

# **A Dynamic Measure of Social Welfare in the European Sport Industry**

May, 2026

Author: Sung, Pin-Hsuan

Advisor: Fang, Chin-Yi

## **Abstract**

The sports industry plays an important role in leisure, health promotion, and economic development. The European Union actively promotes sport-related policies to create employment opportunities, strengthen social cohesion, and enhance international trade. However, substantial differences remain in resource allocation and social welfare outcomes across member states. This study applies a non-oriented dynamic network slack-based measure (SBM) data envelopment analysis (DEA) model under variable returns to scale to evaluate efficiency changes in 30 European countries from 2015 to 2023. The framework consists of two stages. Stage 1 measures sports industry efficiency using sport employment, COFOG expenditure on recreation, culture, and religion (sports category), and average weekly working hours as inputs, with extra-EU trade in sporting goods as the intermediate output. Stage 2 evaluates social welfare efficiency using the intermediate output and the Harmonised Index of Consumer Prices (HICP) as an undesirable output. Land area is incorporated as a dynamic carryover variable. The result shows that Belgium, Germany, France, and Malta achieved frontier efficiency (DEA = 1), while Iceland and Bulgaria showed the strongest productivity growth (MPI > 1). In contrast, Hungary and Norway demonstrated relatively weak dynamic performance, suggesting inefficiencies in long-term sport-to-welfare transformation. These findings provide cross-country comparisons and policy implications for improving the European sports sector's contribution to social welfare.

**Keywords : Dynamic network SBM DEA, Malmquist productivity index, undesirable output, cross-country comparison**