

# Development Homework 3

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March 1, 2019

## 1 Data description and problems

We have four waves of Uganda data, However, not all of the households will participate in all the four waves. There are 10275 observations of 3260 households, including 1490 households participating in 4 waves, 1084 households in 3 waves, 377 households in 2 waves and 309 households only in 1 wave. In this homework, we want to discuss the relationship between the change of income and the change of consumption for each household, which requires that households at least participated in 3 waves (to see the change and do regression on the changes). So the final discussion will be restricted in these 2574 households and the sample size will decrease again for missing data problem. The problem of sample size decreasing may lead to some bias.

In the following section, I will show the answer of each question and I will present the results replication of rural and urban samples in question 1-3 instead of in a separated section

## 2 Question 1

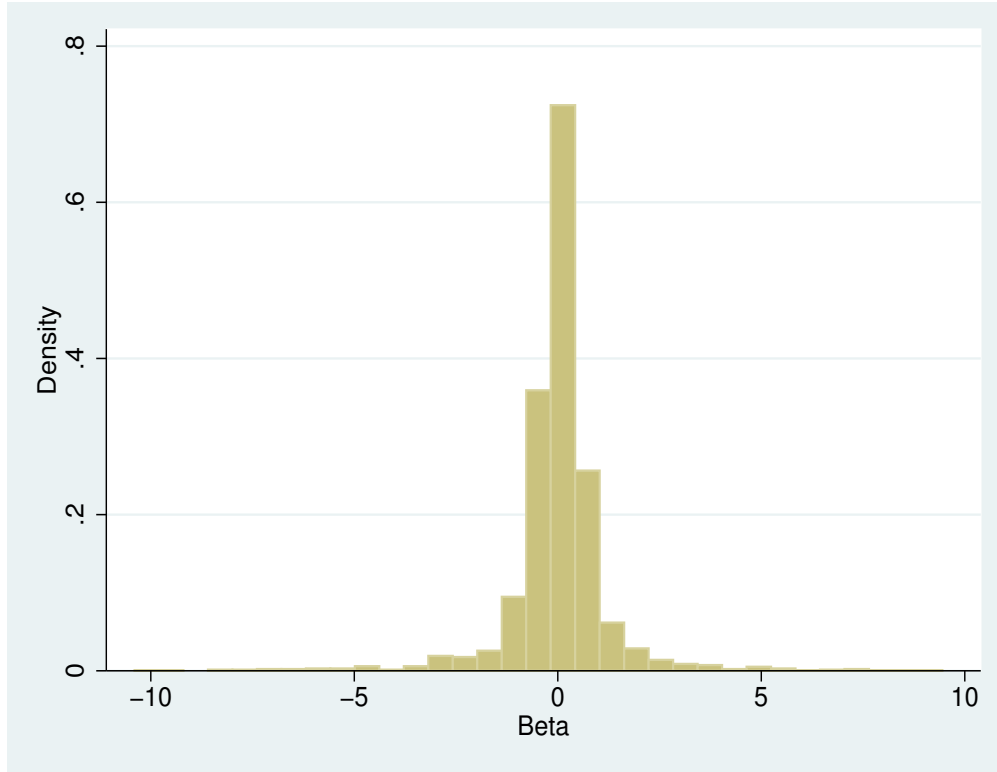
In this question 1, I estimate  $\beta_i$  and  $\phi_i$  for each household. Since there are some outliers, I drop 27 observations and finally get the final sample. Table 1 shows the mean and median of  $\beta_i$  and  $\phi_i$  in urban, rural and total samples. Figure 1 and figure 3 show the distribution of  $\beta_i$  and  $\phi_i$ , and figure 2 and figure 4 show the distribution of  $\beta_i$  and  $\phi_i$  in urban and rural area.

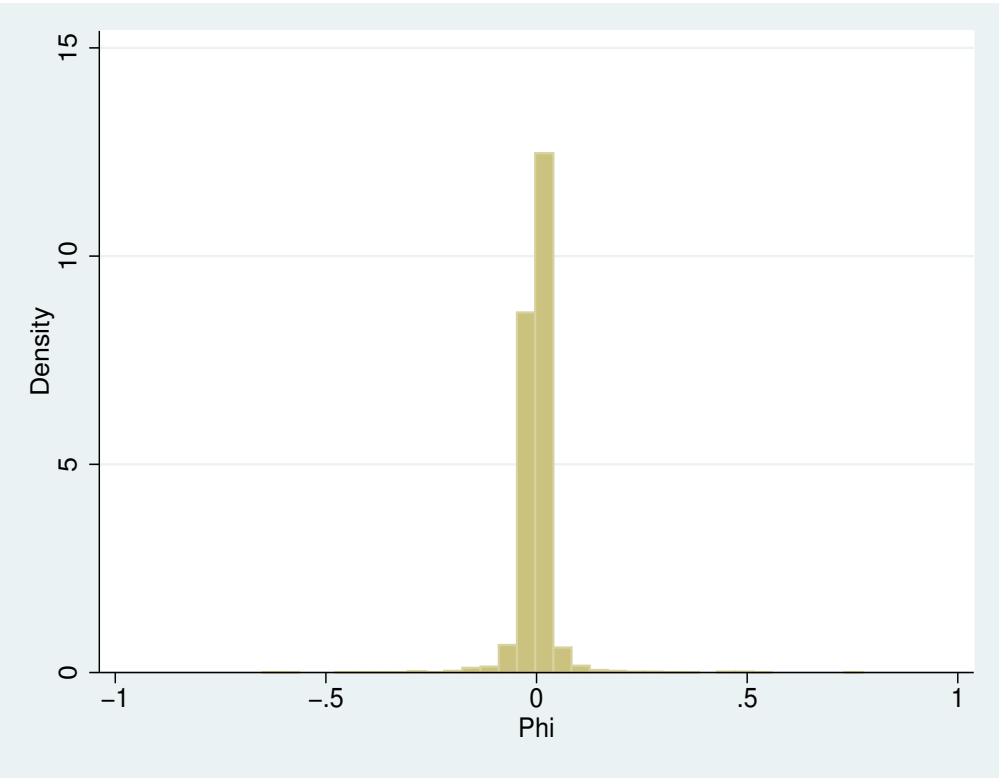
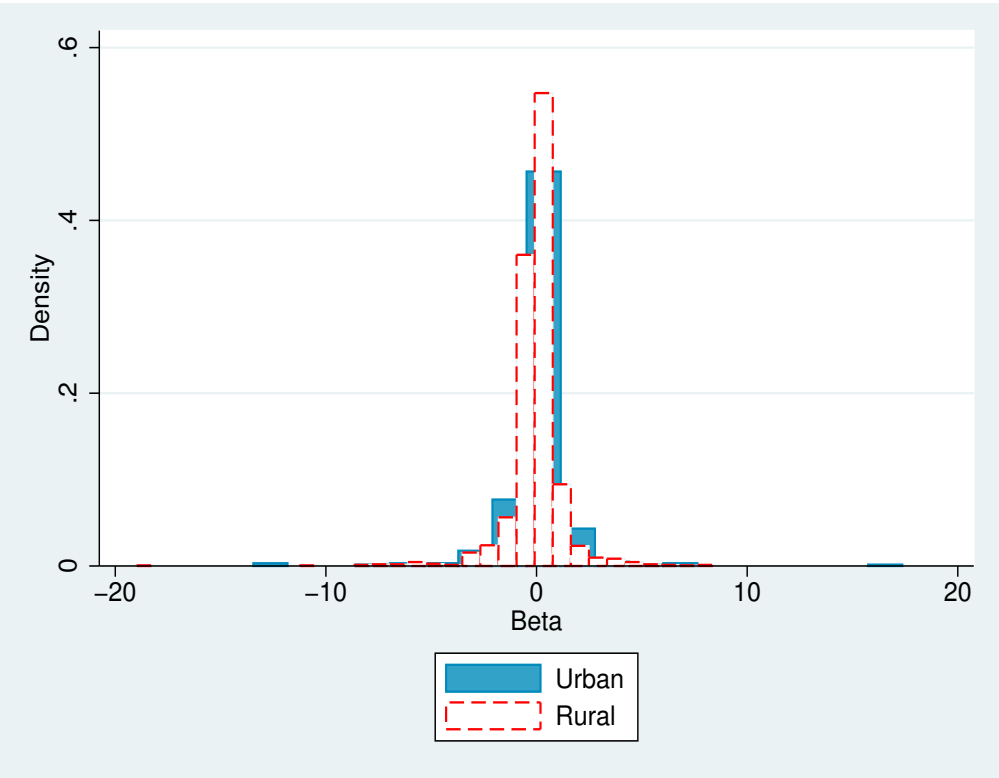
From table 1, it is easy to see that not only the means but also the median are close to zero, which means that there are risking sharing. Since they are not zero, it is not fully risking sharing. And the histogram of  $\beta$  show the distribution of  $\beta$ , which suggests that most of households are insured although there are some household who are still in risk. The changes of income will have a weak effect on the consumption.

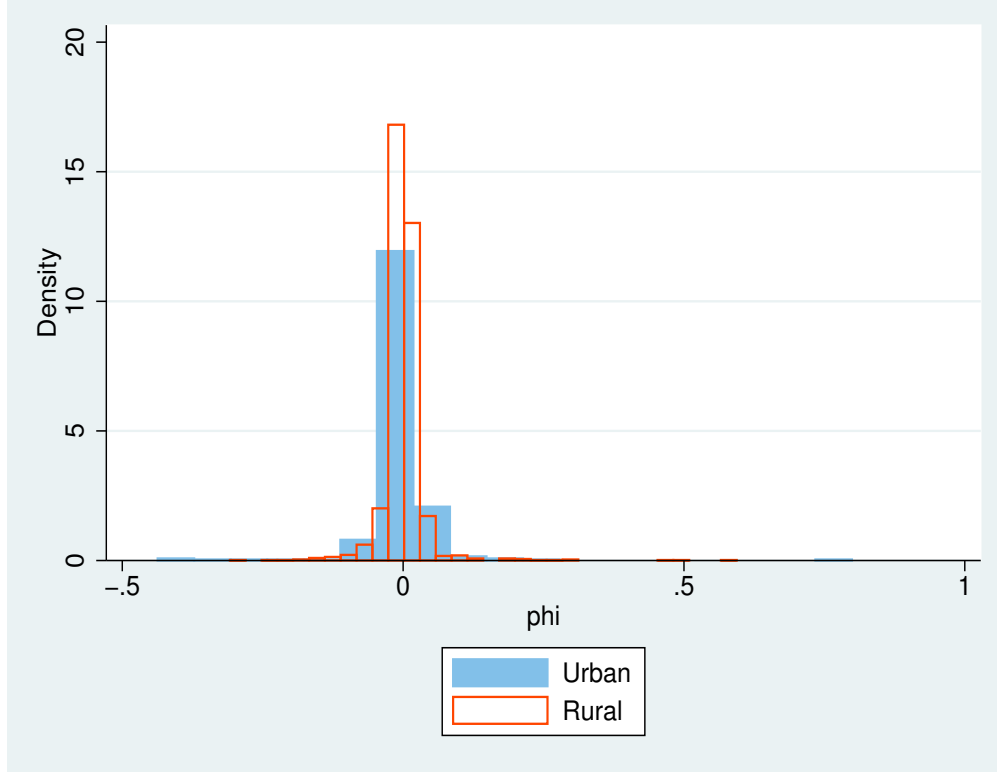
Consider the results in urban and rural area, the households are still highly insured since the coefficients are close to zero, too. So both urban and rural areas have risk sharing. And from figure 2, the coefficient of rural is closer to zero than of urban. We can expect that in rural area, there are usually a stronger risk sharing.

|              | $\beta_i$ Mean | $\beta_i$ Median | $\phi_i$ Mean | $\phi_i$ Median |
|--------------|----------------|------------------|---------------|-----------------|
| <b>Total</b> | 0.0170         | 0.0306           | -0.0009       | -0.0005         |
| <b>Urban</b> | 0.0191         | 0.0693           | 0.0001        | 0.0014          |
| <b>Rural</b> | -0.0171        | 0.0227           | 0.0002        | -0.0005         |

Table 1: Mean and Median of  $\beta_i$  and  $\phi_i$







### 3 Question 2

In question 2, I explore the relationship between insurance and household income. Table 2 is the mean and median  $\beta_i$  grouped by income quantiles while table 3 is the average income grouped by the level of insurance. And since I do not have land and wealth data, I can not do related problem.

From table 2, we can see in all the group,  $\beta_i$  is close to zero and there is no clear pattern to explain the relationship between income and  $\beta_i$ . And compared to urban, the  $\beta_i$  of rural subsample are closer to zero in all the group, which is consistent with the result in first question: households in rural are higher insured.

From table 3, we can see that in different insurance level (we use the absolute value of  $\beta_i$  to measure it.), there still is not a clear pattern to see the relationship. And we can know that the average income level in rural is lower than in urban. And it seems that in rural area, households with higher insurance level are poor while households with higher insurance level are richer.

### 4 Question 3

In table 4, I shows the regression results using pooling data. In this case, I consider the coefficients are same for all the household. I combine the results with table 1. Column(3) and (6) show them. The results are very similar to the results before. Although I will get

| Income level         | Q1      | Q2      | Q3      | Q4      | Q5      |
|----------------------|---------|---------|---------|---------|---------|
| <b>Total(Mean)</b>   | 0.0596  | -0.0001 | 0.0031  | 0.0440  | 0.0048  |
| <b>Total(Median)</b> | 0.0323  | -0.0029 | 0.0226  | 0.0901  | 0.0385  |
| <b>Urban(Mean)</b>   | -0.0221 | -0.1931 | -0.1225 | 0.1322  | 0.3001  |
| <b>Urban(Median)</b> | 0.0382  | 0.0296  | 0.0693  | 0.1329  | 0.1130  |
| <b>Rural(Mean)</b>   | 0.0139  | -0.0325 | 0.0791  | -0.0069 | -0.1395 |
| <b>Rural(Median)</b> | 0.0076  | -0.0070 | 0.0307  | 0.0874  | 0.0244  |

Table 2: Mean and Median of  $\beta_{\beta_i}$  grouped by income

| $\beta_i$ level | Q1      | Q2      | Q3      | Q4      | Q5      |
|-----------------|---------|---------|---------|---------|---------|
| <b>Total</b>    | 3087.59 | 3142.78 | 3175.26 | 3161.80 | 3380.13 |
| <b>Urban</b>    | 3462.31 | 3270.51 | 3281.54 | 3647.99 | 4021.26 |
| <b>Rural</b>    | 2982.80 | 3160.43 | 3071.25 | 3133.10 | 3262.95 |

Table 3: Average income grouped by insured level

a worse insurance level in this case, there still are risking sharing in urban, rural and total sample. And the risking sharing in rural is higher than in urban. And it is interesting to see that the results of rural sample is similar to the whole sample. It may be due to the sample size. Among the whole same, almost 80 percent of the whole sample are from rural area.

|              | $\beta_i$ Mean | $\beta_i$ Median | $\beta$ | $\phi_i$ Mean | $\phi_i$ Median | $\phi$  |
|--------------|----------------|------------------|---------|---------------|-----------------|---------|
| <b>Total</b> | 0.0170         | 0.0306           | 0.0488  | -0.0009       | -0.0005         | 0.003   |
| <b>Urban</b> | 0.0191         | 0.0693           | 0.0704  | 0.0001        | 0.0014          | 0.0018  |
| <b>Rural</b> | -0.0171        | 0.0227           | 0.0448  | 0.0002        | -0.0005         | -0.0002 |

Table 4: Mean and Median of  $\beta_{\beta_i}$  and  $\phi_i$

## 5 Question 4

All the discussion about urban and rural area are included in the analysis above.