Proceedings of ICMRED 2024 Workshop: Identifying the Explanatory Variables of Public Debt and Its Importance on The Economy
DOI: 10.54254/2754-1169/96/2024MUR0088

Research on Economic Resilience Assessment and Improvement Strategies for Small and Medium-sized Cities and Specific Regions

Chenglong Yan[1,a,*]

[1]*School of Economics, Jiangxi University of Finance and Economics, Nanchang, Jiangxi, 330000, China*
a. jjtw112234@outlook.com
**corresponding author*

Abstract: In recent years, economic resilience has attracted much attention as an important concept in responding to external shocks. However, there are relatively few studies on the economic resilience of cities of different sizes, especially small and medium-sized cities and specific regions. This study analyzes the economic resilience of small and medium-sized cities and specific regions, explores the concept, influencing factors, and evaluation methods, and analyzed previous studies. Through the analysis of previous studies, this article discusses in detail the research results on the economic resilience of mega-cities, sub-provincial cities, and Northeast China, including data selection, method use, research results, and conclusions of related studies. This study provides a comprehensive evaluation and analysis of the economic resilience of small and medium-sized cities and specific regions and formulates corresponding improvement strategies. The research results on the economic resilience of megacities, sub-provincial cities, and the Northeast region provide important reference and guidance for policymakers in this field, and provide a basis for improving economic resilience and formulating urban development strategies.

Keywords: Economic Resilience Assessment, Specific Regions, Improvement Strategies, Small and Medium-sized Cities

1. Introduction

Given the state of the world economy today and the ongoing technological revolution, the transformation of China's economic operating model is particularly important. Following the reform and opening up, China has experienced rapid industrialization and urbanization and achieved remarkable economic achievements. However, as economic development enters a new normal, the traditional growth model driven by investment and exports is facing challenges, and it is necessary to shift to a high-quality development model that pays more attention to innovation, efficiency, and sustainability.

In this context, the theory of economic resilience offers a fresh analytical framework and theoretical support for the economic transformation of small and medium-sized cities. This theory emphasizes that in the event of outside shocks, the regional economic system should possess the capacity to maintain or improve the original economic operating model. At the same time, global

DOI: 10.54254/2754-1169/96/2024MUR0088

industrialization is pushing the boundaries of ecological resources ever further, increasing energy consumption and greenhouse gas emissions, and exerting tremendous strain on the planet as a whole. Extreme weather is increasing around the world, and natural disasters occur frequently. Conventional risk analysis and risk management are challenged significantly. Relying on single engineering for disaster prevention and emergency management is no longer sufficient. It is critically important to revise and enhance prevention strategies to support sustainable urban development. The "resilience concept" respects the uncertainty of the development of risks and disasters and highlights the systematic nature and long-term adaptability of cities. This approach meets the requirement and aids cities in managing uncertain risks, minimizing the adverse effects of disruptions, and securing long-term prosperity. Effective adaptive development provides new research ideas. Against this background, research on the economic resilience of small and medium-sized cities is particularly important. This kind of research provides a new perspective for analyzing and understanding the capacity of regional economies to withstand shocks from the outside. Economic resilience theory emphasizes that regional economic systems should have the ability to maintain or improve the original economic operating model when facing challenges, which is of great significance for guiding the sustainable development of small and medium-sized cities and improving their ability to resist risks.

The purpose of this article is to review the concept, influencing factors, and evaluation methods of economic resilience, and to explore the relationship between urban economic fluctuations and economic resilience through case analysis and quantitative model methods, to be able to better understand and evaluate the operating rules of the urban economy.

2. The Concept of Economic Resilience and Its Influencing Factors

2.1. Research on the Concept of Economic Resilience

The original definition of resilience comes from physics and is used to express the property of a material to restore its original configuration after being subjected to external deformation. Canadian biologist Holling first applied the concept of resilience to ecological research to express an ecosystem's capacity to restore its equilibrium after experiencing a disruption [1]. With the development of other disciplines, the concept of resilience is gradually introduced by some disciplines. The concept of engineering resilience is mainly used in the disciplines of mechanics and physics. It is assumed that the system only has a simple and single equilibrium steady state, which means that when the system returns to its initial state, the structure and function of the system do not change [2].

In urban studies, the idea of resilience is mainly used to deal with the risks caused by various disasters and climate change. When a city suffers external shocks from nature, the city's infrastructure system can respond to disasters, including the development of disaster reduction technologies. Application, provision of water, electricity, medical services, and other infrastructure, etc. [3]. Economic resilience is Applying resilience as a concept within an economic context. Since the 1980s, the economic development of various regions has been frequently impacted, and some regions have even fallen into economic recession. The international financial crisis that broke out in 2008 profoundly changed the economic development trends in many regions. When the financial crisis occurred, the response performance of different regions varied greatly. In some regions, the economy recovered rapidly and even exceeded the state before the crisis, but in some regions, it fell into a long-term recession [4].

2.2. Research on Factors Affecting Economic Resilience

Research results on the determinants of resilience in regional economies are quite rich. Swanstorm believes that the study of resilience needs to consider administrative power, and its impact has two

DOI: 10.54254/2754-1169/96/2024MUR0088

sides [5]. On the one hand, the solidification of the system will hinder the adjustment of regional economic structure and industrial modernization and enhancement, but on the other hand, a highly centralized government will also contribute favorably to helping the region get out of the economic crisis and promote industrial transformation and upgrading. Many facts have also proved that regardless of Whether in response to the economic crisis or in the industrial transformation and upgrading of depressed areas, administrative power is a very important influencing factor.

In terms of organizational structure, Hassink believes that knowledge networks and social capital will lead to cognitive lock-in, which is not conducive to the transformation and innovation of regional thinking, but it is the source of regional adaptability [6]. First, he conducted a study on Daegu, South Korea's "textile capital", and found that in the 1980s, due to cognitive lock-in, Daegu did not notice the emergence of other competitors led by China, and failed to carry out industrial transformation in time, which eventually led to the dominance of the industry. decline, and the local economy suffered a severe decline.

In terms of industrial structure, Martin et al. believe that a varied industrial configuration can Lessen the severity of the crisis on the region and play a positive role in reducing unemployment and maintaining stable economic development [7]. Once the leading industries in a region with a single industrial structure are hit, it will be impossible to realize industrial transformation in the short term, and the economy will easily suffer a sharp decline. Davies examined the impact of the 2008-2010 economic recession on various European regions from the viewpoint of economic resilience. The results indicated that areas predominantly driven by the financial sector exhibited comparatively greater economic resilience, whereas regions primarily influenced by the construction and manufacturing sectors also demonstrated enhanced economic resilience.

Customs and culture affect the path dependence of the economic system, thereby affecting the level of economic resilience. Glaeser's research found that in some old industrial bases in the United States, local residents value job stability more, which has led to a conservative and closed regional culture, low innovation capabilities, and weak economic resilience [8]. In contrast, New York has a more dynamic entrepreneurial spirit and customs and culture, which better supports innovation and the transformation and upgrading of the economic system.

Relatively speaking, regions with more flexible enterprises have faster economic transformation and stronger economic resilience. Glaeser pointed out that in the 1950s, New York had a high degree of specialization in the textile industry. Due to its small scale, the transformation of enterprises was relatively flexible. Provide conditions for future economic transformation [9]. Looking back at Detroit, the industry is too single. After decades of development, the automobile industry has become a burden on the city's transformation and sustainable development, and eventually went bankrupt.

Regarding government policies and systems, scholars believe that regions with less government intervention, a high degree of marketization, a loose policy environment, and relatively complete protection of private property rights have stronger economic resilience. In his study of institutional innovation, Whitley pointed out that American-based entrepreneurialism can better unleash the entrepreneurial spirit, promote innovation vitality and technological progress, and has the strongest economic resilience. The resilience of government-enterprise cooperation, mainly in Germany and Northern Europe, is second to that of unionism, and the economic resilience of countries whose economic planning is government-led is poorer [10].

Christopherson et al. pointed out that the relative importance of each factor of regional resilience is different in different regions and at different times [11]. He believes that factors such as a strong regional innovation system; modern productive infrastructure (such as transportation, communications, etc.); an innovative workforce with diverse skills; a sound and reasonable financial system; a diversified economic foundation that does not rely on a single industry for the long term Affecting regional resilience.

DOI: 10.54254/2754-1169/96/2024MUR0088

3. Economic Resilience Assessment Research Methods

3.1. Indicator Evaluation Method

The indicator evaluation method refers to Assessing economic resilience through the development of an indicator system that measures resilience levels. The indicator evaluation method usually divides economic resilience into multiple dimensions selects several indicators, and then combines it with indicator weighting methods, multi-attribute decision-making methods, etc. There is currently no unified standard for dividing the dimensions of economic resilience and selecting indicators. Some scholars build an indicator system from dimensions such as resistance, adaptation, and evolution based on the conceptual framework of economic resilience. Some scholars also build an indicator system based on the components of the economic system, from finance and enterprises. Build an indicator system from dimensions such as innovation, and governance.

Two highly recognized indicator systems are the Rockefeller Foundation's indicator system (CRF/CRI) and the State University of New York Regional Institute's indicator system (RCI). The CRF system and the RCI system are mainly used to evaluate resilience, but both set economic resilience as one of the main dimensions and selected corresponding evaluation indicators. For example, the CRF system constructs an evaluation index of economic resilience based on seven key attributes of the economic system and evaluates it from the aspects of individuals, enterprises, local governments, and knowledge networks. The RCI system can be divided into 3 evaluation dimensions, with a total of 12 evaluation indicators, namely: economic ability, social population, and community connectivity. RCI evaluates the level of economic resilience mainly from four aspects: income fairness, diversification of industrial structure, affordability of cost of living, and business environment. It is divided into extremely high, high, medium, low, and extremely according to the level of economic resilience.

3.2. Case Study Method

The case study procedure is a qualitative research tool that utilizes detailed scrutiny of distinct cases to grasp complex phenomena extensively. In the study of the economic resilience of small and medium-sized cities, the case study method can reveal the city's coping mechanism, decision-making process, and community participation when facing economic shocks. Researchers first need to select representative or typical small and medium-sized cities as research objects, and then collect data through field surveys, interviews, document analysis, etc. During the analysis process, qualitative analysis methods such as thematic analysis and content analysis were used to systematically organize and interpret the collected data. Finally, the researchers extracted key economic resilience factors and strategies from the case analysis to provide a reference for other small and medium-sized cities.

3.3. Quantitative Model Method

The quantitative modeling method is a quantitative research method that analyzes data and predicts results by establishing mathematical models. In the study of economic resilience in small and medium-sized cities, quantitative modeling methods can identify and quantify the essential elements affecting economic resilience, and evaluate the effects of different policies and strategies. During the research process, the researchers first determined the hypothesized factors affecting the economic resilience of small and medium-sized cities based on theory and previous research and then selected appropriate quantitative models, such as regression analysis, time series analysis, etc. Collect relevant statistical data and survey data as input to the model, estimate the model through statistical software, and analyze the degree and direction of the impact of different factors on economic resilience. Finally,

DOI: 10.54254/2754-1169/96/2024MUR0088

model verification and policy simulation, provide a basis for improving the economic resilience of small and medium-sized cities.

4. Analysis of Previous Research

4.1. Research on the Economic Resilience of Mega Cities

In a study by Kou, a comprehensive analysis was conducted on the economic resilience of seven megacities in China [12]. First of all, the selection aspects are comprehensive and reliable. The research data comes from the "Urban Statistical Yearbook", urban development plans, and national statistical bulletins of seven megacities from 2011 to 2020. Some data are taken from Chinese industrial enterprise data. The source of the data can be traced. The data time interval is consistent with the study period, and the data is relatively new, providing an accurate assessment of the economic resilience of megacities. But at the same time, some data come from different sources, which may lead to discontinuity and inconsistency in some data.

The research comprehensively uses methods such as the analytic hierarchy method, optimized entropy weight approach, game theory mixed weighting method, VIKOR method, and quadrant analysis method for evaluation and analysis. The combined use of these methods improves the comprehensiveness and reliability of the analysis. The literature research method was used to select the evaluation indicators, and based on the principles of acceptability, applicability, measurability, and availability, an initial evaluation index system for the economic resilience of megacities was constructed. The article does not detail the methodological steps and specific calculation processes used in the research process, resulting in a lack of reproducibility.

This study selected seven existing megacities in China as the research objects. These cities are Beijing, Tianjin, Shanghai, Guangzhou, Shenzhen, Chongqing and Chengdu. These seven cities are the most representative megacities in China. The research objects are representative and universal to a certain extent, which will help to improve the economic resilience of China's megacities. However, concurrently, the research is limited to China's megacities, and there is a lack of comparison and contrast with cities of other sizes or international megacities, which to a certain extent affects the broad applicability and generalizability of the research.

The study results are clear and conclusive, pointing out that Beijing, Shanghai, and Shenzhen are at a high economic resilience level, Guangzhou and Tianjin are at a medium economic resilience level, Chengdu is at a low economic resilience level, and Chongqing is at a low economic resilience level. The study did not conduct long-term trend analysis on the economic resilience of megacities, and the result was a lack of dynamic changes in time series, which may lead to a lack of comprehensive understanding of the economic resilience of megacities.

This study provides a comprehensive evaluation and analysis of the current level of economic resilience in China's seven megacities and formulates corresponding improvement strategies, which have strong guiding significance and operability. To ensure the applicability and implementation of strategic advice, this study designed a strategy formulation idea of "condensing characteristics - comparative analysis - revealing shortcomings - strategy formulation", using megacities with high levels of economic resilience as the benchmark to condense characteristics, and through comparative analysis Reveal the shortcomings of each megacity's evolutionary characteristics and trends in economic resilience, and then formulate strategies for improving economic resilience in each megacity based on the shortcomings.

4.2. Urban Economic Fluctuations and Economic Resilience

Starting from data from 2015 to 2018, Ji conducted an in-depth analysis of the economic fluctuations and economic resilience of fifteen sub-provincial cities in China using methods such as cluster

DOI: 10.54254/2754-1169/96/2024MUR0088

analysis, spatial data exploration, econometrics, and fuzzy comprehensive evaluation [13]. Through analysis, the correlation between economic fluctuations and the economic primary level in Chinese cities was discovered. It also revealed that the result of technological innovation on economic resilience has a regional effect that decreases from east to west and is more significant in cities with higher regional GDP rankings. scale effect.

The principal data for this analysis consisted of economic statistics from fifteen sub-provincial cities in China, from 2015 to 2018, which served as the research subject. The research data includes indicators of economic volatility and economic resilience in these cities over this period. The data selection is representative and covers the economic conditions of different regions and types of cities in China. This study used cluster analysis, spatial data exploration, econometrics, fuzzy comprehensive evaluation, and other research methods to conduct an in-depth study of urban economic fluctuations and economic resilience from the macro and micro levels by combining theoretical analysis and empirical research.

The research objects are fifteen sub-provincial cities in China, with the period from 2015 to 2018. The cities involved are Shenzhen, Guangzhou, Hangzhou, Nanjing, Qingdao, Xiamen, Ningbo, Wuhan, Chengdu, Xi'an, Jinan, Changchun, Dalian, Harbin, and Shenyang. These cities represent typical situations of different regions and types of cities in China.

The research results show that between 2000 and 2018, the degree of economic fluctuations in Chinese cities has generally slowed down and the primary economy has strengthened, but there are huge differences between cities. The economic growth rate of municipalities, provincial capitals, and cities under separate state planning fluctuates relatively little, and their resilience is relatively good. Generally, the economic growth rate of prefecture-level cities fluctuates relatively greatly, and the economic resilience is relatively poor. Changes in the proportion of investment, foreign trade, secondary industry, and science and technology input in the urban economy have the effect of increasing economic fluctuations. Changes in the proportion of consumption and the young adult population have an impact on the economy by restraining fluctuations.

In the context of medium-to-high-speed growth, China's urban economic fluctuations show a negative correlation with the overall primary economy. If the economic fluctuation is small, the economic basic level will be good; if the economic fluctuation is large, the economic basic level will be poor. The effects of technological innovation on economic resilience have a regional effect that decreases from east to west and a more significant scale effect for cities with top regional GDP rankings. The dynamic panel model was employed to analyze the enduring effects of urban economic resilience, revealing that it exhibits significant inertia. To sum up, this study provides a comprehensive and in-depth analysis of China's urban economic fluctuations and economic resilience, which is highly significant for understanding the operating rules of China's urban economy. However, although this study provides valuable insights into China's urban economic fluctuations and economic resilience, there is still room for improvement in data quantification and theoretical mining.

4.3. Paths and Strategies for Building Economic Resilience in Northeast China

Zhang aims to study the definition, manifestations, and formation mechanisms of regional economic resilience, taking the economy of Northeast China as the research object [14]. The research uses the panel regression method and spatial econometric model to deeply analyze the current development status and major existing problems from four aspects: industrial system, spatial structure, technical capabilities, and trade system. Combining the economic characteristics, problems, and causes of the Northeast region, the path and strategy for building economic resilience in the Northeast are proposed. Through this study, a series of important conclusions were drawn, and constructive opinions and suggestions were put forward for the economic revitalization of the Northeast region. This study selected panel data from 34 cities at or above the prefecture level in the Northeast from 2009 to 2017.

DOI: 10.54254/2754-1169/96/2024MUR0088

This is a representative sample that can comprehensively reflect the economic development of the Northeast, making the conclusion more convincing.

This study adopted two methods: panel regression method and spatial econometric model. These two methods can comprehensively examine the determinants of regional economic resilience and can provide more accurate results, greatly improving the credibility of the study.

The object of this study is the economy of Northeast China, especially the economies of Liaoning, Jilin, and Heilongjiang provinces. These three provinces represent the main economic conditions in Northeast China, so it is reasonable to choose them as research objects.

Panel regression results show that increasing the extent of industrial agglomeration, regional innovation level, and spatial quality will help improve regional economic resilience, while increasing openness will reduce regional economic resilience. This conclusion offers valuable guidance for the future economic growth of Northeast China and suggests a viable development strategy. The regression results of cities of different sizes and types show that the impact of industrial agglomeration and regional innovation level in large cities on economic resilience is much higher than that of small and medium-sized cities, while spatial quality has a positive impact on the economic resilience of large cities and has an impact on small and medium-sized cities. Not significant. This provides clear directions and strategies for urban development in Northeast China.

The analysis results of the spatial econometric model show that industrial diversification has improved local economic resilience, but the impact on surrounding areas is not significant. Industrial specialization has participated in improving the economic resilience of local and surrounding areas, allowing it to better leverage its competitive advantages, optimize resource allocation, and create economies of scale. This conclusion provides strong support for the industrial structure adjustment in Northeast China. The results have practical guiding significance and give helpful advice and recommendations. for the economic revitalization of Northeast China.

Although this study has certain advantages in method and data selection, there are still some limitations in practical application. To further improve the research, in the future, it can dig deeper into the influencing factors that have not been taken into consideration, and propose more practical and feasible suggestions based on policy analysis, to better guide the economic revitalization and development of the Northeast region.

5. Conclusion

This study analyzes the concept of economic resilience and its evaluation methods in detail through a literature review and case analysis. Research results show that the economic resilience of small and medium-sized cities is affected by multiple factors such as industrial structure, administrative strength, innovation capabilities, and knowledge networks. In particular, administrative strength and industrial structure optimization are key factors in improving economic resilience. In addition, this study found that the city's innovation capabilities and the construction of knowledge networks also have a significant impact on enhancing economic resilience.

Compared with the existing literature, this study not only verifies the influencing factors of economic resilience in small and medium-sized cities but also demonstrates the differences in the performance of these factors among different cities, thus providing further empirical support for the economic resilience theory. These findings enrich the application scope of economic resilience and highlight how specific factors specifically contribute to the improvement of economic resilience in the context of small and medium-sized cities.

However, this study also has some limitations. For example, the selection of study samples may be biased, and some data rely on publicly released statistics, which may affect the generalizability and accuracy of the results. Therefore, future research should consider using a wider urban sample and more diverse data sources to improve the representativeness and accuracy of the study.

DOI: 10.54254/2754-1169/96/2024MUR0088

Future research can be deepened and expanded in the following aspects: first, the relationship between economic resilience and other socioeconomic indicators (such as quality of life, and environmental sustainability) can be explored; Secondly, further study on how specific policy measures can effectively improve the economic resilience of specific cities or regions; Finally, the dynamic changes and strategic adjustments of economic resilience in different economic cycles can be explored. From a practical perspective, this study provides specific recommendations for urban planners and policymakers. Optimizing the urban industrial structure, strengthening the role of administrative power in economic regulation, and promoting the development of innovation and technology are all effective strategies for improving urban economic resilience. In addition, building and strengthening the city's knowledge network is also an important way to promote economic resilience.

In summary, this study not only provides an in-depth understanding of the economic resilience of small and medium-sized cities but also provides theoretical basis and empirical support for future research and the formulation of urban economic development policies. It is hoped that the results of this study can contribute to the development of related fields and trigger more meaningful discussions on urban economic resilience.

References

[1] *Holling, C. S., Gunderson, L. H. (2002). Panarchy: understanding transformations in human and natural systems. Washington, DC: Island Pres.*

[2] *Gunderson, L H. (2000). Ecological resilience—in theory and application. Annual review of ecology and systematics, 31(1): 425-439.*

[3] *Berkes, F., Colding, J., Folke, C. (Eds.). (2008). Navigating social-ecological systems: building resilience for complexity and change. Cambridge University Press.*

[4] *Yiwen, S., Jiang, X. (2015). Urban resilience: Concept analysis based on international literature review. International Urban Planning, 30(2): 48-54.*

[5] *Swanstrom, T. (2008). Regional resilience: a critical examination of the ecological framework.*

[6] *Cho, M, Hassink, R. (2009). Limits to locking-out through restructuring: the textile industry in Daegu, South Korea. Regional Studies, 43(9): 1183-1198.*

[7] *Martin, R., Sunley, P., Gardiner, B., et al. (2016). How regions react to recessions: Resilience and the role of economic structure. Regional studies, 50(4): 561-585.*

[8] *Davies, S. (2011). Regional resilience in the 2008–2010 downturn: comparative evidence from European countries. Cambridge Journal of Regions, Economy and Society, 4(3): 369-382.*

[9] *Glaeser, E. (2013). Triumph of the city: How our greatest invention makes us richer, smarter, greener, healthier, and happier. New York, NY: Penguin Books, 10: 1726-3247.*

[10] *Zhang, Z. (2020). Research on regional economic resilience in Northeast China. Jilin University.*

[11] *Chong, P., Minhang, Y., Chaolin, G., et al. (2015). Progress in theoretical and practical research on regional flexibility. Journal of Urban Planning, 1: 84-92.*

[12] *Haoming, G., Pingyu, Z., Wenxin, L., et al. (2018). Comparison of the economic transformation process of China's old industrial cities based on evolutionary elasticity theory. Acta Geographica Sinica, 73(4): 771-783.*

[13] *Chenhuan, K. (2022). Research on the economic resilience of China's megacities. Central University of Finance and Economics.*

[14] *Liqun, L. (2002). Urban economic fluctuations and economic resilience. Dongbei University of Finance and Economics.*