

Regional smile curves in Europe: specialization, growth and value added

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The fragmentation of production across countries and regions has led to the emergence of Global Value Chains (GVCs), where value added is generated at different stages of geographically dispersed production processes. Recent literature shows that gains from GVC participation depend not only on the extent of integration but also on the position along value chains, with value added typically concentrated in upstream and downstream stages, generating the emergence of the “smile curves”. While this convex relationship between position and value creation has been widely documented at the country level and, more recently, for European regions (Capello and Dellisanti, 2024), substantial heterogeneity persists across regions due to capabilities, that is, differences in structural and technological factors.

This paper deepens the analysis of the smile curve concept at the regional level by examining whether the convex relationship between GVC position and economic outcomes differs systematically across groups of European regions according to their structural characteristics. In particular, we assess heterogeneity associated with geographic macro-areas and sectoral specialization patterns. To this end, we combine a multiregional input–output (MRIO) framework with an econometric analysis. Regional positions in GVCs are computed using an upstreamness indicator derived from the Leontief production structure, following the proposal of AntrÃ s et al. (2012). Besides, the limitation of data at the regional scope is a serious setback in economic research, to the extent that most of the studies that focus on the EU stop in 2010 (the last year available in EUREGIO). Therefore, another line of contribution is to extend the timespan of these regional analysis by using the FIGARO regionalized input–output database for 2017 (Redmond-Tiedrez and Rueda-Cantuche, 2019). This database covers 272 EU NUTS-2 regions and 17 non-EU countries with a disaggregation of 56 economic sectors.

The empirical strategy consists of cross-sectional regressions across EU regions relating GVC position and its quadratic term to three dependent variables: value added levels, value added growth, and labor shares. To identify heterogeneous smile-curve patterns, position terms are interacted with regional-group dummies defined under two alternative classifications. First, regions are grouped into four European macro-areas (North, West, South, and East), capturing persistent geographic development trajectories. Second, regions are clustered according to sectoral specialization using Revealed Comparative Advantage Indices (Balassa, 1964) using the information of the FIGAROreg table. The models control for technological and structural conditions, including employment in science and technology, R&D intensity, structural business statistics (SBS), and the degree of urbanization of the different EU regions.

Therefore, the analysis advances understanding of how structural heterogeneity shapes the benefits regions derive from their participation and positioning in global value chains in a EU context, with implications for regional development and specialization policies in the context of global production fragmentation.