Sigma-convergence revisited

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Résumé / Summary

Fueling the relative academic debate and providing insight to the evaluation of the relative policies, the evolution of regional inequalities is an issue of utmost importance. Hence, the study of regional inequalities - in particular, the study of regional convergence / divergence - is at the heart of regional science. Intuitively, regional convergence suggests a process whereby poor(er) regional economies catch-up to rich(er) ones. Thus, from a policy point of view, the study of regional convergence / divergence may interpret as a sign with respect to the evaluation of the effectiveness and the efficiency of the implemented regional policy mix. Under similar reasoning, from a theoretical point of view, the study of regional convergence / divergence may serve as an empirical exercise with respect to the affirmation of regional development theories.
Referring to the diachronic decrease of the overall dispersion of a regional dataset, Sigma is a dominant concept in the regional convergence / divergence literature. In the past decades, Sigma-convergence was mainly apprehended through the coefficient of variation (CV), combined with interdecile ratios. CV is a standardized (relative) measure of dispersion and is expressed as the ratio of the standard deviation of a regional dataset (customarily, but not necessarily, in terms of per capita GDP) to the corresponding (arithmetic) mean, at a given date. The first problem arising from such a calculation is that each one of the n spatial entities taken into account has exactly the same weight (1/n). Consequently, an alternative coefficient

was proposed: the weighted coefficient of variation (CVw). This second coefficient includes in the formula, a weighting factor, so as to account for the corresponding relative regional size (customarily, in terms of relative population) in the treatment of the regional dataset.
The paper aims at revisiting the Sigma-convergence concept. Such a research endeavor stems from both a statistical and a conceptual rationale. Statistically, the mean is a central tendency measure highly sensitive to outliers (i.e. regional dataset values extremely distant from the other corresponding values). Given the fact that such outliers represent actual, and not erroneous, regional values (that, usually, correspond to metropolitan and to outermost regions), turning to the use of the truncated mean (i.e. discarding the outliers and then taking the mean of the remaining regional dataset values) or assuming a normal distribution of the regional dataset values are not risk-free, and beyond critique, methodological choices. For this reason, international organizations generally don't perceive the mean as the central tendency backdrop for defining thresholds. To the end of revisiting the Sigma-convergence concept, the paper expresses the CV and the CVw formulas against the backdrop of the weighted mean (i.e. the mean calculated by attributing weights to, and treating accordingly, the regional dataset values) and the median (i.e. the central tendency measures that separates the higher half of the regional dataset from the corresponding lower one). Thus, the paper specifies and proposes a foursome of alternative formulas for expressing the Sigma-convergence concept. Particularly, next to the classical CV formula, the paper specifies and proposes the CV-weighted-mean (CVwm) and the CV-median (CVmd) formulas. CVwm and CVmd are standardized measures of dispersion that may express as the ratio of the standard deviation of a regional dataset to the corresponding weighted mean and to the corresponding median, at a given date, respectively. Νext to the wCV formula the paper specifies and proposes the wCV-weighted-mean (wCVwm) and the wCV-median (wCVmd) formulas. These two parameters are the weighed CVwm and CVmd counterparts, respectively,
The theoretical propositions of the paper are supported from an illustrative empirical analysis of regional inequalities in France and Greece. Regional inequalities are estimated at NUTS II and NUTS III levels, for the period 2001-2013/2014 on the basis of per capital GDP data. Population data are utilized for the estimation and the use, where appropriate, of the weighting factor (i.e. regional population). The estimation of regional inequalities, in both France and Greece, demonstrates that, in comparison with the CV and the CVwm results, the level of regional inequalities is higher when the mean is replaced by the median. The same results are also obtained when considering the weighted wCV and wCVwm. Irrespective of the central tendency backdrop, the inclusion of the weighting factor indicates higher level of regional inequalities. The estimation of regional inequalities, in both France and Greece, tends to demonstrate that the evolution of regional inequalities is more sensitive when the calculation of the alternative coefficients of variation is based on the median and not on the mean (weighted or not). It comes that different versions of the CV and the CVw may lead to different inferences with respect to regional inequalities (especially in terms of intensity of the phenomenon), providing a new perspective to the empirical regional convergence / divergence literature.

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