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Development Effects of the Fusion of Technological Innovation and Industrial Innovation in Urban Administrative Boundary Areas

Lixiang Guo , Shujing Yue

Southeast University, School of Economics and Management, China

Abstract

Dismantling regional administrative fragmentation and fostering the orderly development of urban administrative boundary areas are essential steps toward the establishment of a unified national market. The integration of technological innovation with industrial innovation provides a crucial new impetus to this process. This study employs panel data from 282 Chinese cities spanning 2005–2023, comprising 55.1 million patent records and 300 million business registration entries, to construct a city-level measure of technological–industrial innovation integration. At the township (sub-district) scale, it further maps economic growth within administrative boundary areas. Within the New Economic Geography framework, this study empirically examines the development effects of technological–industrial innovation integration. The findings demonstrate that technological–industrial innovation integration significantly accelerates the relative economic growth of administrative boundary areas vis-à-vis central urban districts. Mechanism analysis indicates that this integration operates through three primary channels: facilitating knowledge spillovers, reducing transaction costs, and strengthening competitive advantages. Heterogeneity analysis reveals that the positive effects are magnified in contexts characterized by high regional integration, strong human capital endowments, and robust intellectual property protection. While fostering growth in both boundary and central areas, the integration also enhances intra-central-area balance without inducing disorderly sprawl in boundary zones. Further, within the digital-intelligence era, the “physical–digital convergence” of technological innovation emerges as a critical driver of boundary-area growth. These results, framed within the lens of deep technological–industrial integration, offer actionable policy insights for dismantling administrative barriers, constructing complementary and high-quality regional economic structures, and promoting coordinated regional development.

Keywords: **Boundary Effect; Coordinated Regional Development; Digital Technology; New Economic Geography; Industry-Research Collaboration**