Systems of Index Numbers for International Price Comparisons Based on the Stochastic Approach

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Abstract

The main objective of the paper is to demonstrate that a number of widely used multilateral index numbers for international comparisons of purchasing power parities (PPPs) and real incomes can be derived using the stochastic approach. The paper introduces a new class of index numbers for international price comparisons and proves the existence and uniqueness of the new price index. The paper outlines a stochastic approach to generate the Ikle (1972), the Rao-weighted CPD (2005) and the new system of index numbers. The advantage of the stochastic approach is that we can derive standard errors for the estimates of the purchasing power parities (PPPs). The PPPs and the parameters of the stochastic model are estimated using a weighted maximum likelihood procedure. Estimates of PPPs and their standard errors for OECD countries using the proposed methods are presented.

The paper also outlines a method of moments approach to the estimation of PPPs under the stochastic approach. The paper shows how the Geary-Khamis system of multilateral index numbers can be derived using the stochastic approach thus providing a coherent framework for its derivation. Standard errors of the Geary-Khamis PPPs are presented in the paper.