

Research on the Impact of Cross-border E-commerce Comprehensive Pilot Zones on Urban Economic Resilience

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Abstract

Against the backdrop of prevailing trade protectionism and frequent global crises, China's economy is undergoing a critical transition from rapid growth to high-quality development. Economic resilience reflects the ability of a country or region to restore economic growth and forge a new pattern of development after suffering external shocks. Therefore, studying the factors influencing economic resilience can provide references for China to achieve high-quality development. Meanwhile, the pilot cities for cross-border e-commerce comprehensive pilot zones have basically achieved nationwide coverage. the State Council has approved the construction of eight batches of cross-border e-commerce comprehensive test zones, forming an open pattern of "East-West two-way mutual aid, land and sea linkage". Based on this context, this paper explores whether the policy of cross-border e-commerce comprehensive pilot zones can effectively enhance urban economic resilience.

This paper first reviews the literature on the impact of cross-border e-commerce comprehensive pilot zones on urban economic resilience. It then uses theories such as transaction costs, path dependence, and growth poles as the theoretical foundation to analyze the mechanisms through which the policy of cross-border e-commerce comprehensive pilot zones affects urban economic resilience. Subsequently, it briefly elaborates on the establishment and institutional system of the cross-border e-commerce comprehensive pilot zones. Based on the research conclusions and relevant theoretical analysis, countermeasures and suggestions are proposed from aspects such as improving the development mechanism of cross-border e-commerce comprehensive pilot zones, strengthening the introduction and cultivation of professionals, and optimizing the spatial layout of the cross-border e-commerce comprehensive pilot zones.

Keywords

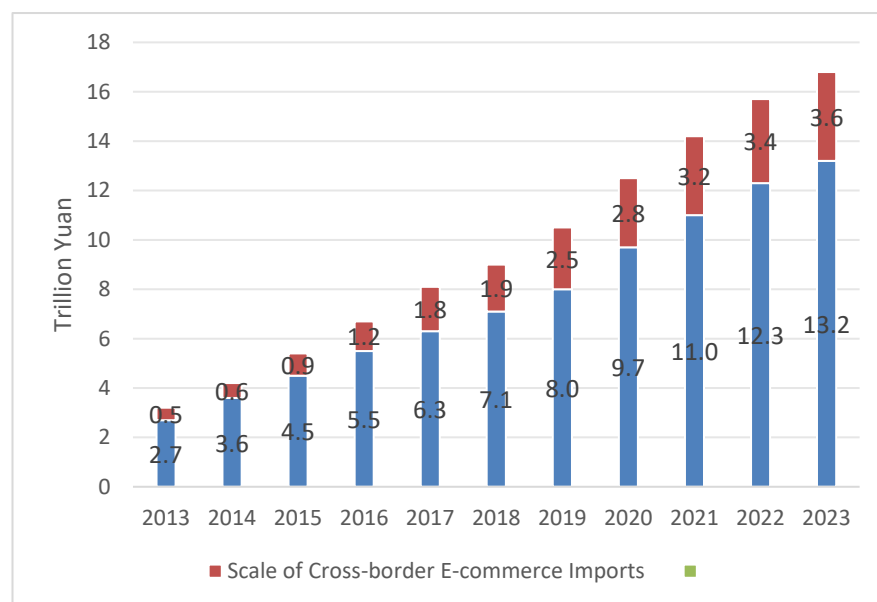
Cross-border e-commerce comprehensive pilot zone; Economic resilience; Policy evaluation

1. Introduction

1.1. Research Background

Amid global trade deceleration and rising protectionism, China's cross-border e-commerce (CBEC) has become a structural driver of trade growth, with total transaction volume reaching CNY 16.85 trillion in 2023 (+7.3%). Since 2015, Cross-Border E-Commerce Comprehensive Pilot Zones (CPZs) have expanded into a nationwide institutional experiment aimed at trade facilitation and supply chain resilience. This paper investigates whether CPZs contribute to urban economic resilience a key policy priority under China's shift toward high-quality, shock-resistant development.

Figure 1. Scale and structure of China's cross-border e-commerce business (trillion yuan)



Data compiled from: iFinD and CIB Research Institute

The rapid rise of cross-border e-commerce is closely linked to strong national policy support. The establishment of Cross-Border E-commerce Comprehensive Pilot Zones represents a significant institutional innovation by China to promote the transformation and upgrading of foreign trade and build a new open economy system in the digital era. As national-level strategic platforms, these pilot zones have become a key lever for constructing a new development paradigm. Since the establishment of the first comprehensive test zone in Hangzhou in 2015, the State Council has approved the establishment of eight comprehensive test zones in seven batches, covering major foreign trade node cities in the country, fully reflecting the regional development strategy of "point to area". Under the background of the rise of global trade protectionism, the comprehensive test areas are also required to enhance the ability of risk prevention and control, and enhance the resilience of the industrial chain and supply chain. In the future, the country will continue to give full play to the role of cross-border e-commerce comprehensive test area and foster new momen-

tum of foreign trade.

Against the backdrop of rising global trade protectionism, these pilot zones are also required to enhance their risk prevention and control capabilities and strengthen the resilience of industrial and supply chains. In the future, the country will continue to fully leverage the role of the Cross-Border E-commerce Comprehensive Pilot Zones to cultivate new drivers for foreign trade.

Meanwhile, against the backdrop of rising global economic uncertainties, economic resilience has emerged as a core issue for urban sustainable development. The report of the 20th National Congress of the Communist Party of China explicitly put forward the strategic requirement to "enhance the resilience and security of industrial and supply chains," which was further underscored by the 2024 Central Economic Work Conference emphasizing that "we must focus on enhancing economic resilience." In this context, exploring effective pathways to enhance urban economic resilience carries significant strategic importance.

From a theoretical perspective, scholars have extensively explored both urban economic resilience and the impact of Cross-border E-commerce Comprehensive Pilot Zones (CBEC CPZs). The conceptual understanding of urban economic resilience has evolved from notions of single or multiple equilibria towards dynamic adaptation, while its measurement has shifted from process-based to state-based approaches. Key factors identified as influencing urban economic resilience include technological innovation and industrial structure. The establishment of CBEC CPZs is recognized to facilitate coordinated regional development through the demonstrative effect of institutional innovation and the resource reallocation effect. Although existing studies have yielded valuable theoretical insights, the specific mechanisms and pathways through which CBEC CPZs influence urban economic resilience, as well as the heterogeneous effects across different urban contexts, require further in-depth investigation.

1.2. Research Significance

Theoretical Significance. First, it enriches the theoretical framework concerning Cross-border E-commerce Comprehensive Pilot Zones (CBEC CPZs) and urban economic resilience. Through empirical analysis of the impact of CBEC CPZs on urban economic resilience, this study will provide new perspectives and insights for the theoretical system linking the two, thereby enriching the research content of relevant theories. It aims to deepen the academic understanding of the roles these two factors play in economic development, augment the body of knowledge in related research fields, broaden research perspectives, and refine the theoretical analytical framework.

Practical Significance. First, it provides strategic guidance for cities seeking to enhance their economic resilience. The findings will assist municipal governments in identifying and leveraging CBEC CPZ policies to formulate effective strategies for improving urban economic resilience and strengthening the capacity to withstand

external shocks. Second, it offers reference for corporate market decision-making. This research will help businesses understand the potential impact of CBEC CPZ policies on their operations, providing a basis for market decisions and strategic planning. Third, it promotes industry-academia-research collaboration. The study seeks to advance both research and practice in the field of cross-border e-commerce, facilitating resource sharing and knowledge innovation.

2. Literature Review and Related Concepts

2.1. Definition of Core Concepts

2.1.1. Cross-border E-commerce Comprehensive Pilot Zone

China's Cross-border E-commerce Comprehensive Pilot Zones (CBEC CPZs) are designated urban areas established by the Chinese government to function as pilot zones for comprehensive cross-border e-commerce initiatives. Their primary objective is to conduct trials and experiments in various aspects, including technical standards, business processes, regulatory models, and IT infrastructure development for key segments such as cross-border e-commerce transactions, payments, logistics, customs clearance, tax rebates, and foreign exchange settlement. Through institutional innovation, management innovation, service innovation, and coordinated development, these zones aim to address deep-seated conflicts and systemic challenges hindering the development of cross-border e-commerce. The goal is to foster a complete industrial chain and ecosystem for cross-border e-commerce, gradually forming a set of management systems and rules that adapt to and lead the global development of cross-border e-commerce, thereby providing replicable and scalable experience for promoting the healthy development of China's cross-border e-commerce.

The CBEC CPZ policy encompasses the "Six Major Systems," covering cross-border transactions, integrated logistics, industry supervision, tax policies, financial support, and data security. These systems work towards achieving information integration, information resource sharing, and regional coordinated development. Concurrently, the policy involves building "Two Major Platforms": an online "Comprehensive Cross-border E-commerce Service Platform" and offline "Comprehensive Cross-border E-commerce Industrial Parks." This combined online-offline platform approach covers all processes of the cross-border e-commerce industry, creates a complete industrial and supply chain for cross-border e-commerce, resolves institutional barriers to industrial development, and ensures the stable growth of the cross-border e-commerce industry within the pilot cities.

2.1.2. Urban Economic Resilience

The city represents the most complex ecosystem in contemporary human society. Its economic, political, and cultural dimensions are in constant flux over time and

are frequently subjected to various sudden disruptions. Consequently, the inherent complexity of cities aligns well with the concept of "resilience." Current economic scholarship primarily categorizes definitions of resilience into the following three types.

The first is engineering resilience, which originated in physics, architecture, and mechanics. After its introduction into economics, this perspective primarily focuses on the magnitude of external shocks an economic system can withstand and its ability to quickly return to its pre-shock state of economic development. It assumes the economic system possesses a specific equilibrium state. When a shock occurs, causing a deviation from this equilibrium, the time it takes for the economy to return to its pre-shock equilibrium (the ex-ante equilibrium) based on its inherent restorative capacity is defined as engineering resilience. Higher engineering resilience implies a greater capacity to withstand shocks and a shorter recovery time.

The second is ecological resilience, a concept first proposed in 1973 by Canadian scholar Holling, who introduced resilience thinking into ecology. This concept initially integrated resilience with hysteresis and multiple equilibria in economics, breaking away from the single-equilibrium definition of engineering resilience. It posits that a resilient system can have multiple equilibria—various stable states. Such a system has a maximum absorption threshold—a "bounce-back threshold"—for disturbances. If this threshold is exceeded, the resilient system may upgrade, degrade, or remain at a similar level, eventually settling into a new equilibrium state. This bounce-back threshold represents ecological resilience, denoting the maximum impact the system can absorb before transitioning to a new equilibrium. Stronger absorption capacity indicates higher ecological resilience, and vice versa.

Urban development is a complex process of actively seeking transformation and progress, where a specific equilibrium state is difficult to maintain long-term. Furthermore, China's Outline of the 14th Five-Year Plan and the Long-Range Objectives Through 2035 explicitly calls for building resilient cities that develop across multiple dimensions. Synthesizing the above, this study draws on the perspectives of these scholars and adopts the concept of evolutionary resilience. Accordingly, urban economic resilience is defined as the capacity of an urban economy, as the primary entity, to adjust across three dimensions when facing major external shocks: resistance and recovery capacity, adaptation and adjustment capacity, and transformation and development capacity, thereby coping with the shock and achieving long-term sustainable development.

2.2. Literature Review

2.2.1. Research Related to CBEC CPZs

CBEC has emerged as a primary transaction model in 21st-century international trade, attracting considerable academic interest. This section reviews literature from two perspectives: the importance and development pathways of cross-border

e-commerce, and the policy effects of Cross-border E-commerce Comprehensive Pilot Zones (CBEC CPZs).

Driven by information technology and the digital economy, cross-border e-commerce has significantly contributed to economic growth. Scholars widely recognize its benefits. Terzi (2011) found that it enhances a country's overall economic strength, with developing nations benefiting from prolonged industry dividends, market expansion for SMEs, industrial optimization, and job creation. Kauffman (2001) highlighted its simplified processes and access to diverse partners as sustainable drivers for international trade. Zhang Li (2018) quantified its macroeconomic contribution, showing that transaction growth boosts per capita GDP and regional coordination. Ma Shuzhong (2023) emphasized its influence on China's foreign trade patterns, while Sun Li (2023) noted long-term improvements in export quality and the cultivation of a dual circulation development pattern. Zhao Xiaohan (2021) linked it to streamlining transactions and empowering the international cycle, and Shi Benye (2023) underscored its role in enhancing export stability for Chinese firms. Ni Yining (2023) pointed to its ability to spur innovation by easing financing constraints and intensifying market competition.

To address trade barriers and promote industry development, the Chinese government has established a policy system focusing on regulation, transactions, platforms, and services. Jing Guowen (2023) argued that CBEC CPZs attract foreign direct investment via human capital agglomeration and business environment optimization, though effects vary regionally. Yue Zhonggang (2023) viewed them as a pathway to trade strength, expanding import-export scale and boosting enterprise agglomeration, IT infrastructure, and logistics. Zhang Bingbing (2023) considered them an institutional innovation with radiating effects that synchronize economic cycles across regions. Shi Yaru (2023) found they foster integrated manufacturing-service formats and enhance enterprise innovation through net growth. Liu Yurong (2023) observed that policy effects strengthen over time, particularly boosting high-end producer services and urban industrial transformation.

Current research affirms the positive role of CBEC CPZs in promoting agglomeration, trade, and innovation. However, significant disparities among pilot cities and insufficient policy differentiation limit potential. Some areas also exhibit strong coupling but low coordination in relevant indicators.

2.2.2. Research Related to Urban Economic Resilience

Urban resilience has evolved from a theoretical concept into a multidimensional research focus. The following section reviews its conceptual development, measurement approaches, and influencing factors—particularly the role of cross-border e-commerce.

Conceptual evolution traces back to biology, later merging with spatial economics. Reggiani et al. (2002) introduced the "resilient city" as a system capable of with-

standing and recovering from external shocks. Hill (2012) further defined urban economic resilience as the ability to maintain stability amid shocks, suggesting an equilibrium state. Additionally, Christoph Hauser et al. (2007) emphasized that industrial diversification allows resilient cities to absorb sector-specific shocks, thereby stabilizing regional economies.

Measurement methods mainly include comprehensive indicator systems and single-indicator sensitivity analysis. Scholars adopting the comprehensive approach often disagree on indicators. Economists such as Briguglio et al. (2006) advocate multidimensional metrics—e.g., industrial structure and labor security (Ubago, 2019). Similarly, Xu Meixin (2023) proposed evaluating resilience through development strength, recovery capacity, and innovation potential. In contrast, geographic studies favor spatial frameworks like the scale-density-form model (Wang Wenrui, 2021), while single-indicator approaches (e.g., GDP growth) enhance cross-regional comparability (Zhao Jianji, 2023).

Influencing factors highlight the underexplored role of cross-border e-commerce. Studies show it strengthens resilience through industrial digitization and enterprise upgrading (Wang Tian, 2023). For example, Cao Xianna (2021) found e-commerce enhances firm-level resilience via R&D and strategic adaptation, while Liu Yurong (2023) demonstrated its agglomeration effects boost industrial upgrading and regional innovation. Similarly, rural e-commerce policies expand markets and attract enterprises, raising regional resilience (He Peijun et al., 2023). Comparatively, other industries—such as finance and logistics—also support resilience through scale expansion and industrial synergy (Liu Li et al., 2020; Chen Lianghua et al., 2023).

In summary, urban resilience is assessed through diverse frameworks, with cross-border e-commerce emerging as a significant catalytic factor. Further research may focus on its policy mechanisms and spatial spillover effects.

2.2.3. Research on the Impact of CBEC CPZs on China's Urban Economic Resilience

In recent years, with the gradual development of cross-border e-commerce, the policy effects of the Comprehensive Pilot Zones (CBEC CPZs) have begun to show results. However, while no literature directly addresses the relationship between CBEC CPZs and economic resilience, the correlation between cross-border e-commerce and regional economic growth has received widespread attention and study.

Li Yongjian (2014) conducted an in-depth analysis of the relationship between cross-border e-commerce and economic growth across multiple levels. At the micro level, cross-border e-commerce significantly enhances consumer shopping efficiency by simplifying processes and enriching product choices, thereby increasing consumer expenditure. Simultaneously, for enterprises, it leverages the advantages of internet platforms to reduce transaction costs and improve market competitiveness.

At the meso level, cross-border e-commerce promotes the adjustment and optimization of enterprise scale, drives the development of related industries, and positively impacts import and export trade. At the macro level, through economies of scale and the consumption multiplier effect, it effectively stimulates overall economic growth. Wang Chaoxian (2016) provided a profound analysis of the role of cross-border e-commerce from the perspective of the circulation system, offering significant insights for understanding its relationship with economic growth. Based on China's cross-border e-commerce transaction volume, import-export trade volume, and GDP data from 2008 to 2020, Wang Xiaohan (2023) employed a VAR model for an empirical study on the relationship between these three variables. The findings revealed that cross-border e-commerce significantly promotes economic growth, and a long-term equilibrium relationship exists among them.

Concurrently, a limited number of studies have explored the impact of other special zones approved by the state on economic resilience. Kong Lingcheng and Chai Zeyang (2021) investigated the impact of the upgrade of development zones on urban economic efficiency. The empirical results indicated a significant effect, but further analysis showed that development zones primarily promote urban development through the mediating role of enterprise entry. Heterogeneity analysis was also conducted from perspectives such as policy intensity and government efficiency. Sun Hongxue and Zhu Jinhe (2023), through empirical research, found that the establishment of Pilot Free Trade Zones (PFTZs) significantly enhances urban economic resilience, with this effect being persistent and conducive to long-term stable urban economic development. Wang Zhaofer and Zhou Juanmei (2023) studied whether the construction of National Independent Innovation Demonstration Zones (NIIDZs) improves urban economic resilience. They found that the establishment of NIIDZ pilots significantly enhances urban economic resilience, with heterogeneity tests revealing a stronger effect in central and northern inland cities compared to others.

In contrast, the relationship between Cross-border E-commerce Comprehensive Pilot Zones and economic resilience still lacks in-depth exploration. This study aims to fill this research gap and contribute new evidence regarding the relationship between the two.

2.2.4. Literature Review

First, the impact of cross-border e-commerce comprehensive pilot zones on urban economic resilience remains to be further empirically examined. As a new driver of global trade, cross-border e-commerce has increasingly become a focal point for research on economic resilience. Existing literature generally acknowledges that cross-border e-commerce plays an important role in enhancing urban economic resilience. Zhang Hua and Li Xiaoguang (2023) point out that cross-border e-commerce strengthens cities' shock-absorption capacity by promoting industri-

al upgrading and technological innovation. Wang Li and Zhao Qiang (2022) further emphasize the significance of cross-border e-commerce policies for improving urban economic stability and recovery, providing both theoretical foundations and empirical support for the present study.

Trade facilitation and economic-structure optimization. The implementation of cross-border e-commerce policies promotes trade facilitation, reduces logistics costs, and accelerates the circulation of goods. Simultaneously, cross-border e-commerce optimizes the economic structure, raises per-capita GDP, and fosters coordinated regional development. **Industrial agglomeration and foreign-trade promotion.** Policies in comprehensive pilot zones accelerate the aggregation of human capital and improve the business environment, thereby expanding foreign direct investment. The establishment of pilot zones not only enlarges the import-export scale of the host cities but also markedly promotes enterprise clustering, industrial clusters, information-technology construction, and the improvement of e-commerce logistics systems. **Enhancement of innovation capability.** The construction of cross-border e-commerce pilot zones creates a new business model integrating services and manufacturing, which has multidimensional effects on firms' innovation capacity. The innovation-promotion effect at the enterprise level in pilot cities stems from net growth generated by policy implementation. **Spatio-temporal heterogeneity of policy effects.** The policy effects of cross-border e-commerce pilot zones strengthen over time, with a more pronounced impact on high-end productive services. This effectively boosts the agglomeration and innovation capacity of the productive-services sector, thereby advancing overall urban innovation levels and industrial-structure transformation. **Coordinated regional economic development.** The establishment of cross-border e-commerce pilot zones represents a successful institutional innovation by the Chinese government to raise openness, serving as a window that radiates to surrounding regions and related industries, and promoting coordinated development across regions and sectors.

Second, the mechanisms through which cross-border e-commerce development influences economic resilience require further exploration. Although the positive impact of cross-border e-commerce on economic resilience has been partially confirmed, its specific mechanisms remain under-investigated. Yu Wei and Zhang Peng (2019) argue that the construction of regional economic resilience depends not only on external technological innovation but also on internal technological innovation, offering a new perspective on how cross-border e-commerce may affect resilience via internal innovation mechanisms. Moreover, studies on the resilience of industrial clusters indicate that technological innovation, relational governance, and market diversification constitute three crucial dimensions of regional resilience. These works provide a theoretical basis for understanding how cross-border e-commerce can influence economic resilience by promoting technological innovation, improving supply-chain relationships, and diversifying markets; however, the precise trans-

mission pathways and mechanisms still need to be validated through further empirical research. The literature examines the policy shock of establishing cross-border e-commerce comprehensive pilot zones-special city areas created by the state to advance cross-border e-commerce, where enterprises enjoy preferential policies and convenient services covering customs supervision, tax incentives, and logistics. Existing studies mainly explore the policy effects of these zones.

Macro-level: Wang Lirong and Rui Lili (2022) contend that the establishment of cross-border e-commerce pilot zones exerts a positive effect on economic growth. Yuan Qigang and Ji Yongsheng (2023) as well as Li Zhen and Zhao Chunming (2023) argue that the zones help stabilize labor and employment and boost urban entrepreneurial vitality. Meso-level: Scholars tend to investigate the impact from an industrial perspective. He Mei and Wang Yanmei (2023) and Yang Yiwen and Liang Qiye (2023) suggest that the construction of pilot zones facilitates the development of manufacturing and e-commerce industries and optimizes regional industrial-structure upgrading. Micro-level: Some researchers analyze the effects of pilot-zone development on firms, covering high-quality firm development (Zhou Kexuan et al., 2024), corporate environmental performance (Zhang Bingbing & Zhang Yewei, 2023), and firm innovation capability (Shi Yaru & Yu Jinping, 2023). Additionally, several scholars have found that the establishment of pilot zones significantly increases firms' cost premiums (Li Li et al., 2023).

3. Policy Recommendations

Expand the scope of cross-border e-commerce comprehensive pilot zones to fully leverage their economic-resilience benefits. First, building on the existing pilot zones, systematically summarize experiences related to the enhancement of technical standards across e-commerce stages, optimization of business processes, reform of regulatory models, and development of information systems. These insights should be codified into a unified, nationwide framework governing the development, operation, and management of cross-border e-commerce platforms, thereby extending the geographic coverage of pilot zones across the country. Second, treat the pilot-zone policy as a key instrument for strengthening economic resilience. Intensify tax-incentive measures for the zones, harness the role of cross-border e-commerce in facilitating the transformation and upgrading of traditional industries, and accelerate the cultivation of new industries and business formats. By reducing trade costs and improving employment structures, the zones can further enhance overall economic resilience.

Formulate differentiated cross-border e-commerce development policies aligned with local advantages and characteristics. First, designate cities with large foreign-trade volumes as central nodes of the pilot-zone network, exploiting their "window" effect to disseminate policy experiences to surrounding regions and to stimulate the formation of regional cross-border e-commerce industry clusters.

Second, existing pilot zones should capitalize on their advantages in policy integration, innovation, and early-stage experimentation. Boldly experiment with regulatory reforms, improvements to the business environment, and advances in information infrastructure, continuously exploring novel ideas and methods for cross-border e-commerce development. The outcomes can serve as demonstrative models for non-pilot areas.

Further strengthen the labor-aggregation effect of cross-border e-commerce pilot zones. First, improve labor-mobility mechanisms such as deepening household-registration reforms to smooth the flow of workers into the zones, thereby enhancing the channels through which labor transfer contributes to economic resilience. Second, establish comprehensive talent-management systems to ensure that the labor attracted by the pilot zones is efficiently converted into productive human capital. This will raise local innovation capacity, production efficiency, and industrial-transformation capability, ultimately promoting higher economic resilience.

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