Measurement of Income Transition and Test of Income Mobility

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ABSTRACT: This paper proposes a new measure of income mobility under the continuous transition, which can be summarized into a single parameter. This measure is also easily testable for its structural changes over time. It is independent of choice of intervals or scale of income, unlike previously developed measures. The income mobility is measured by the variance of the income transition variable defined on a continuous distribution stemming from the income transition rule. It is defined based on the changes in relative income induced by the changes in the household income ranks between two periods (years). The underlying assumptions are twofold: firstly, the probability distribution of household income remains in the same distributional family over time and secondly the expected income rank in the following period equals the realized rank in the previous period within each age group. The proposed measure of income mobility is invariant to the selection of partitions of income intervals adopted in the discrete type income mobility measures using transition matrix as proposed by Shorrocks (1978) and subsequent studies. The continuous measure from Fields & Ok (1996, 1999) is interval-invariant. However, it is scale-dependent, unlike the Shorrocks' type measures. To the contrary, the proposed measure is also scale invariant. Another advantage is the simplicity of calculation and hypothesis testing of structural changes. An additional parametric assumption, such as the log-normality of household income distribution, generally eases the complexity of the measure. It suffices to estimate the variance of income transition variable to infer all characteristics of income mobility since all necessary distributional information is summarized into a unique parameter, the variance of income transition variable, under the log-normality. Thus, its dimension of parameter space of the income mobility shrinks to unity. However, a drawback is misspecification error when the log-normality breaks down. The proposed measure is applied to the case of Korea using a panel data set from the Korea Labor and Income Panel Study (KLIPS). The income mobility expressed in the form of variance was estimated to be 0.183 in 1999, which decreased to 0.106 in 2008. Statistical hypothesis testing shows that this change is statistically significant: the variance estimates are differenced 9 times between the two consecutive years between 1999 and 2008, and the differences turn out to be statistically significant in 7 out of 9 times, implying that they declined significantly over the last decade. The income transition rule can be applied to estimating the poverty inflow/outflow probabilities (PIP/POP), depending on the sizes of households and their income ranks in the previous period. The PIP/POP are analyzed mathematically and their estimates are illustrated graphically. The POP is positively correlated with income mobility. This strongly implies that the POP has decreased significantly over the last decade in Korea. There exist many factors which may reduce income mobility and the POP: key candidates are (rapid) population aging, decreasing labor market flexibility, skill-biased technical development, regulations and so forth. These need to be scrutinized in the future to understand the recent decreasing trend of income mobility/POP.

Key Words: income mobility, lognormal distribution, panel analysis, testing, poverty
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