

## Development Economics HW3

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### Data Preparation.

I did something to make full utilization of the given data.

Firstly, I filled some missing information of ethnicity, rural residence, gender and age of the household head based on the information in other years. For example, if age in 2009 is missing, but in 2010 it is available and takes the value 46, then in 2009 it should be 45.

Secondly, I construct a balanced panel from the unbalanced panel. I drop all households with consumption and income (residuals) being available only in one year. For the remained households, I interpolate/ extrapolate the missing information to get a balanced panel. The underlying assumption is that consumption and income grow at a constant rate. The new panel has the advantage of being balanced, but one caveat is that now there are some artificial observations.

### Question 1

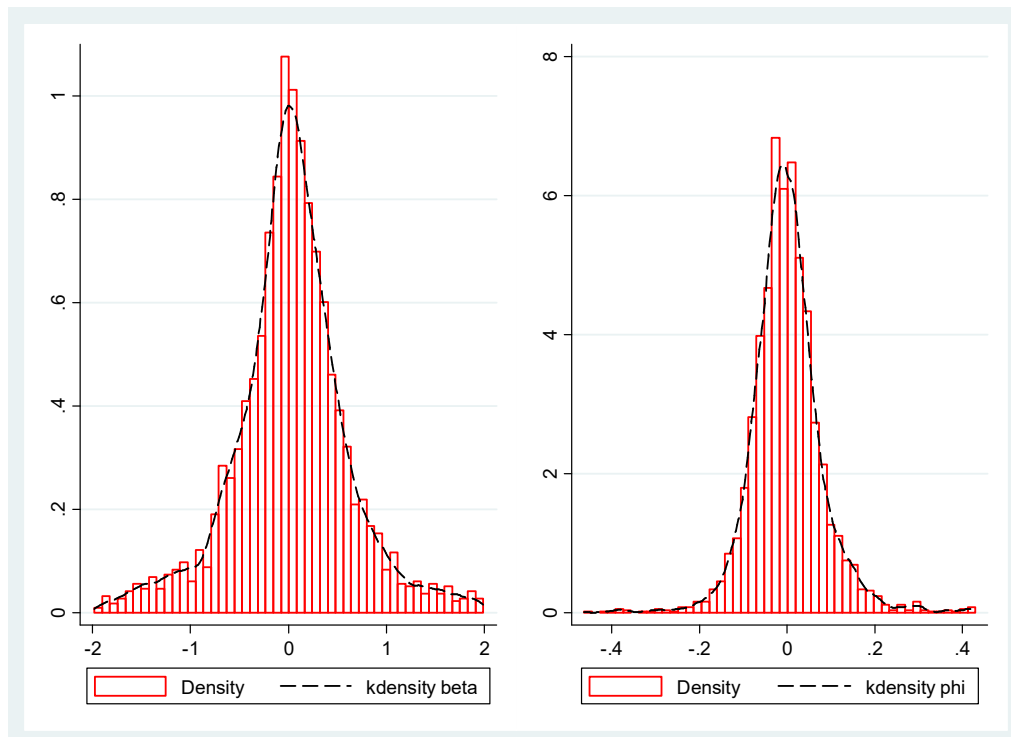


Figure 1 Histogram of the Coefficients.

Figure 1 shows the histogram for beta and phi. The left one is for beta and the right one is for phi. It could be seen that both beta's and phi's concentrate around 0, implying that the effects of income and aggregate consumption on income are very

weak. The result is kind of surprising since we expect at least one is different from 0. But it could appear given the low data quality. Firstly, the time span of the data is too small. We have only three data points to run a regression with two independent variables, which means we can not get precise estimators. Secondly, there are only four regions (which are large geographical areas) when we aggregate consumption. So it is no wonder  $\phi$  is close to 0.

Table 1. Summary Statistics.

	Median	Mean	Mean with the bottom and top 1% excluded
Beta	0.02915	0.20293	0.03120
Phi	-0.00362	-0.00425	-0.00078

With full insurance we expect beta to be 0 and phi to be 1, but here beta is slightly different from 0 and phi is almost 0, there is no full insurance.

### Question 2 a.

Table 2 reports the summary statistics for the five income groups.

For beta, there is no clear pattern. But for phi, median and mean increase as the income increases, suggesting that households get more insurance when their income is higher (inconsistent with our expectation).

Table 2. Summary Statistics of Coefficients across Income Groups.

Income	beta		phi	
	Median	Mean	Median	Mean
0-20%	0.03386	0.98046	-0.02349	-0.04117
20-40%	0.00052	-0.01500	-0.02259	-0.02156
40-60%	0.01308	0.01196	-0.00586	-0.00390
60-80%	0.09413	0.02060	0.00807	0.00860
80-100%	0.03829	0.01731	0.02545	0.03670

Question 2 b. No wealth information.

### Question 2c.

Table 3 reports the summary statistics for the five beta groups. There is no clear relationship between income and beta.

### Question 3

The regression results are shown in Table 4.

Income has statistically significant effect on consumption but the effect is small in

size. If the income growth rate doubles, the consumption growth rate increases by 11.47 percentage point. This coefficient is larger than the mean/ median in Question 1. The aggregate consumption has nothing to do with household consumption. ( $\phi$  is not significantly different from 0.) There is no full insurance, since with full insurance we need  $\beta$  to be 0 and  $\phi$  to be 1.

Table 3. Summary Statistics of Income across Coefficient Groups.

Beta	Income	
	Median	Mean
0-20%	2725.610	3136.256
20-40%	2609.729	3232.263
40-60%	2490.424	3111.992
60-80%	2655.026	3236.004
80-100%	2846.947	3128.900

Table 4. Regression Results.

	Coef.	Std. Err.
Beta	0.11471***	0.00590
Phi	0.00035	0.00090

#### Question 4

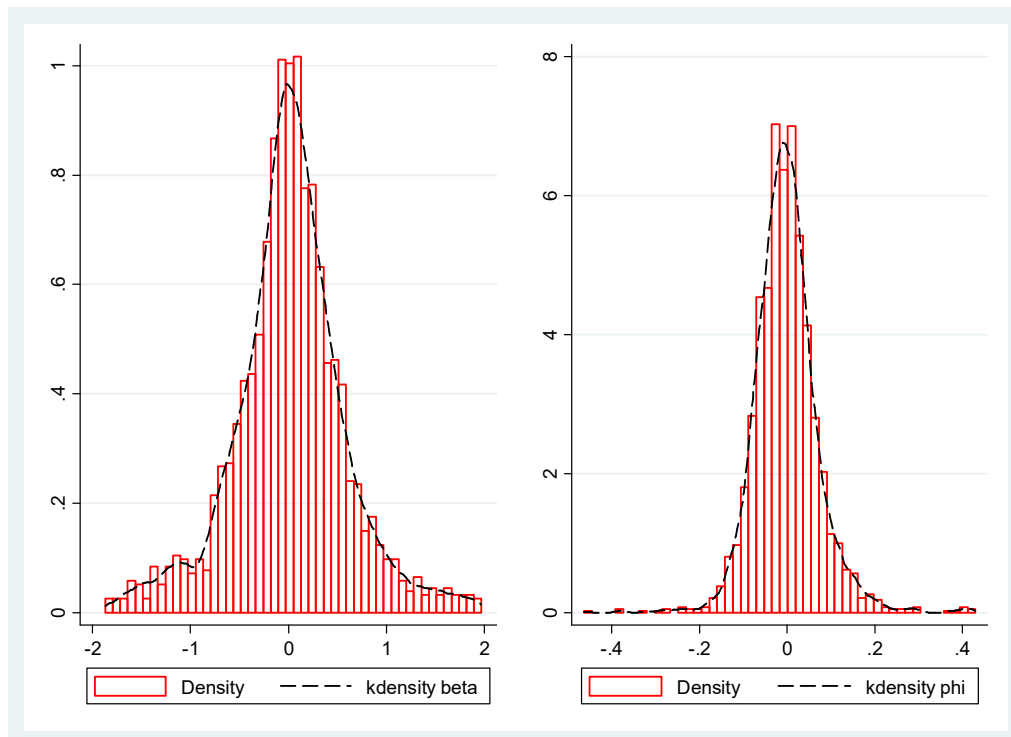


Figure 2 Histogram of beta and phi for Rural Regions.

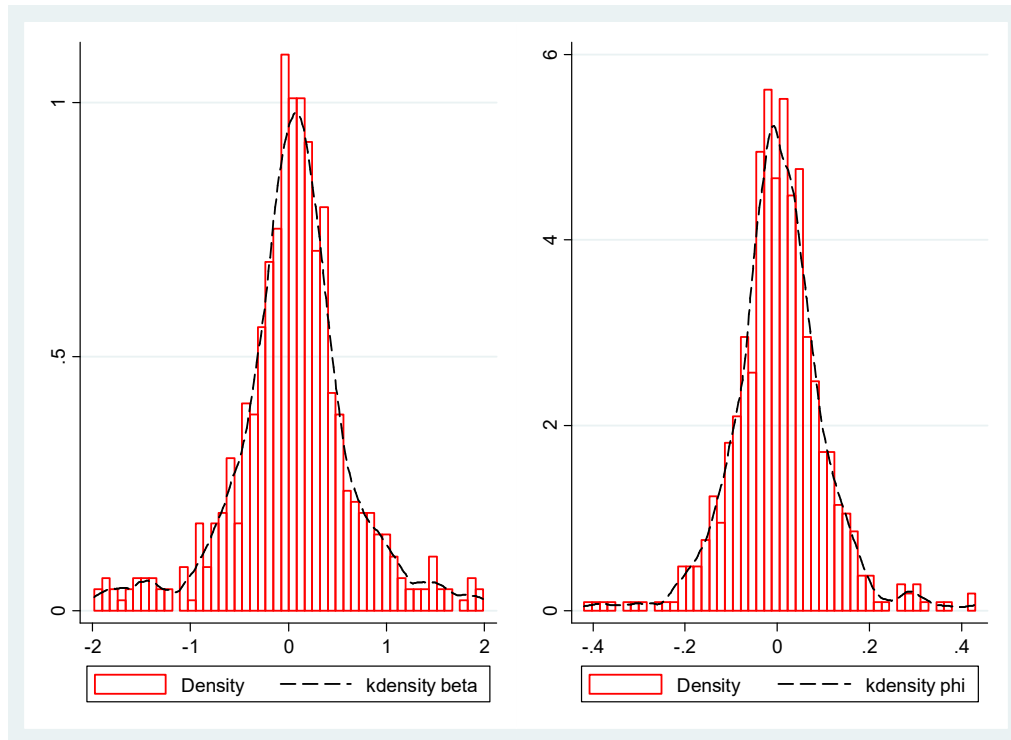


Figure 3 Histogram of beta and phi for Urban Regions

Figure 2 & 3 show the histograms of beta and phi in rural and urban regions respectively. As in Question 1, beta and phi concentrate around 0. Additionally, we cannot see sharp difference between urban and rural regions.

Table 5 reports the summary statistics of the coefficients in rural and urban regions. Beta is larger in urban regions, suggesting that consumption is more sensitive to income in urban regions. Phi is larger in urban regions. If we focus on beta, rural households are more insured, but if we focus on phi, urban households are more insured.

Table 5. Summary Statistics of Coefficients across Income Groups.

	Rural		Urban	
	Median	Mean	Median	Mean
beta	0.01905	-0.02916	0.05735	0.50561
phi	-0.00488	-0.00250	0.00298	0.00984

Table 6 reports the summary statistics for the five income groups in rural regions. For beta, there is no clear pattern. But for phi, median and mean increase as the income increases, suggesting that households get more insurance when their income is higher. Similar pattern is observed in urban regions, as shown in Table 7.

Table 6. Summary Statistics of Coefficients across Income Groups in Rural Regions

Income	beta		phi	
	Median	Mean	Median	Mean
0-20%	0.01467	-0.08838	-0.02905	-0.03518
20-40%	0.00117	-0.02041	-0.02179	-0.02019
40-60%	0.00096	0.00269	-0.00769	-0.00469
60-80%	0.06400	-0.00190	0.00872	0.01200
80-100%	0.01250	-0.03916	0.01876	0.03312

Table 7. Summary Statistics of Coefficients across Income Groups in Urban Regions

Income	beta		phi	
	Median	Mean	Median	Mean
0-20%	0.05777	2.50352	-0.01776	0.02212
20-40%	0.04385	-0.00861	-0.00867	-0.01056
40-60%	0.02155	-0.04692	-0.00166	-0.01071
60-80%	0.15433	-0.01736	0.00265	0.00976
80-100%	0.05835	0.18332	0.05093	0.03628

Table 8 & 9 reports the summary statistics for the five beta groups. There is no clear relationship between income and beta either in rural or urban regions.

Table 8. Summary Statistics of Income across Coefficient Groups in Rural Regions.

Beta	Income	
	Median	Mean
0-20%	2747.636	3110.040
20-40%	2612.484	3226.248
40-60%	2490.423	3019.426
60-80%	2611.272	3143.925
80-100%	2882.187	3120.761

Table 9. Summary Statistics of Income across Coefficient Groups in Urban Regions.

Beta	Income	
	Median	Mean
0-20%	2835.734	3646.662
20-40%	2767.995	3371.519
40-60%	2505.560	3509.143
60-80%	2921.528	3801.181
80-100%	2833.287	3410.206

Regressions results are shown in Table 10. Beta is larger in rural regions but phi is smaller. Therefore, consumption depends more on income, and is less insured in rural regions.

Table 10. Regression Results.

	Rural	Urban.
Beta	0.13308*** (0.00808)	0.09450*** (0.01483)
Phi	-0.00201** (0.00100)	0.00621*** (0.00229)

Standard errors in parenthesis. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .