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Research on the Impact of New Quality Productivity on Urban Economic Resilience

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Abstract

Since 2013, the domestic and foreign environment has gradually changed dramatically. In response to the changes, the central government proposed the concept of new quality productivity, and stressed the importance of urban economic resilience. This paper selects the relevant data of 280 prefecture level cities in the past 13 years 2010-2022 to verify the improvement effect and heterogeneity of new quality productivity on urban economic resilience. The research found that the new quality productivity effectively promoted the improvement of urban economic resilience. After a series of tests, the results were still stable, and the improvement effect was more obvious in the eastern region, while the central and western regions were relatively weak. Therefore, we should vigorously develop the new quality production capacity to improve economic resilience, and strengthen the assistance to the central and western regions to give full play to the new quality productivity.

Keywords: new quality productivity, urban economic resilience, Heterogeneity

1. Introduction

Starting from 2013, starting from the start of 2013, the economic growth began to slow down, the growth mode urgently needs to change, the excess capacity problem starts to show, the "middle-income trap" causes a temporary clamor, in 2016,after the US President Trump came to power to start tariff protection, implement economic anti-globalization, followed by the outbreak of COVID-19 pandemic at the end of 2019, U.S-stocks in 8 days trigger three downward fuses, global capital panic, the Russian Ukraine war broke out in 2022, the president of the "American priority" type president re-enters the White House with an overwhelming advantage, with the campaign slogan of increasing trade barriers, manufacturing industry returns to the US, limiting immigration, and anti-multicultural anti-Semitism reappeared, and the immigration problems and identity of European countries made the society more fragmented, There are also more and more protests on the streets. In this case, the central government decided to develop new quality productivity to cope with economic difficulties, meanwhile stressed the importance of economic resilience.

2. Theoretical Analysis and Research Hypotheses

The development of new quality productivity development helps to build a modern production system. The he main path includes the automation of technology, the melting of digital reality, the advanced structure, the advanced structure, the intelligent circulation, and the low carbon production of production. Secondly, it can improve the total factor productivity (Xiangjie Cai,Zheng He 2024) by expanding the possibility of production, increasing the marginal output of various production resources, reducing labor wage, improving labor capital, rationalizing economic system and changing organization mode, etc. Moreover, the new quality of digital economy can use communication technology and information technology to reduce the value industry chain and promote the return of the value industry chain by virtue of communication technology and information technology, break the closed and rigid value industry chain division mode of labor. At the same time new quality productivity deepening the combination of digital and reality, optimizing industrial structure and strengthening innovation ability is an important way to effectively improve the toughness of manufacturing industry (Yang Gang, Wang Rui, Cai Xian 2,024). In addition, new quality productivity using intelligent sales and replenishment systems can reduce traditional distribution costs. The convenience of online communication makes the division and cooperation between units and individuals more efficient, management work more flat, digital automation can avoid subjective and objective errors caused by human, the application of digital vision can strictly monitor product quality, which all will make each enterprise optimize the management level of each enterprise, improve its own economic efficiency, so that he can integrate into the new high value-added development ecology, The economic

development mode has changed from high investment to innovation, and the industrial ecology has been rebuilt, so that the industries and regions can grow evenly, supply and demand can be more coordinated, the change of trade mode and mode can be promoted, the flow of resources at home and abroad can be improved, and the adaptation to the increase of consumption level can be enhanced (Shihang Xu, Xiaofeng Xu 2,024). These advantages will enhance an economy's resistance, adjustment and growth in the face of shocks, and thus enhance the overall resilience of the economy. Therefore, this paper puts forward a hypothesis: the new quality productivity can improve the urban economic resilience.

3. Empirical Analysis

3.1 Model Construction

According to the previous theoretical analysis and research hypotheses, this paper constructs the following benchmark regression model:

$$Res_{it}=\alpha_0+\alpha_1 New_{it}+\alpha_2 X_{it}+\mu_i+\delta_t+\varepsilon_{it} \quad (1)$$

Among them, Res_{it} it represents the urban economic resilience of city i in year t, New_{it} it represents the new quality productivity level of city i in year t, X it represents a series of control variables, including per capita output value, urbanization rate, financial development level and opening level, μ I represents the fixed effect of city, δ T represents the fixed effect of time, and ε it represents the random disturbance item

3.2 Variable Description and Index Selection

3.2.1 Urban Economic Resilience

The purpose of urban economic resilience is to reflect an economy's resistance to external shocks, the ability to consciously adjust in the face of shocks and the ability to quickly recover after shocks. At present, there are two main measurement methods, the single sensitivity index measurement and the comprehensive index system measurement. Considering the rich connotation of urban economic resilience, the single index measurement is a little less convincing, so this paper mainly refers to the second method. Refer to the practice of Liao Zhang and Lei Yao (2023)，The comprehensive indicator system includes 3 two-level indicators, namely, resistance and recovery capacity, adaptation capacity and transformation and development capacity, 14 three-level indicators, of which two are negative impact indicators. After processing these indexes with entropy method, the comprehensive level of urban economic resilience of each city in each year was obtained. The specific indicators are shown in Table 1:

Table 1. Comprehensive evaluation index system of urban economic resilience

level-one indicators	level-two indicators	level-three indicators	attribute
urban economic resilience	Resistance and resilience	Regional GDP per capita	+
		Disposable income of urban residents	+
		Savings balance of urban and rural residents	+
		Registered urban unemployment	-
		Proportion of total import and export to GDP	-
	Ability to adapt and adjust	Local fiscal revenue and expenditure ratio	+
		Total retail sales of social consumption	+
		The proportion of the third industry to GDP	+
		Deposit and loan ratio of financial institutions at the end of the year	+
		Amount of fixed assets investment	+
	Transformation and development capacity	Number of patents authorized	+
		Number of students in 10,000 higher education institution	+
		Fiscal Expenditure on Science	+
		Financial education expenditure	+

3.2.2 New Quality Productivity

The new quality productivity is a concept of political economy, mainly including new quality labor, new quality labor objects and new quality labor materials, so it is reasonable to use the comprehensive evaluation index system. This paper mainly refers to the practice of Wenlong Han, Ruisheng Zhang and Feng Zhao (2024), and selects 3 level-two indicators and 17 level-three indicators to calculate. The entropy method is used to assign values to each indicator, and finally the new quality productivity level of each city in each year is weighted. The specific indicator selection and meaning are shown in Table 2:

Table 2. Comprehensive evaluation index system of new quality productivity

dimension	element	Indicator interpretation	attribute
new quality labor	Number of employees in emerging industries	Total employees of Listed Companies in strategic emerging industries and future industries	+
	Personal ability of employees	Average wage of employees	+
	High quality level of employees	Number of higher education institution	+
new quality labor objects	infrastructure	Internet broadband access users	+
		Total telecom business	+
	Future development	Robot installation density	+
	ecological environment	Investment in environmental pollution control	+
		Carbon trading, energy trading and emission trading	+
		Harmless treatment rate of domestic waste	+
new quality labor materials	Technology research and development	The proportion of scientific expenditure in local local fiscal expenditure	+
	Innovation output	Number of inventions applied for in the current year	+
		Number of utility models applied for in the current year	+
	Intelligent	Number of AI Enterprises	+
	Green	Number of green inventions applied in the year	+
		The number of green utility models applied for in the current year	+
	data element	Data element utilization level	+
		Is there a data trading platform available，	+

3.2.3 Control Variables

In order to minimize the impact of other interferences on the research results, such as missing important factor variables, multi-collinearity, etc., and considering that the new quality productivity itself is represented by a comprehensive evaluation index, this article refers to the selection experience of scholars such as Mengze Zheng and Fuqiang Li (2024), Yonggang Li and Yue Liu (2025), Yuting Fan and Jie Zhang (2025), Dongdong Han, and Mayi Shi and Yingying Ding (2023), and uses economic development level, urbanization rate, financial development level, and openness level as control variables

Economic development level (Gdp): Expressed in terms of per capita GDP and logarithmically processed, Urbanization rate (Urban): Expressed by the ratio of non-agricultural population to registered residence population, Financial Development Level (Fina): Expressed as the ratio of the year-end balance of deposits and loans of financial institutions to the regional gross domestic product.

Open level: expressed in terms of actual utilization of foreign investment and regional gross domestic product.

3.3 Benchmark Regression

This article uses a two-way fixed effects model for benchmark regression, and Table 3 shows the specific impact results of new quality productivity on urban economic resilience. The first column shows the regression without

control variables, and the results indicate that the improvement of urban economic resilience by new quality productivity is significant at the 1% significance level. When control variables are sequentially added, the results in columns (2), (3), and (4) show that the former still has a positive promoting effect on the latter at the 1% significance level, and all four results have good fit, which can effectively ensure the reliability of the regression results. It is not difficult to see that the improvement of urban economic resilience by new quality productivity is significant, therefore hypothesis holds true.

In addition, after observing the influence of control variables, we first found that the level of economic development has a significant effect on the improvement of urban economic resilience. This indicates that with the increase of per capita production value (Gdp), the level of economic resilience will also be improved. It is not difficult to understand that a wealthy individual or country obviously has better solutions, more choices, and more sufficient confidence when dealing with and solving problems, and is less likely to be knocked down by difficulties. It will be faster to overcome difficulties. Therefore, vigorously developing productivity is an eternal theme of humanity. The improvement of the second level of urbanization (Urban) seems to weaken the economic resilience of cities, which is likely due to the fact that China is still in the process of urbanization and has not fully completed this process. The original rural residents who have just become citizens do not have stable and strong urban survival skills, and their ability to cope with shocks is weak, which will reduce the economic resilience of cities. Therefore, it is necessary to provide them with skills training, which will improve the overall economic resilience of cities. The third level of financial development (Fina) also plays a promoting role in the resilience of urban economies. At the beginning of financial development, it was to cope with risks and better diversify risks. The help of a developed financial market to the economy is self-evident. Therefore, encouraging the development and improvement of financial strength is important, which is also the duty of China's financial power. Finally, the level of openness (Open) It has a certain role in promoting urban economic resilience, which may benefit from a larger market, which will bring more choices, and it is beneficial for every market participant. When a certain partner encounters an impact, it is easy to find the next partner, and the impact on production and income will be reduced. In addition, a larger market range means a broader and deeper division of labor and collaboration, which can make full use of comparative advantages to improve efficiency, increase output, and better respond to the impact. Therefore, openness is the main theme of China, and the "the Belt and Road" initiative and the Global South Economic Union are well reflected. Of course, the above are just some hypotheses, and the specific effects still need to be confirmed through empirical testing. However, this is not the main task of this article and will be explored by other scholars

Table 3. Benchmark Regression Results

variable	Urban Economic Resilience(Res)			
	(1)	(2)	(3)	(4)
New Quality Productivity (New)	0.7126*** (0.0082)	0.5733*** (0.0091)	0.5798*** (0.0092)	0.5401*** (0.0099)
Economic development level(Gdp)		0.2614*** (0.0009)	0.0280*** (0.0108)	0.0281*** (0.0010)
urbanization level(Urban)			-0.0132*** (0.0033)	-0.0214*** (0.0034)
Financial development level(Fina)				0.0052*** (0.0005)
Openness(Open)				0.8279*** (0.2187)
Cons	0.0461*** (.0007)	-0.2272*** (0.0103)	-0.2421*** (0.0109)	-0.2539*** (0.0109)
Urban fixed effects	Yes	Yes	Yes	Yes
Fixed year effect	Yes	Yes	Yes	Yes
N	3640	3640	3640	3640
R^2	0.674	0.727	0.727	0.735

Note: "***", "* *", and "*" respectively indicate significance at the 1%, 5%, and 10% levels, and the values in parentheses are standard errors; The table below is the same

3.4 Robustness Test

3.4.1 Replace Core Explanatory Variables

This article uses the number of words related to new quality productivity in government work reports and Baidu News as proxy variables to re-measure the level of new quality productivity. The estimated results are shown in Table 3. From the regression results, it is evident that even if the core explanatory variable measurement method is changed, the promoting effect of new quality productivity on urban economic resilience is still significant.

3.4.2 Excluding Samples after 2019

Due to the huge damage caused to the economic system by the outbreak of the epidemic that began at the end of 2019, which is incomparable to the impact faced in previous years. The former caused multiple economic shutdowns, seriously damaged the normal operation of production and life, and significantly reduced international trade. In some periods, it even completely stopped. Therefore, it is reasonable to remove data from these years and re estimate. The estimated results are shown in Table 4, which indicate that excluding data after 2019, the new quality productivity still has an improving effect on urban economic resilience.

3.4.3 Perform 1% Truncation on the Core Explanatory Variables

Considering the various difficulties in data collection, measurement errors inevitably caused by humans, and some large or small outliers caused by dimensional differences, which usually bring errors to estimation, deleting some values that are too large or too small often makes the estimation results more scientific, robust, and closer to the real situation. Therefore, it is reasonable to perform a certain degree of tail reduction on the core explanatory variables. This article adopts a top and bottom 1% tail reduction to re -estimate the regression, and the regression results are shown in Table 4. It is not difficult to see from the results that after the top and bottom 1% tail reduction, the new quality productivity still has a significant promoting effect on urban economic resilience.

Table 4. Robustness Test

variable	Replace core explanatory variables	Exclude samples after 2019	Perform 1% truncation on the core explanatory variables
New Quality Productivity (New)	0.0021**** (0.0005)	0.4540*** (0.0100)	0.4501*** (0.0098)
Economic development level(Gdp)	0.0501*** (0.0014)	0.0247*** (0.0010)	0.0290*** (0.0009)
urbanization level(Urban)	-0.0067* (0.0046)	-0.0158*** (0.0035)	-0.0223*** (0.0030)
Financial development level(Fina)	0.0157*** (0.0007)	0.0046*** (0.0005)	0.0053*** (0.0004)
Openness(Open)	2.3874*** (0.2965)	1.2349*** (0.2063)	1.1134*** (0.1945)
Cons	-0.5040*** (0.1374)	-0.2190*** (0.0106)	-0.2606*** (0.0098)
Urban fixed effects	Yes	Yes	Yes
Fixed year effect	Yes	Yes	Yes
N	3640	2800	3568
R^2	0.51	0.73	0.73

3.5 Heterogeneity Analysis

The division of the land into eastern, central, and western regions represents the economic development differences between different regions. The specific results are shown in Table 5. It is not difficult to see from the estimated results that the effect of new quality productivity on improving urban economic resilience is more significant in the eastern region. The GDP of the eastern region accounts for as much as 60% of the national GDP, while the central and western regions each account for 20%. Since the reform and opening up, the eastern region has been the cornerstone of China's economy, gathering the largest population, solving the most employment problems, having the most convenient transportation infrastructure, the most complete industrial chain, and the most advanced technology, high-level talents, and high-tech companies. At the same time, it also has a good business environment and better protection for the market economy. Obviously, these unique conditions will amplify the

role of new quality productivity in improving the resilience of urban economy. In economically underdeveloped areas, the positive effect of the former on the latter will correspondingly weaken. Therefore, developing the economy and improving income levels are key, which will bring many externalities, increase the welfare of the entire society, and improve people's living standards.

Table 5. Regional Heterogeneity

variable	eastern region	central region	western region
New Quality Productivity (New)	0.5471*** (0.0187)	0.4152*** (0.0114)	0.4204*** (0.0160)
Economic development level(Gdp)	0.0343*** (0.0023)	0.0216*** (0.0011)	0.0211*** (0.0014)
urbanization level(Urban)	-0.0237*** (0.0075)	-0.0166*** (0.0043)	-0.0285*** (0.0042)
Financial development level(Fina)	0.0140*** (0.0013)	0.0019*** (0.0006)	0.0048*** (0.0006)
Openness(Open)	-2.4138*** (0.5658)	-0.0405 (0.1981)	3.6397*** (0.3167)
Cons	-0.3288*** (0.0243)	-0.1734*** (0.0115)	-0.1806*** (0.0142)
Urban fixed effects	Yes	Yes	Yes
Fixed year effect	Yes	Yes	Yes
N	1118	1118	1482
R^2	0.77	0.78	0.62

4. Conclusion

From the above theoretical and empirical analysis, it can be seen that new quality productivity has an improving effect on urban economic resilience, and the effect is more significant in the eastern region compared to the central and western regions. Therefore, we should vigorously develop new quality productive forces, focus on basic research, strengthen the enthusiasm of universities and research institutes for revolutionary creation, not only create a free innovation environment where every researcher can put forward their own ideas and exchange opinions, but also provide certain assistance in resources for researchers' own lives and the purchase of experimental equipment. Every idea and practice should be discussed and experimented with as much as possible, so as not to miss opportunities due to practical constraints. In addition, we should strengthen assistance to the central and western regions to enhance the promotion effect of new quality productive forces on urban economic resilience.

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