

Research on the mechanism and policies of polycentric agglomeration for promoting the upgrading of China's position in the global production value chain

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Abstract

Recently, with the increasing trend of anti-globalization, China's manufacturing industry has encountered instability in the supply of upstream products in international trade, a challenge that has given rise to an urgent demand for ways to improve China's position in the global production chain. In response to this challenge, the 14th Five-Year Plan puts forward the strategic goal of building multi-level, multi-node, networked city clusters and trade powerhouses, which provides new development opportunities for China to strengthen its position in the global production chain through the model of polycentric agglomeration. In order to gain a deeper understanding of the impact of polycentric agglomeration on the position of enterprises in the global production chain, this project will use the instrumental variable estimation method to conduct an empirical study. This method can help us accurately identify the causal relationship between polycentric agglomeration and global production chain position and assess the differential impact of different agglomeration patterns on firms' production chain position. Through this study, we expect to reveal how polycentric agglomeration can enhance firms' global production chain positions through mechanisms such as optimizing resource allocation, promoting technological innovation, and strengthening industrial chain synergies. In addition, we plan to explore the impact of polycentric agglomeration on the evolution of firms' roles in global value chains and on international trade competitiveness. The objective of this study is to provide targeted recommendations for policymakers and enterprises to help them achieve high-quality development of China's manufacturing industry by optimizing the structure of polycentric agglomeration in the context of global production chain restructuring. Through this comprehensive study, we expect to provide scientific decision support and action guidelines for China's sustainable upgrading and competitiveness enhancement in global production chains.

Keywords

Polycentric agglomeration, global production value chain, "center-periphery" model.

1. Introduction

This study examines the non-linear impact of polycentric agglomeration on the position of firms in global production chains and finds that this pattern of agglomeration helps to narrow the gap between firms in cities of different sizes, enabling small and medium-sized city firms to absorb the positive impacts of large cities more easily. This finding makes a theoretical contribution by providing a new explanatory perspective to the theory of spatial agglomeration and trade development. Meanwhile, the study highlights the key role of industrial interaction, combining multi-center agglomeration with production efficiency and focusing on the synergistic effect of the service function of the central city and the manufacturing function of the peripheral cities.

By promoting the integration of service and manufacturing industries, this study aims to help enterprises realize their position in the global production chain.

In this study, we use mathematical models to explore how polycentric agglomeration affects firms' position in global production chains. In addition, we provide a detailed analysis of the development trajectory of polycentric agglomeration in different provinces of China, which provides a reliable empirical basis for our study. This study focuses on exchange cost factors such as inter-city distance and infrastructure, which are crucial to the polycentric agglomeration model because they determine the flow of resources and information between cities. Based on these considerations, we develop a polycentric agglomeration model that can fully utilize the strengths and resources of each city, which provides a reference for the formulation of policies to enhance China's position in the global production chain. The findings are not only theoretically significant, but also have important implications for reality. They provide policymakers with a scientific basis for policy formulation and help implement effective measures to enhance China's position in global production chains. Overall, this study provides important theoretical and practical references for enhancing China's position in global production chains through in-depth analysis and empirical research.

2. Analysis of the Current Situation and Evolutionary Dynamics of Polycentric Agglomeration and Global Production Chain Embedding in China

In this project, we are committed to employing a series of precise and rigorous indicators, combined with scientific research methods, to provide in-depth measurements and descriptions of the phenomenon of polycentric agglomeration in China and its degree of integration in global production chains. This fundamental work is essential for understanding the spatial organization and economic development patterns of China's urbanization process.

To achieve this, we will make full use of night-time light data, which reflect the intensity and extent of urban activity, and data on the dynamic distribution of the global population, which will help us to understand the role of different cities in global population movements. In addition, the China Customs database will provide us with detailed information on international trade and production chain activities. Through the combined analysis of these data, we will be able to provide a comprehensive measure of China's polycentric agglomeration and the integration of global production chains across multiple dimensions and long time horizons. The objective of this study is not only to depict the current status of polycentric agglomeration and GPC integration in China, but also to reveal their inherent evolutionary patterns. This will help policymakers and firms better understand the dynamics of global production chains and how to identify and capitalize on opportunities in polycentric agglomeration across China. Through in-depth analysis of these data, we expect to be able to provide a scientific basis and strategic recommendations for China's advancement in global production chains.

3. Theoretical Framework Construction of Multicenter Agglomeration Affecting the Embeddedness of China's Global Production Chain

In the new trend of industrial distribution, we observe that central cities are becoming the concentration of high-end service industries, while peripheral cities are assuming the role of manufacturing industries. The development of this industrial spatial distribution pattern raises the question of how to enhance China's position in the global production chain by optimizing the polycentric agglomeration structure, which has become the focus of this project's strategic research and policy design.

Combining the results of empirical research, we will explore the optimization strategies and paths of regional polycentric agglomeration in China from multiple perspectives. Given the differences in development stages, industrial composition, and infrastructure in different regions, we will develop a set of development models and management policy systems aimed at improving the position of global production chains.

We will examine a variety of influencing factors, including inter-regional competition and cooperation, interactions among various links in the industrial chain, technological innovation and diffusion, and policy orientation and support, in order to find effective optimization strategies for multi-center agglomeration. In addition, we will examine how regional planning and policy design can enhance the linkages between hub cities and neighboring cities, as well as how to attract and utilize resources globally in order to increase China's competitiveness and influence in the global production chain.

Through this comprehensive analysis and practice, we aim to provide scientific decision support and implementation strategies for China's industrial transformation and enhancement of global competitiveness.

4. An empirical analysis of the impact of polycentric agglomeration on the embeddedness of China's global production chain

In this part of the study, we will adopt the "center-periphery" theoretical framework, combined with the analytical paradigm of game theory, and further incorporate the economic theory of development in order to build a general equilibrium model. This model will comprehensively consider producer behavior, consumer behavior, and government behavior in order to explore in depth the mechanisms and paths of polycentric agglomeration phenomenon on the embeddedness of global production chains. Our focus is centered on specialization agglomeration, which allows us to understand how polycentric agglomeration affects the integration of global production chains from a new perspective. By incorporating various factors into the "center-periphery" model, we can more accurately describe and analyze the roles and impacts of producers, consumers and governments in polycentric agglomeration.

On the basis of the theoretical analysis, we will propose a series of research hypotheses to guide the subsequent empirical study. In order to verify these hypotheses, we will apply numerical simulation methods to initially validate the theoretical analysis. By comparatively analyzing the differences in effects between multiple paths of action, we can gain a deeper understanding of the impact of polycentric agglomeration on the embeddedness of global production chains. The research in this part will help us better understand the phenomenon of polycentric agglomeration and how it affects the integration of global production chains. It will provide important references for policymakers and firms so that they can better respond to and take advantage of the challenges and opportunities presented by polycentric agglomeration.

5. Analysis of constraints for positive spillover

In this section of the study, we will analyze the impact of inter-city distances, transportation and communication infrastructure on the efficient use of resources in the phenomenon of polycentric agglomeration. These factors are crucial for the positive effects of polycentric agglomeration. The role of inter-city distance on polycentric agglomeration cannot be ignored as it relates to the opportunity cost of communication and cooperation between cities. Longer distances may increase transportation and time costs, thus weakening the positive effects of polycentric agglomeration. Therefore, we will examine how inter-city distance affects polycentric agglomeration and explore how these costs can be reduced by optimizing city layouts and transportation networks.

At the same time, transportation and communication infrastructures are critical to facilitating inter-city interactions. The quality of these infrastructures is directly related to the efficiency of inter-city exchanges. Good transportation and communication infrastructures can reduce the cost of exchanges and increase the effectiveness of polycentric agglomeration. Therefore, we will explore the role of these infrastructures in polycentric agglomeration and how their effects can be enhanced by improving them.

Through an in-depth study of these moderating factors, we aim to better understand the phenomenon of polycentric agglomeration and to find ways to optimize the urban layout, transportation network and communication infrastructure for efficient resource utilization. This is of great practical significance for enhancing China's position in the global production chain.

6. Construction of a Policy System for Multi-center Clustering to Enhance China's Position in Global Production Chains

In the current industrial development trend, central cities are concentrating a large number of high-end service industries, while peripheral cities are mainly responsible for taking over manufacturing industries. The gradual formation of this industrial spatial pattern makes how to enhance China's position in the global production chain by improving the structure of polycentric agglomeration the core topic of this project's strategic research and policy design. Based on the findings of the empirical research, this section explores the strategies and paths for optimizing polycentric agglomeration in various regions of China from multiple dimensions. Considering the diversity and differences of different regions in terms of development level, industrial structure, and infrastructure, we will construct a set of development models and management policy systems aimed at upgrading the status of global production chains. We will analyze various influencing factors, such as inter-regional competition and cooperation, upstream and downstream interactions in the industrial chain, technological innovation and diffusion, as well as policy guidance and support, with a view to finding the most effective optimization strategy for polycentric agglomeration. At the same time, we will also focus on how to promote the interaction between central and peripheral cities through regional planning and policy design, as well as how to attract and utilize resources globally, so as to enhance China's competitiveness and influence in the global production chain.

Through this comprehensive analysis and practice, we hope to provide a scientific decision-making basis and implementation path for China's industrial upgrading and global competitiveness.

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References

- [1] LI Jinkai,Lv Jun,YE Jing. Urban spatial structure with efficiency and balance--an empirical study based on Chinese urban data[J]. Exploration of Economic Issues,2024,(02):176-190.
- [2] Dai H.H., Yang H.C.. Impact of spatial structure of Chinese city clusters on science and technology innovation[J]. Economic Geography,2023,43(12):36-47.
- [3] Zou Yang,Xue Lei,Shen Yun. Spatial structure of urban agglomerations and urban innovation capacity - Empirical evidence based on China's top ten national-level urban agglomerations[J/OL]. Science and Technology Progress and Countermeasures,1-11[2024-03-05].

- [4] Wang Yuanyu. Spatial reconfiguration of city clusters under the interaction of virtual agglomeration and geographic agglomeration--Mechanism exploration and empirical analysis[J]. Exploration of Economic Issues,2023,(12):143-159.
- [5] Wang Jianzhou,Huang Lei. An empirical test of digital industry penetration driving global value chain reconfiguration[J/OL]. Journal of Northwest University for Nationalities (Philosophy and Social Science Edition),1-17[2024-03-05].
- [6] SUN Shaoqin, ZHAO Yuting, ZHANG Xinyu. Study on the impact of trade facilitation level on the division of labor in global value chains--an analysis based on the perspective of production segmentation[J]. Journal of Southeast University (Philosophy and Social Science Edition), 2023, 25(05):64-77+147.