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New Quality Productivity and the Realization of Common Prosperity

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Abstract: ***This paper focuses on the two development strategies of new quality productivity and common prosperity, and uses panel data from 30 provinces and cities in China from 2012 to 2022 to conduct an empirical test on the relationship between new quality productivity and common prosperity. The study found that the development of new quality productivity can promote the realization of common prosperity. Among them, increasing investment in scientific and technological innovation and improving the quality of public services play a mediating role. In addition, "making the cake bigger" is the prerequisite for new quality productivity to achieve "dividing the cake well"; "dividing the cake well" is conducive to the new quality productivity to further "make the cake bigger".***

Keywords: New Quality Productivity, Common Prosperity, Making the Pie Bigger, Dividing the Pie Well, High-Quality Talents**.**

1. Introduction

Realizing common prosperity has been the eternal pursuit of the Chinese nation for thousands of years and is the Chinese people's long-cherished wish for their future life. It emphasizes that "in order to achieve common prosperity, China must first make the 'cake' bigger and then divide the 'cake' well through reasonable institutional arrangements" [1]. This important statement points out that the concept of common prosperity goes beyond the simple elimination of poverty and contains two meanings: "making the cake bigger" and "dividing the cake well" [2]. "Making the cake bigger" represents highly developed productivity and is a concentrated reflection of people's living standards and quality [3]; "dividing the cake well" focuses on narrowing social gaps, ensuring the rational allocation of resources, and achieving social fairness and justice [4]. Although the vision of achieving common prosperity has remained unchanged, the tide of the times is constantly changing the environment, conditions and strategies for realizing this vision [2]. With the resolution of the problem of absolute poverty and the rise of the new technological revolution, China has entered a new stage of development. To this end, the spirit of the "Decision" of the Third Plenary Session of the 20th Central Committee emphasized: In the new development period, balancing "making the cake bigger" and "dividing the cake well" to achieve common prosperity is the key to promoting the sustained and healthy development of the economy and society.

Accelerating the development of new productivity is an inevitable choice for solidly promoting common prosperity. In September 2023, the General Secretary of the State first pointed out the concept of "new productivity" during his inspection in Heilongjiang, and clearly proposed to "accelerate the formation of new productivity and enhance new development momentum" [5]. In December of the same year, the Central Economic Work Conference listed "developing new productivity" as an important task [6]. Subsequently, at the 11th collective study of the Political Bureau of the CPC Central Committee, it was further emphasized that "we must cultivate urgently needed talents for the development of new productivity and the promotion of high-quality development" [7]. As a "new" productivity, the development of new productivity will inevitably have a profound impact on the environment for achieving common prosperity, and thus have a far-reaching impact on the realization of common prosperity. Therefore, how to grasp the development advantages of new productivity and promote common prosperity in a more proactive manner is of great theoretical and practical significance.

Based on this, some scholars have studied the relationship between new productivity and common prosperity. Yan Lianfu and Niu Ganggang (2024) [8] pointed out through theoretical discussion that the development of new productivity can not only drive economic growth, but also give rise to new production relations, injecting strong impetus into the realization of common prosperity. Xu Zheng et al. (2024) [9] scholars considered from a micro perspective, emphasizing that new productivity can achieve common prosperity by promoting economic growth, increasing employment rate and narrowing regional gaps, and pointed out that talent shortage may hinder the development of new productivity. Huang Chenchen and Liu Fangping (2024) [11] selected 11 BRICS countries and 34 OECD member countries as samples, and verified the positive correlation between the science and technology innovation index and per capita GDP, thereby indirectly supporting the positive impact of new productivity on common prosperity. Wang Jiang (2024) [12] used data from prefecture-level cities in China and established a new productivity indicator evaluation system to confirm the role of new productivity in promoting common prosperity. It is worth noting that empirical research on the relationship between new productivity and common prosperity has mostly focused on the overall indicators of common prosperity, ignoring the fact that common prosperity has two sides ("making the pie bigger" and "dividing the pie well"), which are two different dimensions. In addition, in the theoretical discussion of achieving common prosperity through new productivity, some scholars pointed out that the uneven development of regional science and technology may make it easier for some regions to integrate into the development wave of new productivity, while other regions may lag behind [8-9], which may affect the "dividing the pie well" of common prosperity.

Considering that most current research remains at the

theoretical level, and empirical literature focuses on the role of the development of new quality productivity on the overall level of common prosperity, no scholars have yet explored the impact of new quality productivity on the two sides of common prosperity ("making the pie bigger" and "dividing the pie well"), as well as the dialectical relationship between "making the pie bigger" and "dividing the pie well". This study aims to empirically test the different effects of the development of new quality productivity on the common prosperity of "making the pie bigger" and "dividing the pie well" through theoretical analysis and using panel data from 30 provinces and cities in China from 2012 to 2022, and explore the possible dialectical relationship between the two, in order to provide comprehensive and in-depth insights and suggestions for China to more efficiently use new quality productivity to achieve common prosperity. Therefore, compared with previous studies, the possible marginal contribution of this article is reflected in three aspects: first, it enriches the research connotation of new quality productivity and common prosperity, and attempts to explore the dialectical relationship between "making the cake bigger" and "dividing the cake well"; second, it reveals the mechanism of action of new quality productivity in achieving "making the cake bigger" and "dividing the cake well", that is, scientific and technological innovation investment and public service improvement are the intermediary mechanisms; third, it constructs a measurable common prosperity and new quality productivity indicator system at the provincial level, providing a reference for conducting related research.

2. Theoretical Analysis and Research Hypothesis

2.1 New Quality Productivity and Common Prosperity

New productivity is the direction of the leap of productivity and production relations under the background of the new scientific and technological revolution. From the perspective of productivity, new productivity is a high-level productivity dominated by scientific and technological innovation. It emphasizes that "new productivity is a contemporary advanced productivity generated by revolutionary technological breakthroughs, innovative allocation of production factors, and deep transformation and upgrading of industries" [7]. This important statement points out that new productivity is different from the extensive development model of traditional productivity [13]. It establishes innovation as the core driver of economic and social development [14] and regards industrial transformation and upgrading as the key focus [15]. Its purpose is to promote the transformation and upgrading of various industries, build a modern industrial system, and achieve high-quality development of the economy and society [12-13]. From the perspective of production relations, the development of new productivity will inevitably bring challenges to traditional production relations. It points out that there is a close connection between productivity and production relations, that is, "production relations must adapt to the requirements of productivity development." [7] As new quality productivity includes requirements such as collaborative, green and high-quality development [15], with the development of new quality productivity, a new type of production relationship with collaborative cooperation and shared development as its main characteristics will inevitably be formed [16].

Common prosperity is the organic unity of creating wealth (making the pie bigger) and distributing it fairly (dividing the pie well). "If China wants to achieve common prosperity, it must first make the pie bigger and then divide the pie well through reasonable institutional arrangements" is an important exposition of the concept of common prosperity [1]. This statement clarifies the dual tasks of common prosperity, namely, achieving common prosperity requires taking into account both "making the pie bigger" and "dividing the pie well" [2]. "Making the pie bigger" emphasizes the growth of the total economic volume [3], which means developing productivity by stimulating innovation, promoting industrial upgrading and improving production efficiency [17] and increasing social wealth [3]. This process emphasizes the material accumulation of common prosperity and aims to provide society with abundant material resources. "Dividing the pie well" focuses on how to fairly and reasonably distribute social wealth and ensure that everyone can share the fruits of development fairly [4]. Its purpose is to narrow the gap between the rich and the poor and improve the living standards of low-income groups [18]. This aspect focuses on how to achieve a reasonable distribution of wealth on the basis of "making the pie bigger". In general, "making the pie bigger" and "dividing the pie well" are two sides of the same coin for common prosperity. "Making the pie bigger" provides the necessary material basis for "dividing the pie well", and "dividing the pie well" is an important guarantee to ensure that the results of "making the pie bigger" benefit all the people.

New productive forces can promote "making the cake bigger" and "dividing the cake well", enabling the realization of common prosperity. On the one hand, the high level of productivity contained in new productivity [16] can promote "making the cake bigger" through investment in scientific and technological innovation. As a high-level productivity [14], new quality productivity has strong incremental benefits. Therefore, in a society with highly developed new productive forces, social wealth is abundant. This abundant accumulation of wealth will help increase society's investment in scientific and technological innovation, thereby driving the continuous iteration of technological innovation results, effectively creating huge wealth commensurate with the size of the population, and laying a good material foundation for achieving common prosperity [8]. On the other hand, the new production relations formed by new productive forces can improve the level of public services and promote "dividing the cake." The development of new productive forces will inevitably form new production relations with collaborative cooperation and shared development as the main characteristics [16]. Under the influence of this new relationship, the level of social public services will be significantly improved. This will shape a new pattern of social development, affect social resource allocation and wealth distribution, and ensure that all parties in society equally share development dividends [8]. Based on this, this article puts forward the following hypotheses:

H_1: New quality productivity can promote "making the cake bigger" and "dividing the cake better" and achieve common prosperity.

H_{1a}: New quality productivity promotes "making the pie bigger" by increasing investment in scientific and technological innovation.

H_{1b}: New quality productivity promotes "dividing the pie" by improving the level of public services.

2.2 The Dialectical Relationship between Making the Cake Bigger and Dividing the Cake Well

In the process of common prosperity, "making the pie bigger" and "dividing the pie well" are two interrelated links [2], and the two may have mutual influence. On the one hand, "dividing the pie well" may help the new quality productivity to "make the pie bigger". "Dividing the pie well" is a manifestation of social fairness and justice, and it concerns the vital interests of every member of society. When social wealth is distributed fairly and reasonably, the creativity and enthusiasm of social members will be enhanced. This increase in enthusiasm can promote the development of new quality productivity, thereby providing a stronger driving force for "making the pie bigger". On the other hand, "making the pie bigger" may be the premise of "dividing the pie well". The role of new quality productivity in promoting "dividing the pie well" is not unconditional, it needs to be based on "making the pie bigger". Only when the economic scale reaches a certain level and social wealth accumulates to a sufficient degree, can there be more resources and capabilities to achieve fair and reasonable wealth distribution. In other words, only when the "pie" is big enough and social wealth is rich enough, the role of new quality productivity in promoting "dividing the pie well" is more likely to be realized. In summary, this paper proposes the following hypothesis:

H_{2a}: The effect of new quality productivity on "making the pie bigger" of common prosperity is affected by "dividing the pie well".

H_{2b}: The effect of new quality productivity on "dividing the pie well" of common prosperity is affected by "making the pie bigger".

3. Study Design

3.1 Model Construction

In order to verify that the development of new quality productivity can drive the realization of common prosperity (hypothesis H_1), this paper constructs a regression model (1):

$$Cp_{it}/Cp1_{it}/Cp2_{it} = \alpha_0 + \alpha_1 Nqpf_{it} + \sum \varphi Control_{it} + \mu_i + \lambda_t + \varepsilon_{it} \quad (1)$$

model (1), the explained variable, Cprepresents the level of common prosperity, $Cp1$ is the "making the pie bigger" dimension of common prosperity, $Cp2$ refers to the "dividing the pie well" indicator of common prosperity; $Nqpf$ is the explanatory variable, representing the level of development of new quality productivity; $Control$ refers to a series of control variables; α_0 is the intercept term; μ and λ represent the province fixed effect and time fixed effect respectively; ε is the random disturbance term; subscript *i* and *t*, *representing* province and time (year) respectively.

According to the above, new quality productivity enables "making the pie bigger" through technological innovation investment and "sharing the pie better" through joint service improvement (assuming H_{1a} and H_{1b}). To test this mechanism, this paper constructs mediation effect models (2) and (3):

$$Med_{it}(RD/Pub) = \vartheta_0 + \vartheta_1 Nqpf_{it} + \sum \omega Control_{it} + \mu_i + \lambda_t + \varepsilon_{it} \quad (2)$$

$$Cp_{it}/Cp1_{it}/Cp2_{it} = \tau_0 + \tau_1 Nqpf_{it} + \tau_2 Med_{it} + \sum \psi Control_{it} + \mu_i + \lambda_t + \varepsilon_{it} \quad (3)$$

models (2) and (3), Medis the mediating variable, where RDrepresents the investment in scientific and technological innovation and Pubrefers to the level of public services. The meanings of the remaining variables are the same as those in formula (1).

To further analyze the dialectical relationship between "making the cake bigger" and "dividing the cake well" (assuming H_{2a} and H_{2b}), construct threshold regression models (4) and (5):

$$Cp1_{it} = \gamma_0 + \gamma_1 Nqpf_{it} \times I(Cp2_{it} \le \theta_1) + \gamma_1 Nqpf_{it} \times I(\theta_1 < Cp2_{it} \le \theta_2) + \ldots + \gamma_1 Nqpf_{it} \times I(\theta_n < Cp2_{it}) + \sum \rho Control_{it} + \mu_i + \lambda_t + \varepsilon_{it} \quad (4)$$

$$Cp2_{it} = \gamma_0 + \gamma_1 Nqpf_{it} \times I(Cp1_{it} \le \theta_1) + \gamma_1 Nqpf_{it} \times I(\theta_1 < Cp1_{it} \le \theta_2) + \ldots + \gamma_1 Nqpf_{it} \times I(\theta_n < Cp1_{it}) + \sum \rho Control_{it} + \mu_i + \lambda_t + \varepsilon_{it} \quad (5)$$

Model (4) regards "dividing the cake well" as a threshold variable, and explores the differentiated impact of different stages of "dividing the cake well" on the new quality productivity to achieve common prosperity "making the cake bigger", while model (5) focuses on how different stages of "making the cake bigger" affect "dividing the cake well". In the formula, $\theta_1 \ldots \theta_n$is the threshold value, Iis the indicator function, and is assigned a value of 1 when the conditions in the brackets are met; otherwise, it is 0. The meanings of the remaining variables are the same as those in formula (1).

3.2 Variable Measurement and Description

(1) Explanatory variables. The development level of new quality productivity is the explanatory variable of this study. It is emphasized that "the basic connotation of new quality productivity is the leap forward of laborers, labor materials, labor objects and their optimized combination" [7]. Therefore, this paper refers to the important remarks of the General Secretary and draws on the construction method of the new quality productivity index system by Wang Jue and Wang Rongji (2024) [19]. Focusing on the three core elements of laborers, labor materials and labor objects, this paper builds a comprehensive evaluation index system of new quality productivity, as shown in Table 1. To eliminate the defects of subjective empowerment and the redundancy of multi-indicator data, this paper uses entropy method to measure the new quality productivity index, denoted as.

Table 1: New quality productivity index system

Decomposition indicators	First level indicator	Secondary indicators	Level 3 indicators	Measurement	property
Workers	Personal Awareness	Employment awareness	Proportion of employees in the tertiary industry	The proportion of employees in the tertiary industry in the total employment	just
		Entrepreneurial Awareness	Entrepreneurial activity	Entrepreneurial activity	just
	Personal Abilities	Education	Education level per capita	Average time of education per capita	just
		Human Capital	Proportion of talents with higher education	Number of college students/total population	just
	Personal productivity	Output per capita	GDP per capita	GDP/Total Population	just
		Per capita income	Per capita income	Average salary of employees	just
Labor Object	Industry Development	Emerging Industries	Emerging Industries	Technology market transaction volume	just
		Future Industries	Robot Proportion	Number of robots/total population	just
	Environmental Protection	Green and Environmentally Friendly	Forest Coverage	Forest Coverage	just
			Environmental Protection	Environmental protection expenditure/government public financial expenditure	just
		Pollution reduction	Pollutant Emissions	Sulfur dioxide emissions	burden
				Wastewater Discharge	burden
				General industrial solid waste generation	burden
			Pollutant control	Industrial wastewater treatment facilities (sets)	just
				Industrial waste gas treatment facilities (sets)	just
Production materials	Tangible Materials	Infrastructure	Traditional facilities	Highway mileage	just
				Railway mileage	just
			Digital facilities	Fiber length	just
		Energy consumption	Overall energy consumption	Energy consumption/GDP	burden
			Renewable energy consumption	Renewable energy power consumption/total social power consumption	just
	Intangible Data	Technological innovation	Number of patents per capita	Number of patents granted/total population	just
			R&D investment	R&D expenditure/GDP	just
		Digital Level	Internet penetration rate	Number of broadband access ports per capita	just
			Enterprise Digitalization	Enterprise digitalization level	just

(2) Explained variables. The degree of common prosperity is the explanatory variable. Starting from the connotation of common prosperity, this paper builds a common prosperity index system based on the reference of Yuan Huiai et al. (2023) [2] and Han Liangliang et al. (2023) [20], combined with the availability of provincial data, and uses the entropy method to measure it, denoted as Cp. In addition, the dimension of "making the pie bigger" of common prosperity is denoted as, and the dimension of "dividing the pie well" is denoted as. See Table 2 for details.

Table 2: Common prosperity indicator system

Decomposition indicators	First level indicator	Secondary indicators	Measurement	property
Make the cake bigger	People are wealthy	Resident income	Per capita disposable income	just
		Household expenditure	Per capita consumer expenditure	just
		Development level	GDP per capita	just
	Quality of life	Library Collection	Public library collections per capita	just
		unemployment rate	Urban registered unemployment rate	burden
		Internet Development	Internet broadband access users	just
	High-quality development	Technological innovation	Research and development (R&D) funding intensity	just
		Development of the tertiary industry	Value added of tertiary industry /GDP	just
		Level of opening up	/GDP of the location of the business unit	just
Divide the cake	Economic level	Resident income gap	Per capita disposable income of urban residents /rural residents	burden
		Residents' spending gap	Urban residents' consumption expenditure /rural residents'	burden
	Healthcare	Medical facilities	Number of beds in medical and health institutions	just
		Technical staff	Number of health technicians per 10,000 people	just
	Public Services	Public spending	Local fiscal general public service expenditure /GDP	just
		Public Transportation	Public transport vehicles per 10,000 people	just
		Public toilets	Public toilets per 10,000 people	just
	social Security	Financial security	Local fiscal social security and employment expenditure /GDP	just
		Pension insurance	Number of participants in urban and rural residents' social pension insurance	just
	Ecological Environment	Park green space level	Park green space per capita	just
		Forest Coverage	Forest Coverage	just

(3) Mechanism variables. This paper selects scientific and technological innovation investment and public service level as mechanism variables. Referring to previous studies, scientific and technological innovation investment is measured by the intensity of R&D funding [21], denoted as. The public service level is expressed by the proportion of local fiscal public service expenditure, denoted as.

(4) Control variables. Drawing on relevant studies, this paper introduces labor force level, urbanization level, economic development level, tax burden level, and social consumption level as control variables. The labor force level (Lab) is

expressed as the natural logarithm of the number of employed persons in the region; the urbanization level ( ) is measured by Urbanthe ratio of Ecourban population to total population; the economic development level ( ) is measured by the logarithm of per capita TaxGDP; the tax burden level ( ) is measured by the proportion of Soctax revenue to regional GDP; and the social consumption level ( ) is expressed by the ratio of total retail sales of consumer goods to regional GDP.

3.3 Data Source

This study is based on the balanced panel data of 30 provinces and cities in China (excluding Hong Kong, Macao, Taiwan and Tibet) from 2012 to 2022. The data sources include the China Industrial Statistical Yearbook, China Energy Statistical Yearbook, China Environmental Statistical Yearbook and provincial statistical yearbooks.

The descriptive statistical results of the main variables of this study are shown in Table 3. It can be found that there are obvious differences in statistical characteristics between "making the pie bigger" ($Cp1$) and "dividing the pie well" ($Cp2$), which confirms the necessity of classifying and discussing the common prosperity of "making the pie bigger" and "dividing the pie well".

Table 3: Descriptive statistics of variables

variable	Sample size	Mean	Minimum	Maximum	Median	Standard Deviation
Cp	330	0.230	0.104	0.480	0.208	0.078
Cp1	330	0.207	0.028	0.709	0.158	0.145
Cp2	330	0.258	0.056	0.447	0.258	0.073
NqP	330	0.121	0.020	0.478	0.101	0.067
Lab	330	7.601	5.545	8.864	7.658	0.768
Urban	330	0.608	0.360	0.900	0.590	0.117
Eco	330	10.91	9.849	12.15	10.86	0.445
Tax	330	0.083	0.036	0.188	0.076	0.029
Soc	330	0.389	0.180	0.504	0.394	0.059

4. Empirical Results and Analysis

4.1 Basic Regression

This article focuses on testing the impact of new productivity on my country's common prosperity development level. Table 4 presents the baseline regression results of the two. Columns (1), (3) and (5) show the regression results without control variables and fixed effects, and columns (2), (4) and (6) introduce individual and time fixed effects while adding control variables. regression results. The study found that there is a significant positive relationship between new productive forces ($Nqpf$) and the overall development level of common prosperity (Cp), as well as the two key dimensions of common prosperity - "making the cake bigger" ($Cp1$) and "dividing the cake well" ($Cp2$). Correlation, and this relationship is confirmed at least at the 5% significance level. This shows that the development of new productive forces can improve the level of common prosperity in our country. It not only contributes to the expansion of the economic scale, that is, "making the cake bigger", but also helps to optimize the distribution of wealth, that is, "divide the cake well." Hypothesis H_1 established.

Table 4: Benchmark regression results

variable	Cp		Cp1		Cp2	
	(1)	(2)	(3)	(4)	(5)	(6)
NqP	1.000***	0.205**	1.655***	0.339**	0.184***	0.038**
	(0.033)	(0.041)	(0.077)	(0.076)	(0.059)	(0.008)
Lab		-0.030		0.002		-0.070**
		(0.013)		(0.026)		(0.009)
Urban		0.114		0.028		0.221
		(0.157)		(0.171)		(0.145)
Eco		-0.005		0.024		-0.040**
		(0.017)		(0.029)		(0.002)
Tax		0.407**		0.387**		0.431**
		(0.047)		(0.120)		(0.080)
Soc		0.135		0.170		0.092
		(0.064)		(0.078)		(0.052)
Constant term	0.109***	0.353	0.007	0.070	0.236***	0.705***
	(0.005)	(0.306)	(0.011)	(0.535)	(0.008)	(0.121)
Province fixed	no	yes	no	yes	no	yes
Fixed year	no	yes	no	yes	no	yes
Observations	330	330	330	330	330	330
R^2	0.735	0.980	0.585	0.990	0.026	0.970

Note: ***, * and * indicate significance at the 1%, 5% and 10% levels respectively, and cluster-robust standard errors are in parentheses. The same below.

4.2 Robustness Check

(1) Replace explanatory variables. In order to reduce the dependence of regression results on specific variable measurement methods, this article uses the entropy weight TOPSIS method to recalculate the common prosperity index. It can be seen from Table 5 that the positive impact of new quality productivity ($Nqpf$) on the overall development level of common prosperity (Cp) has been tested at the $Nqpf$1% significance level. At the same time, the positive impact of new quality productivity ( ) on "making the cake bigger" ($Cp1$) and The impact of "divide the cake well" ($Cp2$) is also significantly positively correlated at the 5% level. These results verify the stability and reliability of the above regression analysis.

Table 5: Robustness test - replacing the explained variable

variable	(1) Cp	(2) Cp1	(3) Cp2
NqP	0.201***	0.242**	0.067**
	(0.025)	(0.061)	(0.021)
Constant term	0.862**	0.134	1.072**
	(0.239)	(0.554)	(0.241)
Control variables	yes	yes	yes
Province fixed	yes	yes	yes
Fixed year	yes	yes	yes
Observations	330	330	330
R^2	0.977	0.986	0.979

(2) Eliminate municipalities. Considering that the particularity of municipalities may affect the empirical results, this article excludes four municipalities (Beijing, Tianjin, Chongqing, and Shanghai) from the analysis and conducts a new regression analysis using only provinces as the research sample. The results in Table 6 show that all variables show positive correlation at the 5% significance level. This finding confirms the robustness of the conclusions obtained above.

(3) Shrinking processing. In order to reduce the interference of extreme values on the regression analysis results, all continuous variables are trimmed by 1%. It can be seen from Table 7 that the impact of new productive forces ($Nqpf$) on the overall development level of common prosperity (Cp) in the two dimensions of "making the cake bigger" ($Cp1$) and "dividing the cake well" ($Cp2$) is significant at 5%. Significantly positive at the sticking level. These results are consistent with the previous analysis and further verify the robustness of the previous conclusions.

Table 6: Robustness test - excluding municipalities

variable	(1) Cp	(2) Cp1	(3) Cp2
NqP	0.193 **	0.312 **	0.046 **
	(0.047)	(0.093)	(0.013)
Constant term	0.145	-0.568	1.035 ***
	(0.268)	(0.467)	(0.139)
Control variables	yes	yes	yes
Province fixed	yes	yes	yes
Fixed year	yes	yes	yes
Observations	286	286	286
R^2	0.971	0.979	0.950

Table 7: Robustness test - winsorization

variable	(1) Cp	(2) Cp1	(3) Cp2
NqP	0.229 **	0.402 **	0.059 **
	(0.056)	(0.094)	(0.014)
Constant term	0.238	-0.001	0.609 *
	(0.254)	(0.456)	(0.199)
Control variables	yes	yes	yes
Province fixed	yes	yes	yes
Fixed year	yes	yes	yes
Observations	330	330	330
R^2	0.979	0.989	0.972

(4) Instrumental variable method. In the basic model analysis, this paper introduces individual and time fixed effects to mitigate the potential result bias caused by omitted variables to a certain extent. However, there may still be endogeneity problems between new quality productivity and common prosperity. This is mainly because the two may be causally related to each other, that is, the improvement of new quality productivity can promote common prosperity, and the realization of common prosperity in turn provides impetus for the growth of new quality productivity. In order to solve the endogeneity problem caused by two-way causality, this paper uses the instrumental variable method to conduct a more in-depth robustness test.

In response to the research questions of this paper, based on the in-depth exploration of the internal logic of new quality productivity and common prosperity, this paper selects the following instrumental variables: (1) Historical innovation capability: This study uses the number of per capita patents in the previous period to evaluate the historical innovation capability of a region. From the perspective of relevance, regions with strong innovation capabilities are more likely to achieve rapid development of new quality productivity driven by innovation; in terms of exogeneity, historical innovation capabilities, as a reflection of past innovation activities, are unlikely to have a direct impact on the current level of common prosperity; (2) Technology market activity: This paper measures the activity of the technology market by technology market transaction volume. In terms of relevance, when a region's technology market transaction volume is high, it means that the region has a higher conversion rate of technological achievements [22], the more diverse the available technological innovation achievements, and the faster the development of new quality productivity; in terms of exogeneity, the technology market transaction volume is exogenously determined by various macro factors and has no direct correlation with the local level of common prosperity.

Table 8 shows the regression results of the instrumental variable method. In the first stage of regression, column (1) shows that there is a significant positive correlation between the two instrumental variables and new quality productivity, which is consistent with the expectations of this article, that is Instrumental variables satisfy the correlation requirement. Further observation shows that the F statistic in the first stage is much larger than the critical value 10, indicating that there is no weak instrument problem. In addition, in order to test the exogeneity of instrumental variables, this paper conducts Sargan test. The test results show that the Sargan statistics are all higher than 0.1, which indicates that the instrumental variables selected in this article are exogenous. In the second-stage regression, columns (2) -column (4) show that new productivity ($Nqpf$) has a significant impact on the overall development level of common prosperity (Cp) and its sub-indicator "making the pie bigger" ($Cp1$) at the 1 % level of significance. There is a positive correlation, and the positive correlation with "divide the cake" ( ) is confirmed at the $Cp2$5% significance level. In summary, the reliability of the instrumental variables in this article has been verified, and the robustness of the benchmark regression results has also passed the test.

Table 8: Robustness Test-Instrumental Variable Method

variable	(1) NqP	(2) Cp	(3) Cp1	(4) Cp2
NqP		0.316 ***	0.503 ***	0.082 **
		(0.032)	(0.084)	(0.037)
IV1	15.706 ***			
	(1.773)			
IV2	0.257 ***			
	(0.052)			
F -number	78.79			
Sargan test		0.3687	0.1427	0.4974
Control variables	yes	yes	yes	yes
Province fixed	yes	yes	yes	yes
Fixed year	yes	yes	yes	yes
Observations	300	300	300	300
R^2	0.944	0.980	0.989	0.972

4.3 Mechanism Test

Based on the above mechanism analysis, investment in scientific and technological innovation and public service levels were selected as intermediary variables to test the impact of new productivity on common prosperity. The results are shown in Table 9. Specifically, in columns (1) and (4), the impact of new productivity ($Nqpf$) on investment in scientific and technological innovation (RD) and public service levels (Pub) is tested. The study found that the coefficient of new productivity ($Nqpf$) is significantly positive, which shows that the development of new productivity can improve regional scientific and technological innovation investment and public service levels. At the same time, columns (2) and (3) examine the impact of new productivity on the overall index of common prosperity (Cp) and "making the pie bigger" ( ) when $Cp1$ technological innovation ( ) is used as an intermediary variable. The results show that new quality productivity can promote common prosperity and "bigger the pie" through investment in scientific and technological innovation. Hypothesis H_{1a} is

established; Columns (5) and (6) use public services (*Pub*) as the intermediary to test the impact of new quality productivity on "dividing good things into a good one" Cake (*Cp2*) effect. The results show that public services play a complete intermediary role in the process of "growing the cake" of common prosperity through new productivity, and hypothesis H_{1b} is established. In addition, in order to ensure the robustness of the research results, this paper uses the Bootstrap method for verification, and the results are shown in Table 10. The study found that the Bootstrap test results are consistent with the above regression analysis, which further confirms that "new quality productivity → investment in scientific and technological innovation → common prosperity (making the cake bigger)" and "new quality productivity → public service level → common prosperity (dividing the cake) "The establishment of the transmission mechanism.

Table 9: Mechanism test

variable	(1) RD	(2) Cp	(3) Cp1	(4) Pub	(5) Cp	(6) Cp2
NqP	2.171 *	0.131 ***	0.231 **	0.023 *	0.156 **	-0.015
	(0.911)	(0.019)	(0.043)	(0.008)	(0.038)	(0.020)
RD		0.034 **	0.049 ***			
		(0.006)	(0.004)			
Pub					2.182 **	2.344 ***
					(0.528)	(0.191)
Constant term	2.949	0.252	-0.076	0.260 **	-0.214	0.097
	(1.817)	(0.246)	(0.445)	(0.064)	(0.259)	(0.044)
Control variables	yes	yes	yes	yes	yes	yes
Province fixed	yes	yes	yes	yes	yes	yes
Fixed year	yes	yes	yes	yes	yes	yes
Observations	330	330	330	330	330	330
R^2	0.986	0.983	0.992	0.950	0.983	0.975

Table 10: Bootstrap test

path	effect	coefficient	95% Confidence Interval
RD-Cp	Direct Effect	0.131 **	(0.02769, 0.23411)
	Indirect effects	0.074 ***	(0.03497, 0.11311)
RD-C p 1	Direct Effect	0.231 ***	(0.06548,0.39750)
	Indirect effects	0.107 ***	(0.05521,0.15969)
Pub-Cp	Direct Effect	0.156 ***	(0.06083,0.25041)
	Indirect effects	0.049 ***	(0.01648,0.08217)
Pub-Cp2	Direct Effect	-0.015	(-0.07285, 0.04237)
	Indirect effects	0.053 **	(0.00773, 0.09829)

4.4 Discussion on Dialectical Relationship

Considering that "making the cake bigger" and "dividing the cake well" are two interdependent links in the process of achieving common prosperity. This paper uses the Bootstrap method and 1000 times of repeated iterative sampling to ensure the accuracy of the model structure and threshold value, so as to reveal the dialectical relationship between "making the cake bigger" and "dividing the cake well" in the process of promoting common prosperity. Specifically: when studying the impact of new quality productivity on "making the cake bigger", "dividing the cake well" is introduced as the threshold variable; when studying "dividing the cake well", "making the cake bigger" is set as the threshold variable. Table 11 reports the results of the threshold effect existence test. It can be observed that there are double thresholds for "dividing the cake well" and only a single threshold for "making the cake bigger".

Table 11: Test for the existence of threshold effect of new quality productivity

Threshold variables	Model	Threshold	F -number	P- value	Critical value			BS frequency
					10%	5%	1%	
Divide the cake as the threshold	Single Threshold	0.2511 ***	52.11	0.009	31.9476	38.8875	51.1069	1000
	Double threshold	0.3313 ***	49.43	0.008	26.8891	31.7331	46.2245	1000
	Triple Threshold	0.3421	9.61	0.805	33.0785	40.2154	56.9667	1000
Make the cake bigger as the threshold	Single Threshold	0.1198 **	31.19	0.034	23.3260	28.1016	40.5052	1000
	Double threshold	0.2280	18.63	0.167	21.9602	27.4653	38.3637	1000
	Triple Threshold	0.3508	11.23	0.728	29.6231	33.0002	42.8110	1000

Table 12 reports the analysis results of the threshold effect. Column (1) uses "dividing the cake well" as the threshold variable to explore Cp2how different stages of "dividing the cake well" ( ) affect the new quality productivity's "making the cake bigger" (*Cp1*). From the results, every time "dividing the cake well" crosses the threshold value, the promotion of the new quality productivity to "making the cake bigger" will increase, and its influence coefficient rises from 0.319 to 0.476, and finally reaches 0.655. This shows that in the process of promoting common prosperity by the new quality productivity, if we can optimize resource allocation and continuously "divide the cake well", it will help the new quality productivity to better "make the cake bigger". Column (2) examines the impact of "making the cake bigger" on the new quality productivity's "dividing the cake well". The results show that only when "making the cake bigger" crosses the critical value of 0.1198 can the new quality productivity effectively achieve "dividing the cake well". This shows that only when "making the cake bigger" can "dividing the cake well" be achieved, that is, "making the cake bigger" is the prerequisite for the new quality productivity to "divide the cake well".

Table12: Results of threshold effect analysis

	(1)	(2)
	Cp1	Cp2
Interval 1	0.319 ***	-0.049
	(0.036)	(0.038)
Interval 2	0.476 ***	0.114 ***
	(0.031)	(0.028)
Interval 3	0.655 ***	
	(0.039)	
Constant term	-0.846 ***	0.670 ***
	(0.150)	(0.137)
Control variables	yes	yes
Observations	330	330
R^2	0.926	0.657

Note: Interval 1 is less than the single threshold; Interval 2 is between the single threshold and the double threshold; Interval 3 is greater than the double threshold.

5. Conclusions and Suggestions

5.1 Research Conclusions

This paper focuses on the two major strategies of new quality productivity development and common prosperity, and uses provincial panel data from 2012 to 2022 for in-depth analysis. After constructing an indicator system to measure provincial new quality productivity and common prosperity, this paper uses an empirical research method to

explore the different impacts of new quality productivity on the overall level of common prosperity and its two key areas: "making the pie bigger" and "dividing the pie well". In addition, the study also explores the potential role of high-quality talents in the region. The main results are as follows: (1) New quality productivity can promote the realization of common prosperity by "making the pie bigger" and "dividing the pie well". Among them, the realization of "making the pie bigger" by new quality productivity relies on investment in scientific and technological innovation; the promotion of "dividing the pie well" is through the improvement of public services. (2) "Making the pie bigger" is the prerequisite for the "dividing the pie well" of new quality productivity; "dividing the pie well" is conducive to the further "making the pie bigger" of new quality productivity.

5.2 Research Implications

The findings of this paper have the following policy implications:

First, we should deepen the development of new productivity and promote the realization of common prosperity. Research has confirmed that the growth of new productivity is an important driving force for achieving common prosperity, and that investment in scientific and technological innovation and improvement of public services play a key role in this process. To this end, it is necessary for the competent departments of various regions to build a long-term mechanism for new productivity to empower common prosperity. Specifically, the following measures need to be taken: First, establish a modern infrastructure system and deploy a blueprint for the development of new productivity. The rapid development of new productivity depends on the support of a modern infrastructure system, which requires all regions to not only increase the construction of traditional infrastructure such as transportation, energy, and logistics, but also pay attention to the planning of new infrastructure such as information, technology, and the Internet of Things; second, increase investment in scientific and technological innovation to achieve high-level scientific and technological self-reliance. Science and technology are the foundation of national prosperity, and innovation is the soul of national progress. All responsible departments should fully recognize the strategic leading position and fundamental supporting role of science and technology, anchor the strategic goal of building a strong country in science and technology by 2035, increase investment in scientific research, and strive to form a solid foundation and intellectual support for a world power in science and technology; three, strengthen the construction of a public service system and forge a new productivity driving model. Considering the positive role of improved public services in "dividing the cake well", all regions should accelerate the improvement of the quality and coverage of public services, narrow the public service gap between urban and rural areas and between regions, especially in the fields of education, medical care, and elderly care, and ensure the equalization of basic public services.

Second, implement the strategy of strengthening the country through talents and implement the policy of strengthening the country through science and education. High-quality talents cultivated by colleges and universities can promote the realization of common prosperity through new quality productivity, and this phenomenon is more obvious in areas with lower industrial levels. In this regard, relevant departments should focus on coordinating the strategy of strengthening the country through talents and the strategy of strengthening the country through science and education, and unblocking the two-way circulation of education and talents. In terms of talent cultivation, colleges and universities should serve the needs of major national strategies and local economic and social development, accelerate the transformation of scientific research organization models and paradigms, deepen the cross-disciplinary integration, and strive to cultivate key talents adapted to the development of new quality productivity according to the development trend of science and technology, regional resource endowment, industrial layout attributes and other characteristics. In terms of talent management, we should abandon the traditional "official-oriented" and administrative thinking, create a working environment that recognizes, respects and uses talents, and provide more autonomy and innovation space for talents. In particular, colleges and universities in areas with relatively low industrial levels should plan and deploy in advance, and cultivate disciplines and majors closely related to new quality productivity by strengthening the construction of basic disciplines, emerging disciplines and interdisciplinary disciplines, so as to improve the quality and efficiency of new quality productivity to achieve common prosperity.

Third, we should take into account both "making the pie bigger" and "dividing the pie well" and promote common prosperity simultaneously. Achieving common prosperity is a comprehensive and complex system project, which requires finding an appropriate balance between economic growth and fair distribution. Therefore, in the process of new productivity driving common prosperity, we must coordinate the two sides of common prosperity, that is, "making the pie bigger" and "dividing the pie well". On the one hand, we should take "making the pie bigger" as the basis for development. That is, to achieve common prosperity, we must first adhere to the basic national policy of focusing on economic construction and promote sustained and healthy economic development. This requires local competent departments to improve labor productivity, expand employment opportunities, increase residents' income, etc. On the other hand, we should take "dividing the pie well" as the goal of advancement. That is, while expanding the economic scale, we should establish a scientific public policy system, use taxation, social security, transfer payments and other means to effectively adjust the income gap, and ensure that the new quality productivity "makes the pie bigger" better.

5.3 Research Limitations and Prospects

At present, the quantitative analysis of new quality productivity is still in the exploratory stage, and there is a lack of mature experience to learn from. Therefore, it is difficult to accurately define its scientific definition and apply data science technology to evaluate its development level and realization status. The provincial new quality productivity indicator system attempted to be constructed in this study is still preliminary and aims to provide inspiration and reference for future research. In addition, as an emerging driving force for promoting common prosperity, new quality productivity plays a key role in the development of China's economy and society. However, how new quality productivity promotes common prosperity through its internal mechanism needs further discussion and improvement.

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