International Journal of Modern Developments in Engineering and Science
Volume 4, Issue 3, March 2025
https://www.ijmdes.com | ISSN (Online): 2583-3138

The Degree of Marketization and Economic Resilience – Evidence from the Prefecture-Level City Level in China

Yang Liu*
School of English for International Business, Guangdong University of Foreign Studies, Guangzhou, China

***Abstract*: This paper constructs a panel two-way fixed-effects model based on the panel data of 275 cities in China from 2008 to 2018 to investigate the impact of the degree of marketization on economic resilience to help the world resist economic risks. The results show that there is a significant positive U-shaped relationship between the degree of marketization and economic resilience. Based on the data of China's marketization index, this paper finds that when China's degree of marketization is low, constrained by the imperfect construction of the market system, the government relaxes its "helping hand" to the market, which will weaken the economic resilience of the city. With the deepening of the marketization process, the government has deepened its self-revolution and loosened its "grabbing hand" on the market, which reduces the systemic transaction costs of enterprises, stimulates the vitality of enterprises, and strengthens the resilience of the city's economy. Therefore, the degree of marketization inhibits and then promotes economic resilience. In addition, the article provides practical suggestions on how to further promote the process of marketization and a better combination of "promising government" and "effective markets".**

***Keywords*: economic resilience, marketization process, government intervention.**

1. Introduction

In the context of the new era, the sudden epidemic has triggered a global crisis, and unilateralism and protectionism are rampant, bringing great challenges to the smooth development of the world economy. Facing the huge economic impact, the construction of international resilient cities has become an important issue. Under the impact of the epidemic, the basic development surface of China's economy, which is resilient, with great potential and long-term improvement, remains unchanged and has attracted extensive attention from scholars. So, what kind of economic "mystery" is hidden behind "China's strong economic resilience"? Since the reform and opening up, China has been steadily pushing forward the institutional changes of the marketization process, adjusting the intensity of the government's intervention of the "visible hand", promoting the development of the non-state economy, accelerating the factor allocation of market capital, and gradually accelerating the process of China's marketization. In recent years, despite the complex external environment continues to impact the development of China's cities, strong economic resilience is an important guarantee of China's stable economic development. It can be seen that the degree of marketization may become an important factor affecting China's economic resilience.

The term "resilience" usually refers to the ability of a system to recover after being disturbed (Martin et al., 2015) , urban economic resilience mainly refers to the fact that when cities are faced with shock disturbances, through the strong self-recovery and adjustment of the economy, they can quickly recover to the state before the economy was hit by the shock, or to realize a new state of economic growth. The government's action plays an important role in how to help cities better gather resources and enhance their comprehensive competitiveness. Since the reform and opening up of China, the Chinese government has been deepening the reform, promoting the government's self-revolution, deepening the market economic system, and promoting the good functioning of the Chinese economy.

So, does a continuous improvement in the degree of marketization have the effect of increasing the economic resilience of cities? What is the relationship between marketization and urban economic resilience? In the context of promoting high-quality economic development, how should countries around the world continue to enhance the resilience of their urban economies, improve their economic security and strengthen their economic resilience to external risks? In the current macro context, answering the above questions is crucial, and is of great significance for the world to continuously promote market-oriented reforms and prevent economic risks. Based on 275 cities in China from 2008 to 2018, this paper explores the relationship between the degree of marketization and urban economic resilience, and innovatively finds that there is a significant "positive U-shaped" relationship between the degree of marketization and urban economic resilience, i.e., the enhancement of the degree of marketization inhibits and then facilitates the impact of urban economic resilience. This is different from the existing research on the influence of economic resilience. This is different from the existing literature that examines the factors affecting economic

*Corresponding author: 2680858377@qq.com

resilience, as some existing studies have examined technological research and development (Dai & Liu, 2022; Feng & Su, 2022) , innovation and entrepreneurship (Bristow & Healy, 2018; Williams & Vorley, 2014) , industrial structure (Brown & Greenbaum , 2017; Cainelli et al., 2019)) and industrial structure (Brown & Greenbaum, 2017; Cainelli et al.), this paper focuses on how to further regulate the relationship between the government and the market from the perspective of "active government" in order to enhance the resilience of the urban economy.

The possible marginal contributions of this paper are mainly reflected in the following aspects: first, in terms of research perspective, this paper measures the impact of the degree of marketization on economic resilience from the perspective of urban economic resilience; second, in terms of research subject, this paper for the first time incorporates the degree of marketization and economic resilience into the same research framework, innovatively explores the relationship between the degree of marketization and economic resilience, and discusses the essence of the item-by-item reform policies, such as the reform of administrative reforms Third, on the research conclusion, this paper innovatively explores the relationship between the degree of marketization and economic resilience. Thirdly, in terms of research conclusions, this paper innovatively finds that there exists a significant "positive U-shaped" relationship between the degree of marketization and urban economic resilience, and profoundly explains the dual roles of the government's "assisting hand" and "grasping hand". " and discusses how the government should act to enhance economic resilience.

The article structure of this paper is as follows: the second part is the literature review; the third part is the theoretical foundations; the fourth part is the data sources and variables measurement; the fifth part is the econometric model and empirical analysis; and finally, the conclusions and insights.

2. Literature Review

A. Degree of Marketization

Market-oriented reform, as a kind of institutional mechanism reform for the transition from planned economy to market economy, is not just a simple change of several regulations, but a series of economic, social and legal system changes, and even a series of large-scale system changes (Fan et al., 2011). Market-oriented reform, as an important policy of national deregulation, has caused scholars to conduct in-depth discussions on its impact.

Related studies have found that deregulation can help increase employee returns, boost economic growth and improve industrial structure. In terms of corporate employee returns, Ferreira et al. (2021) find that deregulation will promote flatter firm hierarchies and boost overall employee wages based on a quasi-natural experiment on full deregulation in Portugal using private firms and detailed employer-employee linkage data. Fernandes et al. (2014) design a quasi-natural experiment based on full entry deregulation reforms in Portugal, using Portuguese employer-employee matching data and find that deregulation will increase product market competition and raise the returns to employees' university degrees and skills. In terms of economic growth, Eliasson (1991) examines the importance of deregulation for structural diversity and competition and finds that entry into successful firms completely dominates the long-run performance characteristics of the economy, a phenomenon that is not conducive to long-term economic growth. Therefore, by vigorously pursuing innovation and competition, stable long-term macroeconomic growth can be achieved. In terms of industrial structure improvement and restructuring, Aghion et al (2008) based on India's deregulation of licensing of registered manufacturing industries in states with different labor market conditions (License Raj) found that deregulation led to better industrial development in employer-friendly labor market environments than in employee-friendly labor markets. Ji (2020) based on 1999-2015 panel data of prefecture-level cities, using the double difference method, found that the reform of administrative approval system helps to promote the upgrading of regional industrial structure. The main mechanism is that administrative approval reform promotes industrial structure upgrading through two ways: reducing institutional costs and resource mismatch.

Academics have long explored how to accurately measure the impact of government deregulation in the transition process. The European Bank for Reconstruction and Development (EBRD) has developed transition indicators based on a comprehensive assessment of 27 transition countries in various dimensions, such as enterprise reform, price liberalization, privatization, etc. However, due to the differences in the paths of transition of different countries, the results of the assessment of this indicator are not yet uniform. Specifically for China, some scholars have used the proportion of state-owned workers in employment, the proportion of state-owned investment in fixed assets, or the proportion of state-owned industrial enterprises' output value in total industrial output value to roughly measure the impact of market-oriented reforms (Fan et al., 2011). However, the above proxies are relatively one-sided and cannot fully reflect the impact of the radical changes brought about by market-oriented reforms.

This paper adopts the Fan Gang Marketization Index (FGMI) to measure the degree of marketization. Specifically, the FGMI consists of five indices that fully reflect a particular aspect of marketization in each prefecture-level city, namely, the relationship between the market and the government, the development of the non-state economy, the development of the product market, the development of the factor market, the development of the intermediary market organizations, and the maintenance of the legal system environment. (Fan et al., 2011). Fan's marketization index is a more comprehensive measure of the marketization process and a more complete and objective assessment of the impact of marketization changes on the market in many aspects.

B. Economic Resilience

As an important indicator of a country's ability to withstand external shocks and make dynamic economic adjustments, the study of economic resilience is of great significance in the post-

pandemic context. Martin et al. (2015) defined economic resilience based on four main aspects: the sensitivity of cities to shocks, the resilience of cities to shocks, the ability of cities to adjust and integrate resources to shocks, and the ability of cities to open up a new path of economic growth. The definition of economic resilience is accepted by most scholars.

For the research on the influencing factors of economic resilience, scholars focus on the themes of innovation and entrepreneurial vitality, industrial structure, and human capital level. Bristow & Healy (2018) based on the comparison of the speeds of European regions during the recovery from the economic crisis in 2007-2008, emphasize the role of innovation in facilitating the rapid recovery of the economy from shocks, and argue that the ability to innovate is an important factor in enhancing the resilience of brokers. important factor. Iacobucci & Perugini (2021) A quantitative analysis of entrepreneurial ecosystems in Italian provinces found that entrepreneurial ecosystems at the local level help to stimulate entrepreneurial dynamism, promote the establishment and formation of more new firms, and help to enhance the economic resilience of Italian provinces. Williams & Vorley (2014) Through a review of the literature related to economic resilience) and interviews with policy makers in the Sheffield City Region in the UK, found that entrepreneurship plays an important role in sustaining the city's economic vitality, and that entrepreneurs are critical to the restructuring and adaptation of the regional economy. Brown & Greenbaum (2017) Explore the relationship between state unemployment rates and industrial diversity in Ohio, based on data from the Bureau of Labor Statistics for the period 1977-2011. The study finds that regions with a higher degree of industrial diversity have higher employment recovery rates and greater economic resilience in the face of economic shocks. Cainelli et al. (2019) study the relationship between industrial relevance and economic resilience in the EU region during the recovery from the economic crisis of 2008-2012, focusing mainly on industrial technological relevance as well as vertical relevance of industry. It is found that the stronger the industrial technology correlation, the more it helps to enhance the economic resilience of the region in the short term. Hu & Zhang (2022) conducted a study using 41 prefecture-level and above cities in the Yangtze River Delta region from 2003 to 2019, and found that educational human capital can affect the industrial structure of the cities through the synergistic innovation effect and the labor mobility effect, which ultimately affects the economic resilience.

In the process of recovery and growth of urban economy, it is necessary to give full play to the role of government regulation and market supply, for the current stage of China's economic system, the allocation of market resources is mostly decided by the government (Lu & Teng, 2023), so the degree of government intervention in the market has an important impact on the economic resilience. However, most of the existing literature on factors affecting economic resilience focuses on the impacts of government policies on the economy through industrial and innovation effects, and fewer studies have examined how the government's actions affect the economic resilience of cities from the perspective of a "government with a purpose". Secondly, less literature has incorporated the theme of marketization process and economic resilience into the same research framework to study the impact of government policies on economic resilience during the period of economic transition. Finally, most of the literature focuses on the factors affecting the economic resilience of cities, and less of the literature is based on the perspective of evolutionary economics to explore in-depth how the government's actions can help to promote the improvement of the economic resilience of cities and the high-quality development of the economy. In view of this, this paper takes 275 cities in China from 2008 to 2018 as the research object, constructs a panel two-way fixed-effects model, and focuses on the impact of "active government" on "efficient market", in order to explore the impact of the degree of marketization on the economic resilience of cities, and to provide an opportunity for countries around the world to build a resilient city. The study focuses on the impact of "competent government" on "efficient market", in order to investigate the impact of marketization on the economic resilience of cities, and to provide powerful advice for countries around the world to build resilient cities.

3. Theoretical Foundations

Correctly handling the relationship between the government and the market is the key to promoting national economic development, and it is also a difficult issue in the practice of economic development in various countries. Promoting the in-depth combination of "active government" and "effective market" and regulating the strength of government control over the market is the focus of global economic system reform. On the one hand, the government should enhance market vitality and maintain economic stability; on the other hand, the government should not excessively "meddle" in the market and impede the market's free allocation of resources. Therefore, a good grasp of the relationship between the government and the market is crucial to the economic development of all countries. Theoretically, there are two competing views on whether government regulation is conducive to enterprise entry and resource allocation.

One is the Public Interest Theory put forward by Pigou, which holds that government regulation has a positive role to play in the market, in other words, government regulation plays the role of a "helping hand" in the market. Specifically, from the perspective of the Public Interest Theory, the implementation of effective market regulation by the Government can help to resolve the relationship between market failure and blind competition in the market, and in addition, government regulation can help to promote orderly competition in the market and facilitate the realization of an efficient allocation of resources.

The second is the Public Choice Theory proposed by Stigler, which argues that government regulation has a negative role in the market, that is to say, government regulation plays the role of the "grabbing hand" in the market. Therefore, from the Public Choice Theory, the purpose of government regulation is to prevent the entry of new firms and to protect the monopoly interests of incumbent firms. In addition, in the process of

regulation, the Government plays the role of an "economist", charging incumbent enterprises high "tolls", which creates room for rent-seeking by enterprises and corruption, and is not conducive to the orderly development of the market economy.

Based on the above two theoretical hypotheses, this paper argues that in the process of global marketization, government regulation plays different major roles at different stages of the marketization process. Firstly, when the degree of marketization is low, the government strengthens the reform of the market and relaxes the "helping hand", at this time, the government's "grabbing hand" occupies a major position, and the overall performance is that the government acts as the "grabbing hand". The overall manifestation is that the government plays the role of the "grabbing hand". By relaxing its intervention in the market, the Government has weakened its role in the effective allocation of market resources and the promotion of orderly competition in the market, so that economic resilience has shown an overall downward trend. Secondly, with the deepening of the overall reform, the Government's self-revolution of "turning the blade inward" has been further pursued, and the Government's unreasonable intervention in the market has been reduced, while the quality and efficiency of operation have been improved. Against the background of the comprehensive deepening reform, the government has further loosened its "grabbing hand", and the focus of reform initiatives has gradually shifted from market-oriented to government-oriented. As the government's "grabbing hand" on the market is loosened, the systemic transaction costs of local enterprises' operations are reduced (Huang et al., 2020) , further stimulating the vitality of local enterprises, which helps to enhance the resilience of the urban economy, and thus the resilience of the urban economy is strengthened.

In summary, urban economic resilience shows a downward and then upward trend with deeper marketization. Specifically, China's commercial system reform is a good example. As the first move in the government's "simplification of licenses and decentralization", the reform of the commercial system has gradually introduced initiatives to facilitate business access, such as "three certificates in one", "one certificate, one code", and "license first, then license later". "and other measures to facilitate enterprise access, by relaxing the government's control of market access to facilitate the entry of enterprises, relaxing the government to maintain the order of market access regulations of the "helping hand". However, with the relaxation of market access, a large number of "zombie enterprises" emerged, occupying a large number of social and economic resources, is not conducive to the orderly competition in the market, the city's economic resilience as a whole showed a downward trend; with the government's self-revolutionary to further promote the reform of the commercial system has been deepening in recent years, and comprehensively deepen the implementation of the "double randomization, one openness". With the further advancement of the government's self-revolution, in recent years, the reform of the business system has been deepening, comprehensively deepening the implementation of the "double random, one open" new mode of supervision, optimizing the government's services to enterprises, transparent supervision of the whole process, reducing the possibility of rent-seeking enterprises, the overall business environment of urban enterprises has been improved, and the toughness of the city's economy is rising. On the whole, the reform of the business system is an important initiative to promote the degree of marketization in China, and in the advancement of the reform of the business system, the economic resilience of Chinese cities generally shows a downward and then upward trend.

The process of marketization in a region depends on the quality of institutions in the region and is affected by the different roles played by the government in the market. Therefore, this paper develops an analysis based on a comprehensive perspective to explain the internal mechanism of the local marketization process affecting economic resilience, and to provide a theoretical basis for the subsequent empirical analysis. Based on the above mechanism analysis, we arrive at the following hypotheses to be empirically verified:

Hypothesis 1: Overall, there is a positive U-shaped relationship between the degree of marketization and economic resilience, i.e., the effect of higher or lower levels of marketization on economic resilience is to inhibit first and then pull.

4. Research Methodology

A. Data Sources

The data in this paper mainly come from the China Urban Statistical Yearbook, the China Regional Innovation and Entrepreneurship Index, and the provincial marketization indexes (also known as "Fan Gang Marketization Index") published by the National Economic Research Institute (NERI) (Fan et al., 2011). The China Regional Innovation and Entrepreneurship Index records the number of invention patents granted by prefecture-level cities, and the China Sub-Provincial Marketization Index Database records the marketization index of prefecture-level cities to measure institutional quality. In order to avoid the significant impact of the financial crisis on the economy in 2008 and 2018, the sample interval of this paper is 2008-2018, and 3025 observations are retained after matching, totaling a total of 275 cities included in this study. Considering the large gap in GDP between the four municipalities directly under the central government and the enterprise prefecture-level cities, this paper excludes the data of the four municipalities directly under the central government, as well as the data of some regions with missing marketization indexes.

B. Definition of Variables

1. The selection of economic toughness index of the explanatory variables mainly adopts the growth rate of city GDP in the year minus the growth rate of the national average GDP in the year to measure, at present, there are mainly single-indicator measurement and multi-indicator measurement of economic toughness, one is the single-indicator

measurement, most of the literature is mainly based on the core sensitivity indexes of GDP and employment, and the GDP growth rate of 2008 is selected as the benchmark. GDP growth rate in 2008 as a benchmark, respectively calculate the difference between the actual GDP growth rate of different cities and the actual GDP growth rate in 2008, and convert the calculated economic toughness index into measurable economic toughness. In the literature on measuring economic resilience with employment as a sensitivity indicator, some scholars mainly take the change rate of national employees as a benchmark, and calculate the ratio of the change rate of employees to the change rate of national employees after the impact to measure the economic resilience of cities. Secondly, the multi-indicator measurement method is confined to the fact that the single-indicator measurement method is too dependent on one data indicator and has a certain one-sidedness, and the multi-indicator measurement method calculates economic resilience by constructing the first-level and second-level indicators to build a comprehensive indicator system analysis method. Affected by data availability and other factors, this paper adopts the single-indicator measurement method, taking GDP as the core sensitive indicator, and using the current year's city GDP growth rate minus the current year's national average GDP growth rate to measure the economic toughness. At the same time, the ratio of the actual GDP growth rate of each city/the national GDP growth rate of that year is used as a replacement variable to test the robustness of the economic toughness indicator.

2. The explanatory variables are the marketization index from the Fan Gang Marketization Index Report, which measures the regional institutional environment. The higher the marketization index, the stronger the local marketization and the stronger the institutional environment; the lower the marketization index, the weaker the local marketization and the weaker the institutional environment.
3. Control variables. Referring to Xu & Zhang (2019) et al. article, human capital (Hum) is selected and measured by the average years of education of the employed people at provincial level. High-quality human capital is an important foundation for industrial structure upgrading, and the speed of industrial structure adjustment will greatly affect the city's economic resilience. Innovation capacity (RD), measured by the number of invention patents authorized in the data of Peking University Innovation and Entrepreneurship Index, the role of innovation capacity on industrial structure adjustment, indirectly acting on the city's economic resilience, which makes the innovation capacity has an important impact on the city's economic resilience. Market size (Market) is measured by the logarithm of total retail sales of consumer goods. The scale advantage of a large country helps it to resist external advantages and make the economy recover quickly, so it is usually believed that the larger the market size of the city, the more it can promote the recovery of the city's economy by stimulating domestic demand, and has a stronger economic resilience. The degree of openness (Open) is measured by the number of foreign-invested enterprises/number of industrial enterprises above designated size. The more open a city is, the more vulnerable it is to external shocks, and the more vulnerable an export-oriented economy is to large-scale economic shocks such as the financial crisis, so the degree of openness of a city has an important impact on economic resilience. Infrastructure level (Inf) is measured by the ratio of total fixed asset investment to GDP. Regions with a better level of infrastructure are more likely to attract investment and contribute to economic recovery, so the level of infrastructure affects the economic resilience of cities to some extent. The degree of government intervention (Dgi) is measured by the ratio of government fiscal expenditure to GDP. On the one hand, government expenditure has a "crowding out effect" on private investment, which negatively affects private investment to a certain extent. On the other hand, excessive government intervention will not help maximize market efficiency and affect the recovery of the economy after a shock, so the government intervention will have an impact on economic resilience. The definition of variables and descriptive statistics are shown in Table 1.

Table 1
Descriptive statistical analysis of variables

Variable name	Description of variables	N	mean	sd	min	max
Index_market	Marketization index	3,025	10.67	2.375	3.743	16.56
Resi	Using the current year's urban GDP growth rate - the current year's national average GDP growth rate	3,025	1.000	0.445	-2.458	5.783
Hum	Average years of schooling of employed persons at the provincial level	3,025	9.490	0.768	6.971	10.84
RD	Invention Patent Authorization Index	3,025	52.65	27.91	0.341	100
Market	Log of total retail sales of consumer goods	3,025	15.32	1.034	5.472	18.36
Open	Number of foreign-invested enterprises/number of industrial enterprises above designated size	3,025	0.0438	0.0487	0	0.335
Inf	Total investment in fixed assets/GDP	3,025	0.754	0.280	7.39e-05	2.312
Dgi	Government fiscal expenditure/GDP	3,025	0.184	0.0965	0.0437	1.485

Table 2
Benchmark regression results

Variables	(1) Resi	(2) Resi	(3) Resi	(4) Resi	(5) Resi	(6) Resi	(7) Resi	(8) Resi
Index_market	-0.076**	-0.076**	-0.068**	-0.066**	-0.089***	-0.081***	-0.071**	-0.074***
	(0.030)	(0.030)	(0.029)	(0.030)	(0.029)	(0.029)	(0.030)	(0.028)
Index_market^2	0.003***	0.003***	0.003**	0.003**	0.003***	0.003***	0.003**	0.003**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Market		0.060**						0.004
		(0.031)						(0.029)
Open			4.359***					-3.417***
			(0.545)					(0.525)
RD				0.004***				0.003***
				(0.001)				(0.001)
Hum					0.298***			0.287***
					(0.034)			(0.033)
Inf						0.445***		0.433***
						(0.039)		(0.038)
Dgi							-0.820***	-0.888***
							(0.171)	(0.163)
Constant	1.747***	0.862*	1.931***	1.458***	-0.704**	1.547***	1.836***	-0.832
	(0.185)	(0.487)	(0.184)	(0.189)	(0.337)	(0.182)	(0.185)	(0.539)
yearfixed	YES	YES	YES	YES	YES	YES	YES	YES
cityfixed	YES	YES	YES	YES	YES	YES	YES	YES
Number of code	275	275	275	275	275	275	275	275
Observations	3025	3025	3025	3025	3025	3025	3025	3025
R-squared	0.456	0.457	0.469	0.464	0.471	0.481	0.461	0.514

Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

5. Discussions

A. Econometric Modeling

In order to verify whether the relationship between the degree of marketization and economic resilience is consistent with the conclusions of the theoretical analysis, this paper uses actual data to estimate the analysis, and the benchmark regression model is as follows:

$$Resi_{it} = \alpha_0 + \alpha_1 Index\_market_{it} + \alpha_2 Index\_market_{it}^{\ 2} + \alpha_3 X_{it} + \mu_i + v_t + \varepsilon_{it} \quad (1)$$

where $Resi_{it}$ denotes the explanatory variable economic resilience, $Index\_market_{it}$ denotes the marketization index of i cities in t ,X_{it} denotes the control variables,μ_i is the inclusion of city fixed effects,v_t is the year fixed effects, andε_{it} is the standard errors. This paper uses panel two-way fixed effects to eliminate any observable and unobservable city-specific time-invariant effects and to control for other confounders that affect multiple cities at the same time.

B. Baseline Regression Results

This paper analyzes the empirical results using panel data and all estimates are from the analysis of stata17.0 econometric software. In this paper, the regression is carried out with a fixed effects model, and the findings in column (1) show that when no control variables are included and only the squared term of the marketization index is introduced, the coefficient of the primary term of the marketization index is significantly positive, the coefficient of the quadratic term is significantly positive, and both of them pass the test of 5 percent. From the knowledge of quadratic function, this is a parabola with upward opening. This shows that the size of the economic toughness with the increase of marketization index decreases first and then increases, the marketization index on the economic toughness of the impact of the first inhibition and then promote the "positive U-shaped" impact, consistent with hypothesis 1.

Among the control variables, market size (coefficient of 0.06, 5% level of significance), degree of openness (coefficient of 4.359, 1% level of significance), innovation capacity (coefficient of 0.004, 1% level of significance), human capital (coefficient of 0.298, 1% level of significance), level of infrastructure (coefficient of 0.445, 1% level of significance), and the government's intervention level (coefficient of 0.820, 1% level of significance) contribute significantly and positively to economic resilience. The estimated coefficients of the effects of openness and government intervention on economic resilience are not consistent with the estimates. The empirical results show that the higher the degree of openness, the more economic resilience of regional cities. The main reason for this difference is that Vella (2012) and other scholars are based on the study of small open economies, which is highly dependent on foreign trade to drive the economic development of the economy, the higher the degree of openness to the outside world, the more the economy is affected by the impact of external shocks, and the weaker the economic resilience. The study in this paper is based on 275 prefecture-level cities in China, which has a vast domestic market, and the great domestic demand market can quickly alleviate the problem of export cuts, thus effectively mitigating the impact of external shocks on economic resilience. The impact of government intervention on economic resilience is not in line with the prediction. Vollrath (2009) study is based on the study of the more developed market economy in the West, and believes that the government intervention will reduce the efficiency of resource allocation, and disrupt the spontaneous resource allocation in the market. However, China's current market economy is still immature, when large shocks come, in the market of profit-seeking and blindness, the normal recovery and

Table 3
Robustness test

Variables	(1) Resi2	(2) Resi_w5	(3) Resi	(4) Resi	(5) Resi
Index_market	-0.774***	-0.051***	-0.076***	-0.070**	-0.071**
	(0.268)	(0.016)	(0.029)	(0.029)	(0.029)
Index_market ^{2}	0.025**	0.002***	0.002**	0.002**	0.002**
	(0.010)	(0.001)	(0.001)	(0.001)	(0.001)
Market	-0.135	0.006	0.003	0.004	0.003
	(0.278)	(0.017)	(0.030)	(0.030)	(0.030)
Open	-26.196***	-1.341***	-3.492***	-3.656***	-3.750***
	(4.973)	(0.297)	(0.540)	(0.553)	(0.571)
RD	0.016**	0.001***	0.003***	0.003***	0.003***
	(0.006)	(0.000)	(0.001)	(0.001)	(0.001)
Hum	2.500***	0.154***	0.288***	0.286***	0.286***
	(0.316)	(0.019)	(0.034)	(0.034)	(0.035)
Inf	2.985***	0.195***	0.428***	0.443***	0.439***
	(0.364)	(0.022)	(0.039)	(0.039)	(0.040)
Dgi	-4.538***	-0.359***	-0.879***	-0.884***	-0.875***
	(1.544)	(0.092)	(0.165)	(0.164)	(0.166)
Constant	-12.022**	0.137	-0.799	-0.847	-0.816
	(5.108)	(0.305)	(0.547)	(0.543)	(0.551)
yearfixed	YES	YES	YES	YES	YES
cityfixed	YES	YES	YES	YES	YES
Number of code	275	275	266	270	261
Observations	3025	3025	2926	2970	2871
R-squared	0.509	0.694	0.511	0.514	0.511

Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

development of the economy will encounter a greater obstacle, so in the event of large shocks, government intervention can help to stabilize the market in the short term, to provide the market with a more stable environment for the development of the market, and to promote the rational allocation of resources. In addition, in the event of a major shock, the Government's supportive policies will help damaged enterprises to resume work and production and promote normal production and business activities, which will contribute to economic recovery and strengthen the resilience of the regional economy.

C. Robustness Test Results

The following robustness tests are conducted by (1) replacing the core explanatory variables; (2) shrinking the core explanatory variables; (3) excluding the sub-provincial cities in the sample; (4) excluding the planned cities in the sample; and (5) excluding both the sub-provincial cities and planned cities in the sample.

1) Replacement of Core Explanatory Variables

This paper repeats the benchmark regression by re-measuring economic resilience using the real GDP growth rate of each city in the current year/national GDP growth rate in the current year (Resi2). Column (1) reports the regression results after transforming the core variables, showing that the sign and significance of the estimated coefficients of the core explanatory variables are consistent with the benchmark regression results. This is a good indication that the empirical evidence for Hypothesis 1 is robust to the metric form of the core explanatory variables.

2) Tailoring of Explanatory Variables

In this paper, the explanatory variables are subjected to 5% tailoring to correct the regression bias that may be introduced by the extreme values. Column (2) reports the results of tailoring the core explanatory variables, and the fitted shapes of the resulting curves are all consistent with the underlying regression results, i.e., the effect of the marketization index on the resilience of the economy is suppressed first and then facilitated.

3) Excluding Sub-Provincial Cities from the Sample

Due to the fact that sub-provincial cities differ from general administrative level cities in various aspects such as infrastructure, geographic location, and resource conditions, the inclusion of sub-provincial cities as the scope of the study may lead to some estimation bias in the results. Therefore, this paper excludes the sub-provincial cities from the sample for the robustness test, and the regression results in column (3) are consistent with the baseline regression results, indicating that the results are still robust after excluding the sub-provincial cities.

4) Excluding Planned Cities from the Sample

Since the administrative level of the planned cities is higher than that of general cities, the level of economic development and the degree of marketization is higher than that of general administrative level cities, therefore the inclusion of the planned cities in the study may affect the estimation results, so this paper does not include the planned cities as the study object, Column (4) reports the results of the regression, which show the same results as the benchmark regression results, indicating that the process of the impact of the economic resilience of the process first inhibits and then promotes this result are robust.

5) Also Excluding Sub-Provincial Cities and Planned Cities from the Sample

Given that the level of economic development and the degree of urbanization of the two types of cities with different administrative levels, namely sub-provincial cities and cities with separate plans, are all somewhat different from those of cities with general administrative levels, both sub-provincial cities and cities with separate plans are removed from the study population at the same time, and Column (5) shows that the baseline regression estimation results are still robust.

Table 4
Endogeneity test

Variables	(1)	(2)	(3)	(4)
	Resi	firstIndex_market	firstIndex_market_2	Second
		Index_market	Index_market_2	Resi
IV1_hazard free treatment rate of domestic rate1		0.400*	9.000*	
		(1.87)	(1.85)	
IV1_hazard free treatment rate of domestic rate2		-0.265*	-5.917*	
		(-1.71)	(-1.68)	
IV2_private1		-0.235	-5.956	
		(-0.85)	(-0.95)	
IV2_private2		0.197	5.474	
		(0.70)	(0.86)	
IV3_ Index_market1		0.769***	-2.704***	
		(29.85)	(-4.63)	
IV3_Index_market1_2		-0.003***	0.890***	
		(-3.04)	(40.41)	
Market	0.004	-0.013	-0.326	0.005
	(0.15)	(-0.54)	(-0.59)	(0.18)
Open	-3.417***	0.363	9.058	-4.636***
	(-6.51)	(0.69)	(0.76)	(-8.15)
RD	0.003***	-0.001**	-0.027*	0.004***
	(4.44)	(-1.98)	(-1.85)	(5.25)
Hum	0.287***	0.016	0.425	0.239***
	(8.63)	(0.52)	(0.62)	(7.23)
Inf	0.433***	0.036	0.999	0.386***
	(11.28)	(1.04)	(1.29)	(10.39)
Dgi	-0.888***	-0.046	-1.795	-0.784***
	(-5.45)	(-0.32)	(-0.55)	(-5.07)
$\widehat{Index\_market}$	-0.074***			-0.086***
	(-2.63)			(-2.60)
$\widehat{Index\_market}^2$	0.003**			0.003***
	(2.39)			(2.62)
Constant	-0.832	2.395***	34.133***	-0.780
	(-1.54)	(4.67)	(2.94)	(-1.38)
Year fixed	YES	YES	YES	YES
City fixed	YES	YES	YES	YES
Observations	3025	2709	2709	2709
R-squared	0.514			0.545
Under identification test		5600.12***	43717.03***	
Weak identification (Cragg-Donald Wald F statistic)		1000.54	7810.65	

Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

D. Endogeneity Test Results

1) Tool Variable Construction

In this paper, we use the hazard free treatment rate of domestic rate1, the proportion of private enterprises, and the lagged period of marketization index (Index_market1) as instrumental variables. First, in order to solve the endogeneity problem caused by omitted variables, this paper draws on the methodology of (Huang & Zhao, 2023) to innovatively use hazard free treatment rate of domestic rate1 as an instrumental variable for business environment optimization. Hazard free treatment rate of domestic rate is an important indicator of the efficiency of governmental public services, which to a certain extent reflects the government's efforts to improve the quality of public services. Building a high-level market-oriented environment is also an important element of government public services. Under the condition of limited resources, the government is faced with the choice between optimizing the market environment and improving the rate of harmless treatment of domestic waste, therefore, the rate of harmless treatment of domestic waste is related to the construction of the local market-oriented environment to a certain extent. On the other hand, there is no direct relationship between the domestic waste treatment rate and economic resilience. Therefore, the domestic waste disposal rate as an instrumental variable satisfies both correlation and exogeneity. Secondly, this paper selects the proportion of private enterprises (private) as an instrumental variable. The higher the proportion of private enterprises, the more enterprises ask the government to improve the market environment, and the more enterprises the government serves to optimize the market environment, so the more motivation to improve the market environment. Therefore, the share of private enterprises is correlated with the marketization index, on the other hand, it is difficult for economic resilience to directly affect the share of private enterprises in the current period. Finally, this paper re-estimates the model with the one-period lagged term of the explanatory variable marketization index as an instrumental variable, considering that the current period economic resilience does not affect the marketization index of the previous period, and the marketization index of the previous period also affects the marketization index of the current period, so the marketization index as an instrumental variable satisfies both exogeneity and correlation. Given that the square term of the marketization index is also included as an endogenous variable in this paper, the instrumental variable and the square of the instrumental variable are used as instrumental variables to test the endogeneity of the "positive U-shaped" curve.

2) Endogeneity Test

Column (1) of Table 4 shows the results of the baseline

regression, which indicates that the impact of the marketization index on economic resilience shows a "positive U-shaped" curve, with an inhibitory and then promotional effect, while column (2) shows the first-stage regression, which indicates that both instrumental variables, namely, hazard free treatment rate of domestic rate1 and marketization index lagged one period (Index_market1), as well as the squared terms of these two instrumental variables are significant as instrumental variables. of domestic rate1) and marketization index lagged one period (Index_market1), as well as the squared terms of these two instrumental variables are significant as instrumental variables, and the Cragg-Donald Wald F statistic statistic is >10, thus ruling out the possibility of a weak instrumental variable and the instrumental variables pass the non-identifiable test, thus ensuring the validity of the instrumental variables. From the results of the second-stage regression, it can be seen that with the inclusion of instrumental variables, the endogeneity test is in the same direction as the results of the baseline regression, indicating that the conclusion that the effect of the degree of marketization on the resilience of the economy is inhibited first and then facilitated is robust.

6. Conclusions

Based on the panel data of prefecture-level cities in China, this paper explores the intrinsic link between the degree of marketization and urban economic resilience, further clarifies the role of the government in the market, and obtains some meaningful results. The results of the study show that when the degree of marketization is low, the government takes the lead in relaxing its "helping hand" to the market and reduces the degree of government intervention in the market, however, the construction of the market system at this time is still imperfect, and the relaxation of the government's "helping hand" weakens the government's influence on the effective allocation of market resources and the promotion of the market's resilience. Effective allocation of market resources and promote the role of orderly competition in the market, weakening the city's economic resilience, the city's economic resilience showed a downward trend; with the deepening of reforms, the government deepened the self-revolution, and further relax the government's "hand" on the market, greatly reducing the systemic transaction costs of enterprises, stimulate the vitality of enterprises, and enhance the city's economic resilience, the city's economic resilience showed a downward trend. The economic resilience of the city shows an upward trend. Overall, with the deepening of marketization, the degree of marketization first inhibits and then pulls on urban economic resilience. Therefore, based on the conclusions of this study, this paper puts forward the following policy recommendations.

First, to promote the organic combination of "active government" and "effective market", and to give full play to the "two-wheel-drive" role of the two main bodies. Insist on deepening the promotion of market economic reform, and further create a long-term market mechanism, to realize the micro market players bursting with vitality as well as macro government regulation and control of the perfect economic system. Define the important role of the government and the market in the development of the market economy, accurately position the functions of the government to realize the government in respect of the laws of the market economy under the premise of providing quality market services. Secondly, improve the efficiency of market resource allocation and fairness, and fully stimulate the vitality of various types of market players. Deepen the promotion of decentralization, reduce the government's direct intervention in market activities, and fully realize the free flow of factors. Accelerate the improvement of the market-determined factor allocation mechanism, and promote the maximization of efficiency and optimal allocation of resources based on market rules, market prices and market competition. Improve the market supervision system, fully respect the status of market players, stimulate competition among various types of market players, promote fair and orderly competition among enterprises, and optimize the quality of factor allocation through the mechanism of enterprise survival of the fittest. Thirdly, reduce the systemic transaction costs of enterprises, and continuously optimize the business environment for market players. Deepen the reform of the market main body to enter the approval matters, and further eliminate the invisible threshold of business operations, reduce the institutional transaction costs of enterprises, maximize the benefits of business operations, and help the development of the market main body. Optimize enterprise-related services, strengthen the government's online and offline service capabilities, and continuously improve the efficiency of business operations and reduce the transaction costs of business operations.

References

[1] Dai, Xinling, & Liu, Wei. (2022). Industrial digitalization, technological innovation and urban economic resilience. China Circulation Economy, *36*(12), 81-91.

[2] Fan, Wang, Xiaolu, & Ma, Guangrong. (2011). The contribution of China's marketization process to economic growth. Economic Research. *46*(9), 4–16.

[3] Feng, Xiaoxiao, & Su, Erdou. (2022). Trade policy uncertainty, technological innovation and economic resilience in Chinese cities. Urban Issues, *10*, 55-63.

[4] Hu, Yan, & Zhang, Anwei. (2022). How human capital enhances urban economic resilience. Financial Science. *8*, 121–134.

[5] Huang, Liangxiong, Xiangxiang Sun, & Xianbin Wang. (2020). Has the Commercial System Reform Effectively Stimulated Entrepreneurship? -- Evidence from prefecture-level cities. Financial Studies, *46*(2), 142-155.

[6] Huang, Shoufeng, & Zhao, Yan. (2023). Informatization of administrative services and the level of basic public services. World Economy, *8*, 32-54.

[7] Ji Xiangyu. (2020). Does Administrative Approval System Reform Have an Industrial Upgrading Effect? Economic and Management Research, *41* (9), 47-61.

[8] Lu, Xianxiang, & Teng, Yu, J.J. (2023). How innovation-driven policies can enhance the economic resilience of cities: a mechanism analysis based on effective market and active government. China Soft Science, vol. 7, 102–113.

[9] Xu, Yuan, & Zhang, Linling. (2019). Economic resilience and origins of Chinese cities: an industrial structure diversification perspective. Finance and Trade Economics. *40*(7), 110–126.

[10] Aghion, P., Burgess, R., Redding, S. J., & Zilibotti, F. (2008). The Unequal Effects of Liberalization: Evidence from Dismantling the License Raj in India. *American Economic Review*,*98* (4), 1397-1412.

[11] Bristow, G., & Healy, A. (2018). Innovation and regional economic resilience: an exploratory analysis. *The Annals of Regional Science*,*60* (2), 265-284.

[12] Brown, L., & Greenbaum, R. T. (2017). The role of industrial diversity in economic resilience: an empirical examination across 35 years. *urban Studies*,*54* (6), 1347-1366.

[13] Cainelli, G., Ganau, R., & Modica, M. (2019). Industrial relatedness and regional resilience in the European Union. *papers in Regional Science*,*98* (2), 755-778.

[14] Eliasson, G. (1991). Deregulation, innovative entry and structural diversity as a source of stable and rapid economic growth. *Journal of Evolutionary Economics*,*1* (1), 49 -63.

[15] Fernandes, A. P., Ferreira, P., & Alan Winters, L. (2014). Firm entry deregulation, competition and returns to education and skill. *European Economic Review*, *70*, 210-230.

[16] Ferreira, P., Fernandes, A. P., & Cooke, D. (2021). *Entry deregulation, firm organization, and wage inequality.* https://repositorium.sdum.uminho.pt/handle/1822/73454

[17] Iacobucci, D., & Perugini, F. (2021). Entrepreneurial ecosystems and economic resilience at local level. *Entrepreneurship & Regional Development*,*33* (9-10), 689

[18] Martin, R., Sunley, P., & Tyler, P. (2015). Local growth evolutions: recession, resilience and recovery. *Cambridge Journal of Regions, Economy and Society*, *8*(2), 14 1-148.

[19] Vella, L. B., Gordon Cordina, Nadia Farrugia, Stephanie. (2012). Economic Vulnerability and Resilience: Concepts and Measurements. *Measuring Vulnerability in Developing Countries*. Routledge.

[20] Vollrath, D. (2009). How important are dual economy effects for aggregate productivity? *Journal of Development Economics*, *88* (2), 325-334.

[21] Williams, N., & Vorley, T. (2014). Economic resilience and entrepreneurship: lessons from the Sheffield City Region. *Entrepreneurship & Regional Development*, *26*(3-4), 257-281.