Earnings mobility in Korea
-pseudo panel approach

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Introduction and Aim

Earning mobility is defined as the rate of change about relative income ranking which is shown from continuing two terms. It is a measure of the equality of opportunity in a society and of the flexibility and freedom of its labor market. It is usually measured with a panel data. However, measurement of the mobility using panel data on earning is complicated by the presence of measurement error, and by non-random attrition from the panel. As an alternative, it has been shown that pseudo-panel methods can be used to consistently estimate measure of the mobility when genuine panels are not available or are prone to errors.

To investigate precisely earnings mobility in Korea with a pseudo panel correction, we use the both a conventional panel (the Korean Labor Income Panel Study), and a pseudo panel with repeated cross-sectional data (Korean Urban Household Survey) with a pseudo-panel method.

Method

Consider the data generating process for the actual log income, of individual i at time period t:

$$Y_{i,t}^{*} = \alpha + \beta Y_{i,t-1}^{*} + u_{i,t} \quad \text{- (1)}$$

The coefficient is a measure of mobility. If it is equal to zero , then it indicates no convergence income. If it is greater than unity, then there is divergence. And less than unity indicates some convergence of income, so less than zero would indicate some reversal. However, in practice data are measured with error.

One thus observe: $Y_{i,t} = Y_{i,t}^{*} + \varepsilon_{i,t}$ - (2)

The degree of bias in mobility estimates arising from measurement error. Substituting (2) into (1) gives the equation to be estimated in terms of observed income:

$$Y_{i,t} = \alpha + \beta Y_{i,t-1} + \eta_{i,t} \quad \text{where} \quad \eta_{i,t} = u_{i,t} + \varepsilon_{i,t} - \beta\varepsilon_{i,t-1} \quad \text{- (3)}$$

$$\beta_{OLS} = \frac{\sum_{i=1}^{N} Y_{i,t} y_{i,t-1}}{\sum_{i=1}^{N} Y_{i,t-1} y_{i,t-1}} \quad \text{-(4)} \qquad \hat{\beta}_{OLS} \xrightarrow{P} \beta + \theta_{OLS} \quad \text{-(5)}$$

The θ_{OLS} is the asymptotic bias and OLS will be inconsistent. By taking cohort average of equation (3) over the n individuals observed in cohort c at time t and following regression for cohort c=1,2,…,C and time periods t=2,…,T:

$$\bar{Y}_{c(t),t} = \alpha + \beta \bar{Y}_{c(t-1),t-1} + \bar{u}_{c(t),t} + \bar{\varepsilon}_{c(t),t} - \beta\bar{\varepsilon}_{c(t),t-1} + \lambda_{c(t),t}$$

where $\lambda_{c(t),t} = \beta(\bar{Y}_{c(t),t-1} - \bar{Y}_{c(t-1),t-1})$ -(6)

Any measurement errors will not cause inconsistency, since we observe different individuals each period. The standard errors from pseudo-panel estimation will be larger than those obtained with genuine panels. Choose cohorts to allow for a large number of individuals per cohort, and therefore can use OLS on the cohort means. for estimation.

Data

To estimate equation (1), we use data from the Korean Labor Income Panel Study (KLIPS), which is an on-going nationally representative longitudinal household survey since 1998 by the Korea Labor Institute. KLIPS collects data on an exhaustive list of individual and household characteristics including detailed income and expenditure data.

We use 3 rounds of KLIPS data from 2003 to 2005 to estimate the degree of income mobility. Reported real total household income including labor income and financial income averages 3,400 million Korean won which is approximately equal to USD 30,000 in 2003 average exchange rate. Householder averages 41.2 years old and his years-of-schooling is 12.7. KUHS collects urban households' income and expenditure for urban households residing in 69 cities and the sample size is about 5,200 households.

The survey is conducted monthly. Its method and structure are very comparable to the United States' Current Population Survey. The descriptive statistics of the pseudo panel data (KUHS) are very comparable to those of the genuine panel (KLIPS). The variances of the panel income are much larger than those of the pseudo panel income due to the measurement error; individual level transitory shock and classical measurement error. This feature would overstate the degree of mobility compared to the pseudo panel.

Table1. Descriptive Statistics (KLIPS, 2003-05, KUHS)

Data	variable	Obs	Mean	S.D	Min	Max
KLIPS	ln(Y) (log household income),2003	1570	17.14	.719	11.84	19.89
	ln(Y) (log household 7income),2004	1570	17.22	.67	13.18	20.42
	ln(Y) (log household income),2005	1570	17.27	0.74	10.81	20.1
KUHS	ln(Y) (log household income),2003	300	17.42	0.35	16.49	18.57
	ln(Y) (log household income),2004	300	17.47	0.37	16.49	18.96
	ln(Y) (log household income),2005	300	17.54	0.36	16.42	18.59

Empirical result: the degree of mobility

We use equation (1) to estimate the degree of income mobility with the genuine panel (KLIPS). We use pseudo panel methods to consistently estimate equation (1), which is modified into equation (5). A pseudo panel tracks cohorts of individuals over repeated cross-sectional surveys (KUHS). The estimated mobilities are reported in Table 2. As expected, the degree of mobility is higher with the genuine panel. For example, when we regress 2004 annual income on 2003 annual income, the estimated income correlation is 0.624 for the panel which is much lower than .869 of the pseudo panel as in the second column of Table 2, which is illustrated in Figure 1. The results indicate that the estimated degree of income mobility with the panel data range substantially from 0.624 to 0.794 for the same household over only three consecutive years. The individual error components of the panel income seem sensitive to transitory income variations over time.

Figure 1

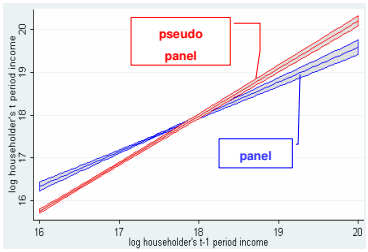

Table2. Earnings mobility (KLIPS, KUHS)

	2005~2004		2004~2003	
	panel	Pseudo panel	panel	Pseudo panel
Intercept	3.56 (.332)	3.241 (.547)	6.519 (.304)	2.324 (.607)
ln(Y)(log household income)	.796 (.019)	.818 (.031)	.624 (.0177)	.869 (.034)

Empirical result: the existence of poverty trap

The different degrees of mobility in the linear income mapping model with a genuine panel and a pseudo panel are applied to empirical detection of poverty traps, where there is a threshold level of income. Individuals of the lagged income below the threshold level are unable to surpass the level in the future. The overstated mobility in the linear income mapping with the genuine panel of error-ridden income would make empirical detection of poverty trap difficult. Following Jalan and Ravallion(2004), we use cubic non-linear income mapping and the condition of the existence of poverty traps is defined as equation (7): $Y_{i,t}^{*} = \beta_1 Y_{i,t-1}^{*} + \beta_2 \left(Y_{i,t-1}^{*}\right)^2 + \beta_3 \left(Y_{i,t-1}^{*}\right)^3 + u_{i,t}$

$$g_i'\left(Y_{i,t-1}^{*}\right)\Big|_{Y_{i,t}^{*} = Y_{i,t-1}^{*}} > 1 \quad \text{-(7)}$$

The results of the genuine panel clearly understate the existence of poverty traps as in Table 3.

Table3. Empirical Detection of Poverty Traps (KLIPS, KUHS)

	2005~2004		2004~2003	
	panel	Pseudo panel	panel	Pseudo panel
$g_i'(Y_{i,t-1}^{*})\big\|_{Y_{i,t}^{*}=Y_{i,t-1}^{*}} > 1$	0.879	1.208	0.507	0.798

Reference

Francisca Antman and David J. Mckenzie (2007) "Earnings Mobility and Measurement Error: A Pseudo-Panel Approach" *Econometric Development and Cultural Change,* vol.56,No,1,pp.125-161

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