Department
SEMINARS

Regional disparities in European Union. A Machine Learning Approach

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ABSTRACT

The paper investigates the hypothesis of club convergence in 249 European regions (NUTS2) during the 2000-2018 period. Several empirical contributions in the literature conclude that European regions tend to converge to a GDP distribution characterized by multimodality (convergence club). Unlike this literature, we do not find evidence supporting such a conclusion. Instead, we find evidence of convergence from 2000 to 2018. Although the GDP distribution was characterized by a "twin-peak" property in 2000, it tends to disappear over time, bringing, in 2018, to an unimodal distribution. Physical and human capital and cohesion funds are the most responsible for the convergence process.

To empirically investigate the question, we follow a threefold approach:

1. A simple kernel analysis is provided to investigate the GDP per capita distribution.

2. A mixture of Gaussian distribution is used to estimate possible clusters in the data.

3. We used a supervised machine learning algorithm (GPBoost) to assess the importance of the covariates in the convergence process instead of the more traditional linear techniques used in the current literature.

The advantages of machine learning are several; generally, they perform better than linear models, allowing them to capture non-linearities and multicollinearity in the covariates.

The overall picture brings us to the conclusion that a robust convergence process is working among European regions. The main drivers of such convergence seem to be physical and human capital as well as the funds coming from the European Union, such as the European Regional Development Fund (ERDF), the Cohesion Fund (CF), the European Social Fund (ESF) and the European Agricultural Fund for Rural Development (EAFRD, previously EAGGF).

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