ANALYSIS OF THE TOP OF THE INCOME DISTRIBUTION BY A MULTIRESOLUTION FAMILY OF DENSITY

Palacios-González, Federico   fpalacio@ugr.es
García-Fernández, Rosa María   rosamgf@ugr.es

Department of Quantitative Methods in Economics
University of Granada
Campus de Cartuja s/n.
Granada, 18071, Spain

Abstract of the proposed paper

There is an increasing interest in the study of the evolution of the income distribution motivated by recent changes in the distribution and concentration of income.

These changes show that income has increased relatively more for those groups at the top of distribution. As a consequence, a small group has emerged whose income is so large that they can be said to diverge from the rest of the society (see among others Piketty 2005, Atkinson 2005, Saez 2005)

The aim of this paper is threesome. First, we pursue a flexible probability model to study the right tail of the income distribution. Second, we provide a measure of the level of conflict that may arise between the individuals that belong to the right tail of the distribution and the rest. Third, we apply the model and the measure to the European Community Household panel data (1993 and 2000) for EU-15 countries and establish static and dynamic comparisons across these countries.

Several probability models have been proposed to study the distribution of income (see for instance Dagum 1980). These models reflect the observed characteristics of the income distribution: asymmetry, high level of kurtosis and multi-modality.

The proposed model is based on multiresolution and wavelet analysis and it can be derived by mixing dilations and traslations of a cubic box spline function.

To define the model let us assume that the support of the income distribution is the closed interval $[a,b]$ that contains the sample data and which is partitioned in m regular

segments. Let $\theta(x)$ be a box spline of degree three. The family of densities f is defined by the expression

$$f(x) = \sum_{k=0}^{m} a_{mk} \theta_{mk}(x),$$

where $a_{mk} > 0$, $\sum_{k=0}^{m} a_{mk} = 1$ and $\theta_{mk}(x) = s\theta(s(x-a)-k)$, with $s = \dfrac{m}{b-a}$.

The parameter s determines the level of resolution and its inverse, s^{-1}, is the scale parameter. Using an appropiate level of resolution we can focus on any segment of income. In particular, we focus on the top of the income distribution. For each value of m, the coefficients of the model are estimated by maximum likelihood. Different values of coefficients isolated by values of coefficients equal or close to zero define different subpopulations. These groups let us identify the location and size of the right tail of the distribution. In addition, several coefficients located together and distinct from zero may generate a unimodal income distribution, not necessarily symmetric, what allows us to estimate the top income density function.

The model and the index will be used to compare the top of the income distribution across the EU-15 countries whose income is provided by the European Community House Panel data (ECHP) for the years 1993 and 2000. The density function of the top of the distribution will be estimated for each of the EU- 15 countries. Moreover, the concentration at the top of the distribution and the level of conflict between the individuals in the right tail of the distribution and the rest will be analyzed. Static and dynamic comparisons will be done for the previous period of time.