

Time Evolution of Income Distributions with Subgroup Decompositions

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Abstract

In this paper, we propose a two-step decomposition procedure for studying the functional time series of income distribution (ID) of a population under a subgroup classification. Using the law of total probability, we first decompose the overall ID as a linear combination of the subgroup IDs weighted by the subgroup shares. In the second step, we use a functional principle component analysis to decompose the subgroup ID as a class of orthonormal functions with time-varying coefficients. We then apply this two-step decomposition to develop a class of models for exploring the ID evolution, the ID change, and the dynamics of various distributional features at different levels ranging from broad to specific. For empirical illustration, we apply the proposed methods to explore Taiwan's family ID evolution from 1981 to 2014.