Economic interdependencies in the Great Lakes–St. Lawrence region: A dynamic analysis of manufacturing connectedness
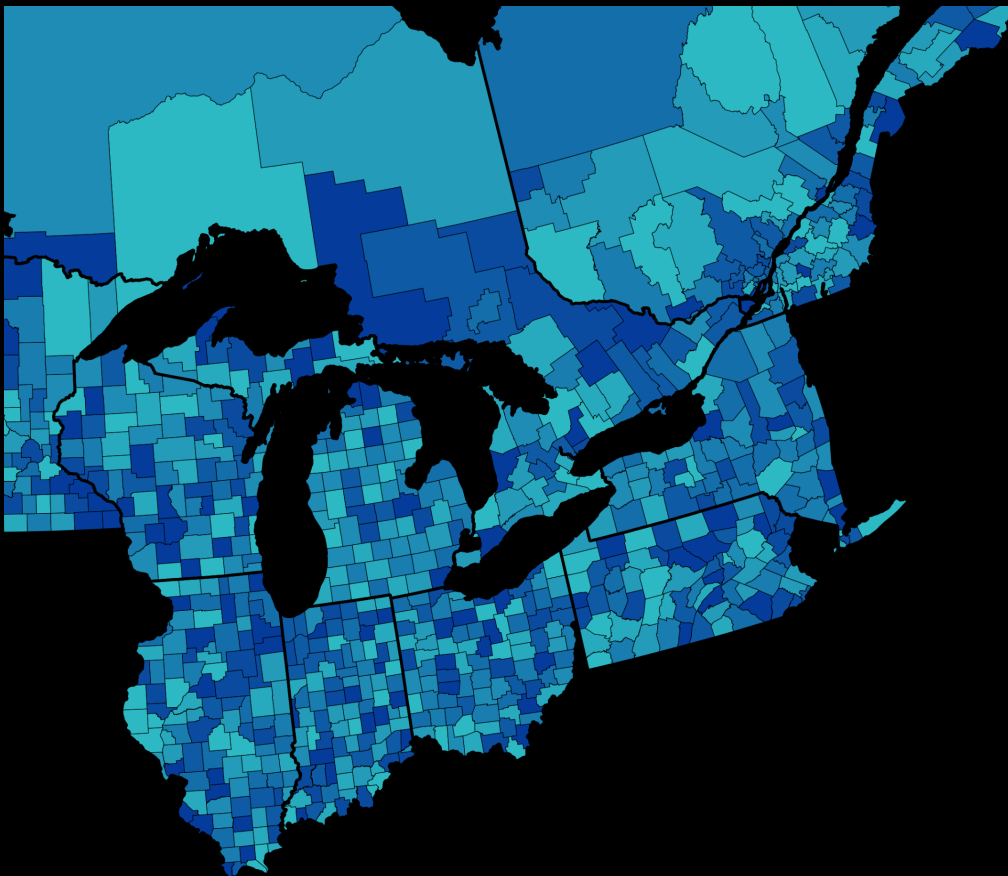
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Economic Interdependencies in the Great Lakes–St. Lawrence Region: A Dynamic Analysis of Manufacturing Connectedness

Executive Summary

The Great Lakes–St. Lawrence (GLSL) region, encompassing eight U.S. states and two Canadian provinces, stands as one of the world's most significant industrial hubs. This region produces nearly 40% of the United States' manufacturing output and about two-thirds of Canada's industrial production. Given its high degree of economic integration, disruptions in one part of the network—whether due to macroeconomic shocks, natural disasters, or policy changes—can quickly ripple across the entire region, affecting businesses, labor markets, and supply chains.

This study investigates the evolving nature of manufacturing connectivity in the GLSL region, utilizing a sophisticated statistical approach to analyze over three decades of monthly employment data (1990–2024). By applying a Vector Autoregressive (VAR) model with Elastic Net regularization, the research quantifies how economic shocks spread between states and provinces, identifying which areas act as major transmitters and which are more vulnerable to external disruptions.

We found that Ohio and Indiana emerge as the most significant transmitters of economic shocks, exerting substantial influence over manufacturing activity throughout the region. Their industrial output fluctuations create ripple effects that extend across multiple states and provinces. In contrast, Quebec exhibits a greater degree of resilience, with its manufacturing sector experiencing lower exposure to economic disturbances originating from other parts of the GLSL region. Moreover, the study reveals that economic connectivity tends to intensify during periods of crisis. For example, both the 2008–2009 financial downturn and the COVID-19 pandemic saw a marked increase in economic interdependence across the region, highlighting its vulnerability to global economic shocks. Additionally, cross-border spillovers account for nearly half of the observed manufacturing employment volatility, emphasizing the importance of coordinated policies to maintain regional economic stability.

These findings carry significant implications. The presence of a few dominant transmitters implies that localized disruptions can rapidly diffuse throughout the regional manufacturing sector, prompting policymakers to consider pre-emptive measures aimed at stabilizing the labor markets in these key nodes. Simultaneously, the considerable exposure registered by other entities underscores the need for collaborative strategies—such as supply-chain diversification and enhanced workforce retraining programs—that may help mitigate the most acute vulnerabilities. The total connectedness index further reveals that roughly half of the observed variance in

manufacturing employment is linked to cross-border spillovers, highlighting that, while local dynamics remain critical, joint regional efforts can play a decisive role in managing systemic risks.

Further research could expand upon these findings by incorporating additional industries, analyzing the role of trade policies, and exploring nonlinear relationships in economic connectivity. Strengthening regional collaboration and adopting proactive economic measures will be essential to safeguarding the GLSL region's economic future, ensuring stability, competitiveness, and sustainable growth in an era of increasing global uncertainty.

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