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Analysis on the Acceleration of Urban-Rural Integration by New-type urbanization Construction from the Perspective of Equalization of Basic Public Services

Linling Ge[1,2], Shifang Tang[1,2*]
[1]School of Finance and Public Administration, Guangxi University of Finance and Economics, Nanning, Guangxi, China
[2]Guangxi Education Performance Evaluation Studies Collaborative Innovation Center, Key Research Institute of Humanities and Social Sciences in Universities of Guangxi, Nanning, Guangxi, China
* Corresponding author.

Abstract:

Equalization of basic services is the starting point and focus of promoting the integration of urban and rural areas which is an important content of realizing the coordinated development of economy and society at the current stage. Can the new-type urbanization construction started in 2014 aiming to explore a new road of high-quality development of urban and rural areas improve the imbalance of basic public services in urban and rural areas and thus accelerate the development of urban-rural integration? To get the answer, in this paper, the quasi-natural experiment was constructed by the national comprehensive pilot of new-type urbanization, and the panel data of prefecture-level cities from 2011 to 2019 were used to empirically explore the impact of new-type urbanization on the equalization level of basic public services. The conclusions show that the new-type urbanization promotes the equal development of basic public services in urban and rural areas and is conducive to the realization of the organic integration of urban and rural areas, which provides empirical evidence for how to better implement the concept of coordinated development and promote high-quality economic and social development in the "14th Five-Year Plan" period.

Keywords*: Quasi-natural experiment; New-type urbanization; Equalization of basic public services; Urban-rural integration; Fiscal policy*

I. INTRODUCTION

Coordinated development is an important starting point for implementing the new development concept and promoting high-quality economic and social development, in which the coordinated development of urban and rural areas is the core proposition. Since the reform and opening up, how to deal with the relationship between urban and rural areas and realize coordinated development has always been a major strategic issue concerning the national economy and people's livelihood. In the process of

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exploration, the concept transition from "urban-rural separation" to "urban-rural coordination" and then to "urban-rural integration" has been gradually formed in China, and the urban-rural integration development has become the final stage to deal with the relationship between urban and rural areas [1]. A journey of one thousand miles begins with the first step. Realizing the equalization of basic public services between urban and rural areas is the primary task to promote the development of urban-rural integration, and is also an important work to realize the coordinated development of urban and rural areas. At the present stage, there is still a big gap in the supply level of basic public services between urban and rural areas in China, in which rural areas are the absolute depression of basic public services. The accelerating process of urbanization has promoted the widening gap between urban and rural areas in education, medical care, health and social security [2,3]. In this context, urbanization is expected to narrow the gap between urban and rural hard infrastructure [4,5]. Over the past years, although China has achieved some positive results in promoting urbanization construction by adjusting the administrative boundary, the transfer of rural productivity and the extensive integration of industrial structure, a large number of rural population in cities have not received appropriate public goods and public services. On the contrary, the income gap between urban and rural areas has been widening, and urbanization construction has become a mere formality [6,7].

In order to effectively solve the increasingly serious imbalance between urban and rural development, China officially promulgated the *National New-type urbanization Plan (2014-2020)* in March 2014, which clearly stated that all localities should stop the urban sprawl. Instead, they should promote the agricultural transfer population to enjoy better basic public services, and implement measures such as expanding social security coverage, improving basic medical and health conditions, and ensuring that children moving with them equally enjoy the right to education. From February 2015 to December 2016, China successively published a list of three batches of national comprehensive pilot areas for new-type urbanization, and planned to achieve phased results in each pilot task by 2017, forming replicable and replicable experiences. However, at present, the actual effect of the new-type urbanization pilot has not been discussed in the academic circles, which undoubtedly cannot provide empirical evidence and policy reference for the next vigorous promotion of the new-type urbanization construction. In this paper, the national comprehensive pilot area reform of new-type urbanization was taken as a policy shock, and the data of 216 prefecture-level cities from 2011 to 2019 were used to construct a difference-in-difference model to empirically test the actual effectiveness of new-type urbanization in narrowing the gap between urban and rural basic public services, and on this basis, the impact mechanism of new-type urbanization on the equalization of urban and rural basic public services and accelerating the development of urban and rural integration was investigated. In addition, regional differences, the degree of agricultural development and the heterogeneity of government governance capacity were brought into the analysis framework to further explore the impact of new-type urbanization on the equalization of basic public services between urban and rural areas and the integration of urban and rural areas, so as to provide policy basis for optimizing the supply of basic public services.

The innovation points of this paper mainly fall on the following three aspects: First of all, the theoretical research on urban and rural basic public services has been enriched. Most of the existing

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literatures discuss how internal factors affect the coordinated development of urban and rural areas from the realistic background, while this paper attempts to explore the catalytic role of national policies for the equal development of basic public services in urban and rural areas. Next, the empirical research of new-type urbanization pilot has been supplemented. The current research on new-type urbanization mostly stays at the theoretical level, and scholars generally abstract its connotation by describing the characteristics of new-type urbanization. This paper takes the national comprehensive pilot reform as the policy shock to get more real and objective empirical evidence on the basis. At last, the perspective of urban-rural integration development is clarified. The existing literature studies the path of urban-rural integration from multiple perspectives, but seldom regards the equalization of basic public services as the starting point and focus of urban-rural integration. This paper regards basic public services as the starting point and entry point of urban-rural integration, and explores the policy factors that affect the equalization of basic public services in urban and rural areas, so as to provide practical policy enlightenment for promoting urban-rural integration.

II. THEORETICAL ANALYSIS AND RESEARCH HYPOTHESES

Urbanization plays an important role in stimulating regional economic growth and promoting regional coordinated development [8]. China has made remarkable achievements in urbanization development since the reform and opening up. However, the adoption of the past urbanization model has not only improved the overall development level of the region, but also caused a new problem that the rural population has not really integrated into the urban environment [9]. So, the state put forward the concept of new-type urbanization in time. In contrast, the new-type urbanization is "new" mainly in the following aspects: First, it emphasizes the overall planning of urban and rural areas and the coordinated development of urban and rural integration. The new-type urbanization is one in which large, medium and small cities, small towns and new rural communities develop harmoniously and promote each other. Different from the past city-building movement, the new-type urbanization aims to truly realize the citizenization of rural population, thus realizing the urbanization of industry, population, land, society and rural areas. Second, it emphasizes the coordinated development of urban and rural residents in living conditions and quality of life. New-type urbanization promotes the rural population to truly integrate into urban life by giving them more convenient infrastructure and better public goods and services. Finally, it emphasizes the function of the government in promoting the integration of urban and rural areas. In the past, urbanization relied more on market mechanism to realize population mobility and natural changes to realize industrial transfer. As a result, urban and rural residents only achieved formal integration, and the income gap became wider and wider. New-type urbanization emphasizes the positive role of the government in promoting the deep integration of urban and rural areas, and realizes the balanced development of urban and rural areas by optimizing the allocation efficiency of public resources.

As an important category of public resources provided by the government, basic public services, including education, medical care, health and social security, all depend on the support of financial funds. Therefore, it is of great practical significance to realize the equalization of basic public services enjoyed by cities and villages for narrowing the gap between urban and rural areas and promoting the integration and

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development. As mentioned above, new-type urbanization has changed the basic path of urban-rural integration in the past, and a new mode of urban-rural connectivity should be established through more rational allocation of public resources. The equalization of basic public services embodies the social value appeal of "equal opportunities and equal results", that is, every citizen should enjoy equal financial benefits such as education, medical care and health under any conditions. Equalization is a dynamic process, which is gradually realized with the development of economy and society and the improvement of system [10]. The core of the new-type urbanization is "people-oriented". It emphasizes that urban and rural residents "share fairly" the fruits of modernization construction, and calls for steadily promoting social security measures such as affordable housing, basic education, basic old-age pension, and medical and health services, so as to make people's lives more secure.

Based on this, hypothesis 1 is put forward in this paper: China's new-type urbanization construction is helpful to narrow the gap between urban and rural basic public services and realize the equal development of urban and rural basic public services.

The key to realizing the equal development of basic public services in urban and rural areas is to narrow the development gap between urban and rural areas [11]. New-type urbanization has improved the scale and quality of basic public services enjoyed by rural residents, mainly in the following two aspects [12]. On the one hand, the new-type urbanization has absorbed more agricultural transfer population into the cities, so that they can enjoy the basic public services of urban residents. At the same time, population urbanization has a reverse impact on urban basic public services [13], which is manifested by the increase in urban demand for basic public services and the decrease in the growth rate of urban basic public services. On the other hand, the transfer of rural labor force to cities has raised farmers' income level, promoted social and economic development in rural areas, and improved the supply capacity of basic public services in rural areas [14]. On the whole, the new-type urbanization changes the relative growth rate of the basic public services in urban and rural areas, which makes the basic public services in urban and rural areas converge and converge, thus bringing positive impact to the coordinated development of urban and rural areas. Based on this, hypothesis 2 is made in this paper.

H2: The implementation of new-type urbanization can achieve the equal development of urban and rural areas by narrowing the gap in the growth rate of basic public services between urban and rural areas.

III. RESEARCH DESIGN

3.1 Modeling

In this paper, according to the Notice of National New-type urbanization Comprehensive Pilot Program issued by National Development and Reform Commission in December, 2014, the quasi-natural experiment was carried out with the establishment of national new-type urbanization comprehensive pilot areas as a policy shock. As the above-mentioned pilot work was gradually implemented in three batches from 2015 to 2016, different impact time points were divided by year, and on this basis, a multi-period

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double difference model was constructed.

$$Equalization_{ct} = \beta_0 + \beta_1 New_{ct} + \sum \beta_i \, Control_{ct} + Province_c + Year_t + \varepsilon_{ct} \quad (1)$$

Where, Equalization=the explained variable, means the degree of equalization of basic public services in urban and rural areas;*New*=the explanatory variable, and the interaction of policy dummy variable and time dummy variable in DID model;*Control*=a set of control variables.

The subscripts c and t denote city and time, respectively. In addition, in order to control the fixed effect (two-way fixed effect) at the provincial and Year levels, the province dummy variable Province and the time dummy variable Year were introduced in this paper. Besides, a robust standard error from cluster to province level was also used considering the inevitable interaction between cities in the same province.

The coefficient β_1 of the core variable in formula (1) is the most concerned parameter in this paper. According to the above theoretical analysis and the meanings of the variables in the model, the direction of β_1 was judged to be negative, which would be verified by *OLS* regression.

3.2 Variable Selection

Explained variable: The *Equalization* of basic public services in urban and rural areas. Based on the existing literature, nine indicators from the three dimensions of education, health care and sanitation were selected to construct the index system for evaluating the basic public service level in the region (see TABLE I). The comprehensive index of basic public service in cities and villages was calculated according to the entropy method [15,16]. Entropy method is a statistical method that reflects the influence of index dispersion on comprehensive evaluation, and then quantifies abstract concepts according to the weight of each index. It is widely used in dimension reduction and quantification of complex indicators because it can not only avoid subjectivity and randomness caused by artificial weighting of indicators, but also make full use of statistical information reflected by sub-indicators to describe comprehensive concepts. As it is very difficult to obtain statistical data of villages at the prefecture level, the city was defined as a municipal district and the village was defined as an area outside the municipal district in this paper [17].

TABLE I. Evaluation indicator system of regional basic public service level

Dimensions	Meaning of indicators	Efficacy	Unit
Education	Number of regular primary schools per 10,000 people	Positive	School/10,000people
	Number of regular secondary schools per 10,000 people	Positive	School/10,000people
	Teacher/student ratio in regular primary schools	Positive	People/10,000people

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	Teacher/student ratio in regular secondary schools	Positive	People/10,000people
	Expenditure on education/general public budget	Positive	Ten thousand yuan/ten thousand yuan
Medical treatment	Number of hospitals and health centers per 10,000 people	Positive	One/ 10,000 people
	Number of beds in hospitals and health centers per 10,000 people	Positive	Bed / 10,000 people
	Number of doctors per 10,000 people	Positive	People/10,000 people
Culture	The total quantity of books in public libraries per 10,000 people	Positive	One thousand books/10,000 people

After calculating the comprehensive indexes of basic public services in cities (*City Score*) and villages (*Country Score*) respectively, the equalization degree of basic public services in cities and villages was measured according to formula (2).

$$Equalization_{ct} = (Ctiy\ Score_{ct} - Country\ Score_{ct})^2 \qquad (2)$$

In the above formula, the actual meaning of Equalization is the difference in the level of basic public services between urban and rural areas. The smaller the indicator, the higher the degree of equalization of basic public services in urban and rural areas.

Explanatory variables: Whether a new-type urbanization pilot (New) has been carried out. The core explanatory variables were constructed in the following aspects: First, the division of treatment group and control group. According to the list of three batches of national new-type urbanization comprehensive pilot areas published by the National Development and Reform Commission from 2015 to 2016, the cities that fall on the new-type urbanization pilot in the sample period were defined as the treatment group, and the cities that do not fall into the pilot were defined as the control group. As only some districts and counties in 78 cities, such as Hefei and Baoding, have carried out pilot projects of new-type urbanization, in order to accurately depict the economic and social effects caused by the pilot projects of new-type urbanization, and to ensure the homogeneity and comparability between individuals in the treatment group and the control group as much as possible, these cities that have not completely carried out pilot reforms were excluded from the city samples. Second, the selection of the time of policy shock. Based on the basic principle that the time of pilot reform is the time point of policy shock, the following amendments were made in this paper. First of all, the pilot areas announced in November 2015 are all at the county and district levels, and all their cities had been eliminated in grouping. Secondly, considering that the list of the third batch of pilot cities was announced in November 2016, and it was difficult to produce economic and

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social effects in that year, the policy shock point of these pilot cities was postponed by one year. Thirdly, the construction of interaction terms. For the samples of the cities in the treatment group in the year of policy shock and all subsequent years, New was named as 1 in this paper, and that of all other samples was named as 0. In addition, in order to verify the continuous impact of new-type urbanization on the equalization of basic public services between urban and rural areas, a continuous explanatory variable Long was constructed: the year of new-type urbanization construction in each pilot city was added with 1 and the natural log was taken. The Long of cities without pilot and before pilot was 0.

Control variables: In this paper, economic scale, social development, financial situation and other indicators that may affect the empirical model were selected as control variables [18,19]. See TABLE II for detailed definitions of variables.

TABLE II. Comparison table of control variables

Names	Symbols	Meaning
Quality of economic development	*PerGDP*	The natural log of GDP per capita
Level of economic growth	*Growth*	(GDP of the current year-GDP of the previous year)/GDP of the previous year
Level of development growth	*Agriculture*	GDP of primary industry/total GDP
Urban unemployment rate	*Unemployment*	(Number of registered unemployed people in cities and towns/number of registered unemployed people in cities and towns+ number of employees in units+ number of private and individual employees)
Urbanization rate	*Urbanization*	Non-agricultural population/average annual population of the whole city
Fiscal expenditure gap	*Expenditure*	Per capita fiscal expenditure in cities/rural areas
Government deficit to GDP ratio	*Deficit*	(Fiscal expenditure - fiscal revenue)/total GDP

3.3 Data Processing and Source Description

In this paper, the sample period was selected from 2011 to 2019, in order to better reflect the actual effect difference between the treatment group and the control group before and after the policy shock. Considering the "cliff-like" decline of economic figures in various places under the influence of COVID-19 outbreak in 2020, all the samples in 2020 were eliminated in order to ensure the consistency of individual statistical characteristics of various variables.

As mentioned above, the individual cities where only some districts and counties have carried out the pilot reforms were excluded. On this basis, the administrative units at the prefecture and municipal levels, such as autonomous prefectures (leagues) for ethnic minorities, regions and counties under the jurisdiction

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of provinces, as well as the administrative units at the provincial level, such as municipalities directly under the central government and special administrative regions were excluded. Only 216 samples of prefecture-level cities were retained. In addition, the prefecture-level cities with inconsistent administrative levels during the sample period were also eliminated, so as to eliminate the systematic deviation between the treatment group and the control group as much as possible. Finally, all continuous variables were winsorized by 1% and 99% to eliminate the abnormal values generated in the data processing.

The data of explanatory variables in this paper are from the policy documents issued by the National Development and Reform Commission on the website of the State Council. The data of control variables and interpreted variables are from *China Urban Statistical Yearbook, China Regional Economic Statistical Yearbook, China Statistical Yearbook and China Fiscal Yearbook*.

Descriptive statistics of the main variables are shown in TABLE III.

TABLE III. Descriptive statistical results of main variables

Variable name	Control group				Treatment group			
	Sample size	Mean	Min.	Max.	Sample size	Mean	Min.	Max.
Equalization	1472	0.0084	0.0000	0.0732	326	0.0067	0.0000	0.4153
New	1592	0.0000	0.0000	0.0000	352	1.0000	1.0000	1.0000
Long	1592	0.0000	0.0000	0.0000	352	0.8992	0.0000	1.6094
PerGDP	1541	10.5968	8.8509	13.0851	344	11.0504	9.4056	13.1851
Growth	1553	0.0592	-0.1654	0.3109	347	0.0547	-0.1524	0.2775
Agriculture	1525	0.1282	0.0003	0.4695	339	0.0981	0.0004	0.4246
Unemployment	1542	0.0969	0.0026	1.0000	350	0.1150	0.0015	0.9999
Urbanization	1556	0.3663	0.0468	1.0000	345	0.4253	0.1130	1.0000
Expenditure	1468	2.4711	0.0228	571.7170	324	1.9314	-4.9604	42.9366
Deficit	1541	0.1303	-0.0671	1.4886	344	0.1040	-0.0090	0.8217

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IV. EMPIRICAL RESULTS AND ANALYSIS

4.1 Benchmark Regression

TABLE IV shows the results of the benchmark regression in this paper, in which models (1) and (3) are unary regression with no control variables introduced, models (2) and (4) are regression with all control variables introduced, and explanatory variable of models (1) and (2) is a virtual variable (*New*), "whether the city has joined the new-type urbanization pilot", that of models (3) and (4) is "the number of years the new-type urbanization pilot has been implemented" (*Long*). From the results of (2) and (4), the new-type urbanization has indeed improved the level of equalization of urban and rural public services in the pilot areas, and this positive impact has a significant persistence, which proves hypothesis 1.

TABLE IV. Results of benchmark regression

Variable name	(1)	(2)	(3)	(4)
	Explanatory variable: pilot or not		Explained variable: Duration of the pilot	
New	-0.0024*	-0.0040***		
	(0.0013)	(0.0010)		
Long			-0.0026**	-0.0040***
			(0.0011)	(0.0007)
PerGDP		0.0042***		0.0042***
		(0.0012)		(0.0012)
Growth		0.0001		-0.0003
		(0.0087)		(0.0088)
Agriculture		0.0027		0.0025
		(0.0038)		(0.0041)
Unemployment		0.0007		0.0008
		(0.0029)		(0.0029)
Urbanization		0.0008		0.0007
		(0.0042)		(0.0042)
Expenditure		0.0000**		0.0000**
		(0.0000)		(0.0000)
Deficit		0.0041*		0.0038
		(0.0021)		(0.0022)
Fixed effect of provinces	Y	Y	Y	Y
Fixed effect of time	Y	Y	Y	Y
_cons	0.0075***	-0.0385***	0.0074***	-0.0379***
	(0.0005)	(0.0109)	(0.0005)	(0.0109)
N	1796	1700	1796	1700
adj. R^2	0.2165	0.0650	0.2172	0.0657

Note: The robust standard errors from clustering to province level are shown in parentheses. *, * *, * * * represented significance at 0.1, 0.05, and 0.01 levels, respectively.

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4.2 Robustness Test

4.2.1 Parallel trend test

An important prerequisite for the effectiveness of the DID model is to meet the parallel trend test, i.e. there is no significant difference between the treatment group and the control group before the policy shock, otherwise it will not be possible to prove that the economic effects assessed were generated by the policy shock. In view of the fact that there is no uniform policy time point for the multi-period DID model, the traditional test method can no longer be applied. Therefore, the event analysis method was used to perform a difference-in-difference test on the multi-period DID model.

Fig 1 shows the results of parallel trend test. It is obvious that there is no obvious difference between the treatment group and the control group before the policy shock. After the policy shock, the level of equalization of urban and rural public services in the treatment group city is significantly higher than that in the control group city, which is consistent with the benchmark regression results, thus indicating that the parallel trend test has been passed.

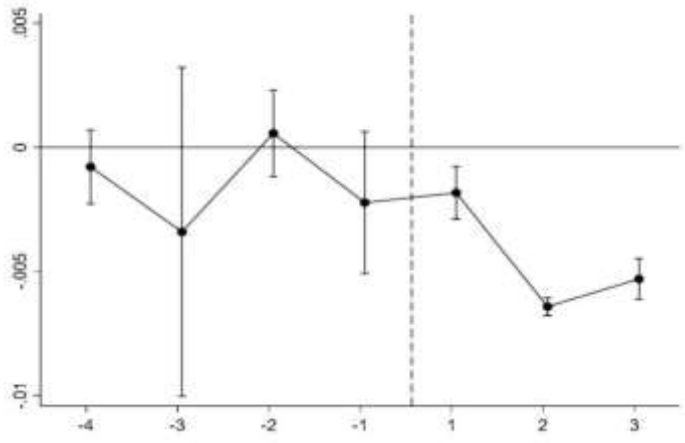

Fig. 1 Results of parallel trend test

4.2.2 Model modification

Although the hypothesis in this paper has been proved to be true by benchmark regression, there may be model errors that distort the result. Therefore, in this paper, the benchmark model was modified from the following three aspects.

First, the core variable was replaced. Since the explanatory variables in this paper were the interaction terms of the DID model, they were replaced for regression. Specifically, on the basis of the basic public service index system constructed in Table 1 and the entropy method, the urban public service index (*City*

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Score) and the rural public service index (*Country Score*) were calculated respectively. The equalization level of urban and rural basic public services was re-measured according to the information entropy principle [19], and the information entropy function was designed as follows:

$$Equalization_{ct} = \frac{-\left\{\frac{City\ Score_{ct}}{\sum City\ Score_t} ln \frac{City\ Score_{ct}}{\sum City\ Score_t} + \frac{Country\ Score_{ct}}{\sum Country\ Score_t} ln \frac{Country\ Score_{ct}}{\sum Country\ Score_t}\right\}}{E_{max}} \quad (3)$$

Since the information entropy reflects the degree of information dispersion, the larger the Equalization obtained from Formula (3) is, the smaller the gap between urban and rural basic public services is, and the higher the degree of equalization is. When the urban and rural basic public service levels are equal, the entropy is the maximum state ($E_{max}=ln2$), at which time the equalization level reaches the peak value. In this paper, the ratio of the actual entropy value and the maximum entropy value was taken as a new explained variable (*Equalization2*) and regressed.

Secondly, the sample was changed. As mentioned above, in order to ensure that the processing group and the control group have the least noise interference, the prefecture-level cities where only some districts and counties have carried out the pilot reforms were excluded. As a result, only 216 of the 293 prefecture-level cities in the country remained, and there may be sample selection bias. For this reason, the research hypothesis was relaxed in the robustness test, and the excluded prefecture-level cities were reconsidered. The new treatment group was understood as "cities that participated in the pilot reform" (cities that only implemented the reform in some districts and counties were also included).

Finally, the control variables were added. In this paper, province dummy variable and time dummy variable were introduced into the basic regression, thus controlling the two-way fixed effect of province and time. In the robustness test, the interaction items of provinces and time trends and time trends were introduced in turn to control the joint fixed effect of provinces and time levels. See TABLE V.

TABLE V. Robustness test: model modification

	(1)	(2)	(3)	(4)	(5)
Variable name	Replaced core variable	Replaced sample	Added control variable	Placebo test: the policy point was advanced by 3 years.	Placebo test: the policy point was advanced by 4 years.
New	0.0010*	-0.0020*	-0.0020*		
	(0.0006)	(0.0011)	(0.0010)		
New-3				-0.0013	
				(0.0013)	
New-4					-0.0012
					(0.0008)

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PerGDP	-0.0020	0.0040***	-0.0080	-0.0083*	0.0057**
	(0.0023)	(0.0010)	(0.0044)	(0.0044)	(0.0021)
Growth	0.0092*	0.0075	-0.0014	-0.0008	0.0137*
	(0.0048)	(0.0054)	(0.0093)	(0.0091)	(0.0065)
Agriculture	0.0079	-0.0036	0.0079	0.0074	-0.0003
	(0.0060)	(0.0039)	(0.0069)	(0.0069)	(0.0062)
Unemployment	-0.0020*	0.0026	-0.0026	-0.0027	0.0001
	(0.0011)	(0.0027)	(0.0016)	(0.0016)	(0.0026)
Urbanization	-0.0136**	-0.0002	-0.0001	-0.0003	0.0011
	(0.0067)	(0.0033)	(0.0064)	(0.0065)	(0.0046)
Expenditure	0.0001***	0.0000	0.0000	0.0000	0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Deficit	-0.0161**	0.0065**	-0.0311	-0.0301	0.0039
	(0.0066)	(0.0027)	(0.0173)	(0.0171)	(0.0042)
Fixed effect of provinces	Y	Y	Y	Y	Y
Fixed effect of time	Y	Y	Y	Y	Y
*Province * time trend*	N	N	Y	N	N
*Province * time trend squared*	N	N	Y	N	N
_cons	0.0994***	-0.0368***	0.0952*	0.0982*	-0.0545**
	(0.0246)	(0.0092)	(0.0498)	(0.0497)	(0.0213)
N	1700	2309	1700	1700	1700
adj. R^2	0.6763	0.0716	0.2030	0.2025	0.0739

4.2.3 Placebo test

Although the results of the benchmark regression mentioned above show that the new-type urbanization reform does promote the equal development of basic public services in urban and rural areas, and has passed a series of robustness tests, this effect may be caused by unknown factors that are not observed. Limited by the availability of data and the inexhaustible of unknown factors, this problem can only be eliminated indirectly through the placebo test, whose principle is to artificially change the policy shock process without changing other conditions to determine whether the original conclusion is still valid. As far as this study is concerned, if the equalization level of basic public services in urban and rural areas is still improved when the new-type urbanization reform is implemented in different cities, this result is obviously caused by other reasons. On the contrary, it proves that the policy effect of the new-type urbanization reform does exist.

In this paper, two different methods were used to change the time point of policy shock. First, the policy occurrence time was pushed forward by 3 years and 4 years respectively, i.e. the false explanatory variables were constructed and substituted into the benchmark model for regression. Secondly, all the cities in the treatment group were re-matched with the time when the policy occurred (the selected interval

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was the sample period of this paper: 2011-2019), and false explanatory variables were also constructed for regression. In order to ensure that the matches conformed to the simple random sampling as much as possible, this process was randomly run 500 times, and all regression coefficients were plotted into the kernel density distribution (Fig. 2). In Fig. 2, the dotted line refers to the average value of 500 regression coefficients, and the solid line refers to the coefficient size of the benchmark regression result, and it is obvious that there is a significant difference between the two. Unreported results also showed an average P-value of greater than 0.1 for the 500 regression results, further suggesting that the randomized matched results did not lead to a benchmark regression, supporting the placebo test.

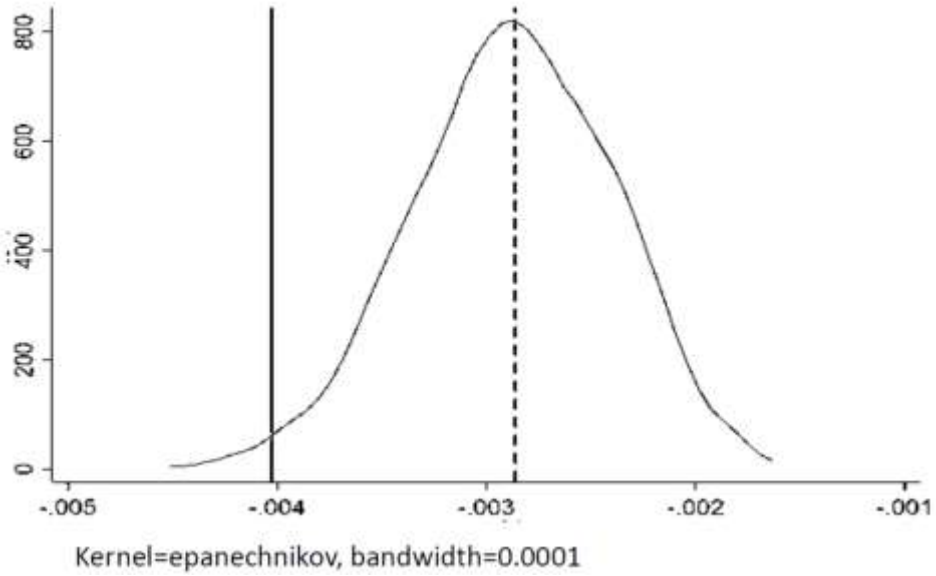

Fig. 2 Placebo test results: 500 random matches.

V. FURTHER ANALYSIS

5.1 Heterogeneity Analysis

The result of benchmark regression indicates that the promotion of new-type urbanization accelerates the equalization development of basic public services in urban and rural areas, and this result has passed the robustness test. On this basis, the heterogeneity analysis was carried out from the following four aspects to deeply explore the structural impact of new-type urbanization. First, whether it is one of the old revolutionary base areas. The old revolutionary base areas, minority autonomous areas and land border areas are the places with the most backward economic and social development and the oldest concept of development in China. Compared with other regions, they have more realistic resistance to eradicate absolute poverty and realize common prosperity, and the impact of national policies is even weaker. In order to explore the impact of this differentiation, the 27 provincial administrative regions (excluding Taiwan Province, Hong Kong, Macao and four municipalities directly under the central government) were divided into old revolutionary base areas and non-old revolutionary base areas, among which the former includes 17 provinces, namely Jiangxi, Hubei, Hunan, Sichuan, Shaanxi, Sichuan, Guizhou, Yunnan,

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Gansu, Qinghai, Jilin, Heilongjiang, Yunnan, Inner Mongolia, Tibet, Xinjiang and Guangxi. The heterogeneous virtual variable *Old* of the old revolutionary base areas was set, and the former was assigned 1 and the latter 0. Second, whether it includes state-level poverty-stricken counties, which are the main targets of China's precision poverty alleviation work, representing the places with the largest gap between the rich and the poor and the most serious imbalance between urban and rural development. In order to explore how the difference of unbalanced development between urban and rural areas affects the conclusion of this paper, the heterogeneity virtual variable Poverty of national poverty-stricken counties was set, and the prefecture-level cities including national poverty-stricken counties were assigned a value of 1, while other regions 0. Thirdly, the degree of agricultural development. Generally speaking, farmers in areas with relatively developed agriculture have higher income levels, better quality of life, and enjoy basic public services closer to those of urban residents. On the contrary, in underdeveloped agricultural areas, the improvement of farmers' income level is often ignored, so it is difficult for rural areas to become the main outflow place of government financial expenditure. The heterogeneous impact of agricultural development was explored in the following aspects: First, an indicator system was constructed to measure the degree of regional agricultural development according to the output of major agricultural products in the public yearbook. Secondly, the entropy method was used to calculate the comprehensive index to measure the agricultural development degree of each prefecture-level city. Thirdly, the *Mean* of agricultural development degree in all prefecture-level cities was calculated year by year. Finally, the heterogeneous virtual variable *Farm* of regional agricultural development degree was set, and the samples of prefecture-level cities higher than *Mean* were assigned to 1, and the rest 0. Fourthly, the ability of government governance. The local government's governance capacity determines its willingness to spend and changes in spending behavior, which will undoubtedly affect the distribution of public resources, including how to provide public services within its jurisdiction. Therefore, in this paper, the sub-item of "*Link* between government and market" in *China's Provincial Marketization Index* published by Fan Gang and Wang Xiaolu over the years was selected as the proxy variable to measure the government's governance capacity. The larger the Link, the stronger the government's willingness to intervene in the market economy and the larger the scale of public expenditure. The average value of *Link* in each province was calculated year by year, and the heterogeneous virtual variable *Capacity* of government governance capacity was set. The samples of provinces less than the average value were assigned to 1, and the rest 0.

The regulatory effect model was used for heterogeneity analysis (see formula (4)). Compared with the way of classified discussion, the moderating effect can compare the relative differences between different groups, and then more systematically reflect the overall picture of the actual economic effect.

$$Equalization_{ct} = \beta_0 + \beta_1 New_{ct} + \beta_2 New_{ct} * Item_{ct} + \beta_2 Item_{ct} + \sum \beta_i \, Control_{ct} + Province_c + Year_t + \varepsilon_{ct} \quad (4)$$

In Formula (4), *Item* was a regulatory variable, which included four heterogeneous virtual variables,

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namely, *Old*, *Poverty*, *Farm* and *Capacity*. The remaining variables were consistent with the benchmark regression. We are most concerned about the size and direction of the coefficients β_1 and β_2, where β_1 indicates the actual effect of *Item=0* grouping, $\beta_1 + \beta_2$ indicates the actual effect of *Item=1* grouping, and β_2 indicates the relative differences among different groupings. See TABLE VI.

TABLEVI. Heterogeneity analysis

	(1)	(2)	(3)	(3)
Variable name	Former revolutionary base areas *Item =Old*	National-level poverty-stricken counties *Item =Poverty*	Degree of agricultural development *Item =Farm*	Governance capacity *Item =Capacity*
New	-0.0050***	-0.0063***	-0.0026***	-0.0046***
	(0.0009)	(0.0014)	(0.0007)	(0.0013)
*New*Item*	0.0038***	0.0042***	-0.0036*	0.0060*
	(0.0009)	(0.0008)	(0.0016)	(0.0026)
Item	0.0022*	0.0025**	0.0027*	
	(0.0010)	(0.0010)	(0.0014)	
PerGDP	0.0041***	0.0044**	0.0039***	0.0041***
	(0.0012)	(0.0013)	(0.0011)	(0.0012)
Growth	0.0018	0.0008	0.0001	0.0004
	(0.0081)	(0.0080)	(0.0085)	(0.0099)
Agriculture	0.0005	0.0013	-0.0006	0.0036
	(0.0046)	(0.0043)	(0.0045)	(0.0038)
Unemployment	0.0006	0.0004	0.0010	0.0011
	(0.0031)	(0.0030)	(0.0027)	(0.0028)
Urbanization	0.0004	0.0004	0.0025	0.0003
	(0.0043)	(0.0042)	(0.0040)	(0.0044)
Expenditure	0.0000**	0.0000*	0.0000**	0.0000**
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Deficit	-0.0001	0.0001	0.0067**	0.0008
	(0.0028)	(0.0027)	(0.0025)	(0.0034)
Fixed effect of provinces	Y	Y	Y	Y
Fixed effect of time	Y	Y	Y	Y
_cons	-0.0374**	-0.0413**	-0.0365***	-0.0371***
	(0.0112)	(0.0129)	(0.0106)	(0.0108)
N	1700	1700	1700	1700
adj. R^2	0.0701	0.0706	0.0677	0.0672

Note: As the fixed effect of provinces is used in this paper, the Item in model (4) is at provincial level, so it is not introduced into the moderating effect model (otherwise, multiple collinearities will occur)

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5.2 Mechanism Analysis

Although the previous results have verified the correctness of the research hypothesis proposed in the theoretical part and explored the structural impact of new-type urbanization on basic public services in urban and rural areas through heterogeneity analysis, the reasons for this result still need further analysis. Therefore, it explores how the implementation of new-type urbanization can narrow the gap between urban and rural basic public services by decomposing the explained variables.

In this paper, the explained variables in the benchmark regression model were decomposed into urban basic public service index and rural basic public service index, and the annual growth rates of urban and rural basic public service indexes of each prefecture-level city were calculated respectively, and then regressed as new explained variables. The results are shown in models (1) and (2) in Table VII. Obviously, with the passage of time, the effect of the new-type urbanization reform on the improvement of urban and rural public service level is weakening, among which the rural growth rate drops relatively slowly and the urban growth rate drops relatively faster. It is precisely because the growth rate of basic public services in urban and rural areas shows a differentiated decline that the development of public services in urban and rural areas shows a trend of convergence. In model (3), a new explanatory variable was added on the basis of the original benchmark model: the ratio of the growth rate of basic public services between urban and rural areas (Gap=Country Score Rate/City Score Rate), As a result, it is precisely because the gap between the growth rate of basic public services in rural and urban areas is narrowing that the basic public services in urban and rural areas are becoming more and more equal.

The above results verify the hypothesis of the previous study, that is, the implementation of new-type urbanization can narrow the growth gap of basic public service level between urban and rural areas, and then realize the equal development of urban and rural areas, which proves the hypothesis 2.

5.3 Expansion Analysis

Some extended derivative studies are also made on the basis of the conclusion of this paper. Firstly, the explanatory variable of the benchmark model was replaced by the *Equalization* of basic public services between urban and rural areas, and the explained variable was the gap between urban and rural social consumption levels (*Sale*= total retail sales of social consumer goods /*GDP*), so as to explore how the narrowing of the gap between urban and rural basic public services affects the high-quality development of regional economy and society. According to the model (4) in TABLE VII, the gap between urban and rural consumption levels is also narrowing [20] after the new-type urbanization reform narrows the gap between urban and rural basic public services, thus contributing to the coordinated development within the region and laying a solid foundation for the early realization of common prosperity. In addition, the model (5) shows that the new-type urbanization reform has improved the overall consumption level of the region. In other words, narrowing the consumption gap between urban and rural areas is to achieve equalization at a higher level.

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TABLE VII. Mechanism analysis

Variable name	(1)	(2)	(3)	(4)	(5)
	Mechanism analysis			Expansion analysis	
	Explained variable Growth rate of public service level		Explained variable *Equalization*	Explained variable: The gap of social consumption level	Explained variable: social consumption level
	Rural growth rate	Urban growth rate			
New	-0.0330*	-0.1016*	-0.0001***		0.0304***
	(0.0191)	(0.0576)	(0.0000)		(0.0071)
Gap			-0.0023*		
			(0.0010)		
Equalization				0.6122*	
				(0.3268)	
PerGDP	-0.0672***	0.1981	0.0057*	-0.0491	0.0364*
	(0.0222)	(0.1314)	(0.0027)	(0.0348)	(0.0165)
Growth	-0.6317***	0.6522**	0.0178**	-0.3297***	-0.0625
	(0.2081)	(0.2776)	(0.0071)	(0.0647)	(0.1038)
Agriculture	-0.1075	0.4395***	-0.0015	-0.1099	0.0026
	(0.1528)	(0.1209)	(0.0071)	(0.2405)	(0.0484)
Unemployment	-0.0087	-0.0639	0.0001	0.0362	0.0287**
	(0.0368)	(0.0639)	(0.0028)	(0.0315)	(0.0101)
Urbanization	0.1000*	0.0739	0.0007	0.1793	0.0448
	(0.0531)	(0.0737)	(0.0054)	(0.1827)	(0.0433)
Expenditure	0.0004***	0.0004***	0.0000	0.0001	-0.0001
	(0.0000)	(0.0001)	(0.0000)	(0.0001)	(0.0000)
Deficit	-0.3610***	0.3091	0.0016	0.0790	0.8348***
	(0.1151)	(0.2373)	(0.0046)	(0.1346)	(0.1216)
Fixed effect of provinces	Y	Y	Y	Y	Y
Fixed effect of time	Y	Y	Y	Y	Y
_cons	0.8176***	-2.1201	-0.0542*	0.5366	-0.1310
	(0.2395)	(1.4472)	(0.0281)	(0.3281)	(0.1841)
N	1500	1500	1500	1695	1695
adj. R^2	0.0098	-0.0065	0.0773	0.0044	0.7335

VI. CONCLUSIONS AND SUGGESTION

In this paper, the panel data of 216 prefecture-level cities from 2011 to 2019 were used as samples to empirically test the role of new-type urbanization policies in promoting the equalization of basic public services and helping the integration of urban and rural areas. The results show that: (1) New-type urbanization does improve the level of equalization of urban and rural public services, and this positive

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impact has significant persistence. (2) New-type urbanization has a structural impact on urban and rural basic public services. There is great resistance to the equalization of public services in the former revolutionary base areas. The more developed agriculture areas, the higher the degree of equalization of basic public services in urban and rural areas, the stronger the governance ability of local governments, and the more balanced allocation of urban and rural public resources. (3) The promotion of new-type urbanization makes the gap between the growth rate of basic public services in rural areas and cities narrowing. Basic public services in urban and rural areas are increasingly showing equal development. The gap between urban and rural consumption levels is also narrowing. In order to promote the integration of urban and rural areas, speed up the pace of new-type urbanization construction and improve the level of equalization of basic public services, the following suggestions are put forward based on the above conclusions:

First of all, the "people-oriented" new-type urbanization strategy should be adhered to. The research results of this paper confirm the positive role of new-type urbanization in narrowing the gap of basic public services between urban and rural areas and solving the problems of urban-rural integration development. In the construction of new-type urbanization in the future, more attention should be paid to adhering to the "people-oriented" principle and strengthening the identity of the vulnerable groups. In the supply of public goods, citizens' free choices should be respected, and equal opportunities for all citizens in cities and villages to enjoy basic public services should be guaranteed, with roughly the same results.

Secondly, financial support policies that vary from place to place should be adopted. The study of this paper reveals that although the new-type urbanization has a significant improvement on the equalization of basic public services in urban and rural areas, there is significant heterogeneity in this effect between different regions. Similar to the coordinated development of urban and rural areas, the coordinated development of regions is also an important part of China's high-quality economic and social development during the "14th Five-Year Plan" period. Therefore, differentiated financial support policies should be implemented in the process of new-type urbanization based on regional characteristics. Specially, great efforts should be made in supply quality in the eastern region, and the endogenous power of economic development should be continuously strengthened to increase the scale and quantity of public services enjoyed by urban and rural residents in the central and western regions.

Finally, the government's governance capacity should be improved to balance the allocation of urban and rural resources. As the rational allocation of public resources between urban and rural areas is the key link to realize the equalization of basic public services between urban and rural areas, local governments should focus on the integrated development of urban and rural areas when allocating public service resources, rationally adjust and divide financial power and administrative power, further optimize the structure of fiscal expenditure, enhance the government's governance capacity, and give full play to the regulatory role of fiscal policy. Moreover, public resources should be properly tilted to rural areas to improve the level of public service supply in rural areas, so that the allocation of public resources between rural and urban areas can reach a relatively balanced development state.

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