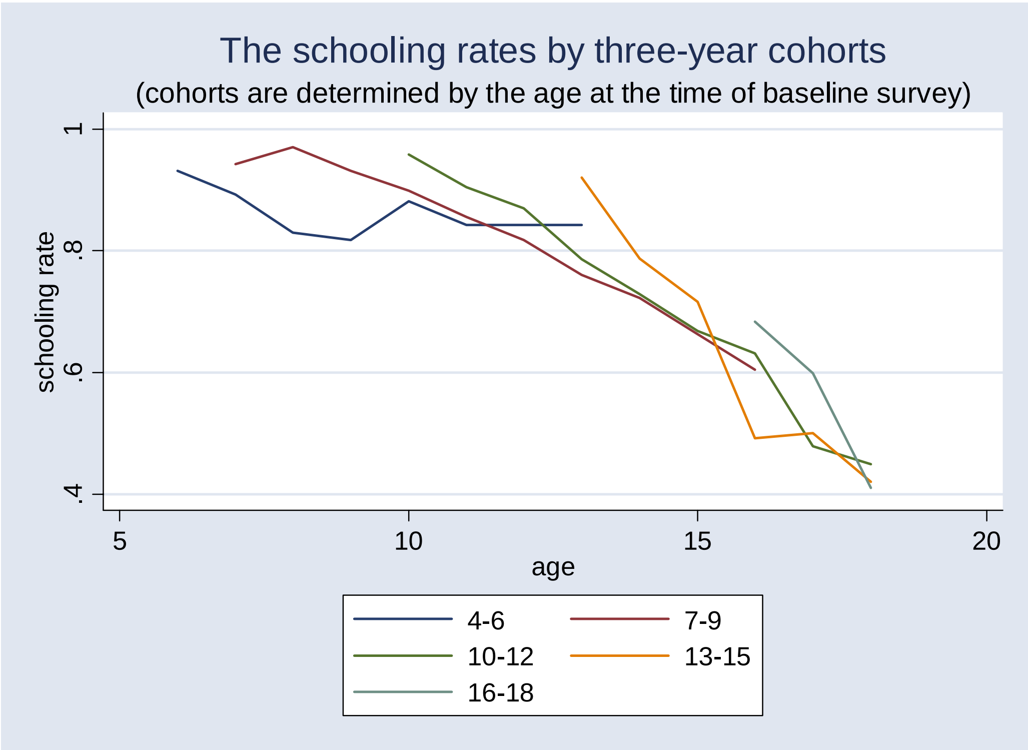

Figure10-3

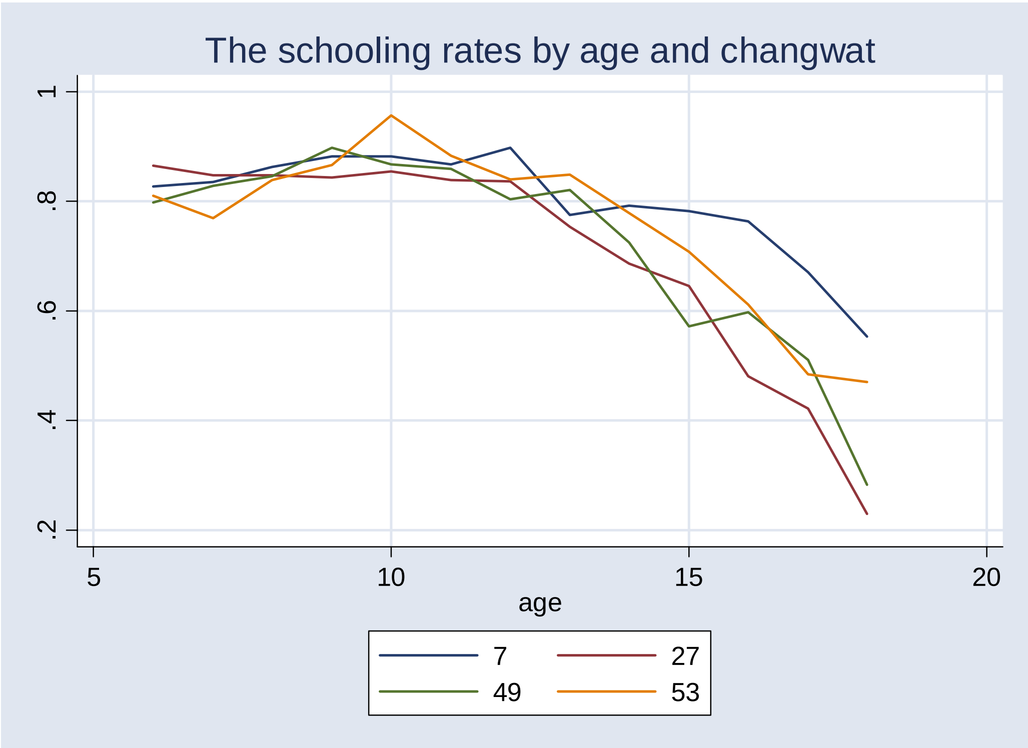

Figure10-4

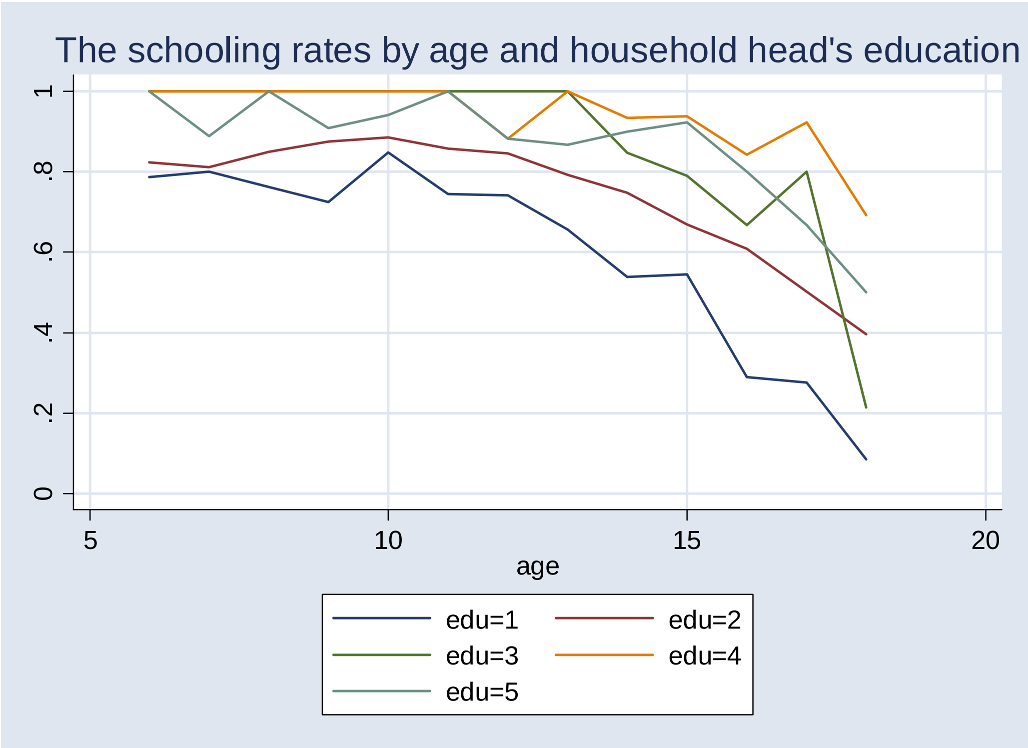

Figure10-5