

National E-commerce Model City Construction and Common Wealth: Empirical Evidence from Chinese Cities

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Abstract. Realizing common wealth is the essential requirement of socialism with Chinese characteristics, and the construction of national e-commerce model cities provides a new opportunity for the realization of common wealth. The article measures the construction of national e-commerce model cities and the level of common wealth based on dummy variables and multidimensional indicator system for 282 Chinese cities data from 2011 to 2021, and explores the causal effect of the construction of national e-commerce model cities and common wealth. It is found that the construction of national e-commerce model cities can significantly increase the level of common wealth. This paper examines the impact of the pilot policy of national e-commerce demonstration cities on the level of common wealth through a series of tests such as PSM-DID, parallel trend test and placebo test. Based on the conclusions of the study, suggestions are made to further strengthen the construction of national e-commerce demonstration cities, provide policy protection according to local conditions, and rationalize the construction around the demonstration cities.

Keywords: national e-commerce model city; common wealth; double difference modeling.

1. Introduction

The report of the twentieth CPC National Congress points out that common prosperity is an essential requirement of socialism with Chinese characteristics, and that efforts should be made to promote the common prosperity of all people and resolutely prevent polarization. Common wealth emphasizes not only the satisfaction of material and spiritual wealth, but also the sharing of the fruits of development by the people. It is an all-round, multi-dimensional and high-level affluence, encompassing the comprehensive development of material, spiritual, political, social and ecological civilization. "Common" means that efforts should be made to narrow the gap between urban and rural areas and prevent polarization (Li Shi and Zhu Mengbing, 2022) ^[1] and at the same time to reduce the national fiscal deficit rate, control the proportion of low-income population, achieve balanced development in all regions, and ensure fairness (Hu Angang and Zhou Shaojie, 2022) ^[2] The term "affluence" is used to refer to the "wealth of the people". "Affluence" means that all aspects of life meet people's needs for a good life, and the level of per capita national income and the level of wealth should be controlled within a reasonable range, which is the material basis for realizing common prosperity (Liu Peilin et al., 2021) ^[3]. Regarding the research on promoting common wealth, in recent years, scholars have mainly explored the influencing factors of common wealth from the perspectives of industrial structure, digital economy and regional economy. Wan Haiyuan (2022) ^[4] Entrepreneurial activities as a whole are conducive to the optimization of industrial structure, promote the development of new products and new markets, and then bring about high-quality development of the economy and promote common wealth; Zhang Jinlin et al. (2022) ^[5] (2022) constructed a common wealth index based on CHFS micro-survey data, and explored the impact of digital inclusive finance on common wealth. Yu Panpan et al. ^[6] (2023) explored the development of e-commerce in the regional economy, which works through the form of conditional grouping state to improve the level of common wealth. In addition, other scholars have explored how to realize the path of common wealth, and the key to realizing common wealth lies in the reduction of the gap between the rich and the poor, and the promotion of social equality and social justice in society (He Lixin and Pan Chunyang, 2011) ^[7]. Li Peng et al. (2022) ^[8] Based on the perspective of tourism quality services,

analyzed the realization path of common wealth from the perspective of residents' income improvement; Xu Qiyao (2023)^[9] Starting from the perspective of income distribution policy, exploring the income policy support for realizing common prosperity; common prosperity is an effective way to achieve social harmony and stability and lasting social progress. However, at the present stage, the development of different regions in China is still uneven, there are large differences, the structure of income distribution among residents is unreasonable, which hinders the expansion of the middle-income group, and the realization of common prosperity still has a long way to go.

Since 2003, the Ministry of Commerce and the National Development and Reform Commission (NDRC) have planned to select some cities to create e-commerce demonstration cities. In 2009, Shenzhen became the first pilot national e-commerce demonstration city. Subsequently, 22 cities, including Beijing, Shanghai, Qingdao and Ningbo, have been approved as national e-commerce model cities. In accordance with the principle of "pilot first, promote gradually", the National Development and Reform Commission (NDRC) and the Ministry of Commerce (MOFCOM) approved more cities to become national e-commerce demonstration cities in 2014 and 2017, with the total number of cities reaching 70. 2005, the General Office of the State Council (GOH of the State Council) issued Several Opinions on Accelerating the Development of E-commerce. With the promotion of the construction of national e-commerce demonstration cities, e-commerce has achieved remarkable results in optimizing resource allocation, reducing energy consumption and developing a green economy. National E-commerce Demonstration City is a new model of urbanization, the essence of which is the product of the integration of urbanization and e-commerce. The construction of e-commerce model cities has played an important role in improving the efficiency of resource allocation, promoting the development of small and medium-sized enterprises and boosting employment. At present, domestic and international studies on the impact effect of e-commerce mainly focus on industrial transformation, high-quality development and income distribution. E-commerce promotes high-quality development of cities through industrial structure upgrading effect, economic agglomeration effect and cost reduction effect, and lays the foundation for realizing common prosperity. National e-commerce demonstration cities, as a kind of city construction carried by digital technology, can not only effectively break the limitations of geographic space, broaden the scope of market radiation, so that more enterprises and individual operators can participate in the market economy, improve the vitality and competitiveness of the market, and then promote the development of urban and rural economy (Liu Naiquan et al., 2021)^[10]. In addition, it can attract and gather e-commerce-related enterprises and innovative talents, forming the agglomeration effect of innovative resources. The gathering of these enterprises and talents will promote the city's innovation ability. Through technological innovation and business model innovation, cities can better respond to changes in market demand and provide more innovative products and services (Shi Yitao, 2022)^[11]. Giving full play to the role of e-commerce and promoting the rapid development of regional e-commerce can reduce energy consumption, develop a green economy, improve urban management, and enhance the ability of public services. At the same time, it can also promote the digital transformation of cities, promote the digitization and intelligence of government public services through the construction of digital business platforms and intelligent logistics networks, and enhance the overall competitiveness and development of cities (Wu Jiangshou, 2015)^[12]. Therefore, the construction of national e-commerce model cities aims to further promote the development of China's economy and accelerate the realization of the goal of common prosperity.

At present, the construction of national e-commerce cities and common prosperity have become a hot issue in academic research at home and abroad. The twentieth report pointed out the objective reality that "the gap between urban and rural regional development and income distribution is still large", which is a problem that must be addressed in order to realize the goal of common prosperity in the new era. Therefore, the Party and the State have launched a series of timely decisions and deployments, such as rural revitalization and urban-rural integration, with a view to narrowing the income gap between urban and rural areas. In this series of policy deployments, the rise of e-commerce has provided the state with an effective grip. Empirical studies have proved that e-

commerce can realize the scale effect of industry and regional balanced development, and promote economic growth, but fewer analyze e-commerce in conjunction with common wealth, and the specific path of its effect on common wealth has not yet been clarified. Meanwhile, scholars have studied the role of e-commerce on common wealth from different perspectives. In terms of direct impact, the construction of model cities can realize the industrial cluster effect (Wang Zhihui et al., 2021)^[13], the expanded scale of operation also helps to improve labor productivity (Tan Lyric et al., 2022)^[14], which in turn increases productivity and promotes common prosperity. In addition, the construction of model cities generates a large number of jobs by promoting the development of e-commerce, optimizing the business environment, and encouraging innovation and entrepreneurship (Xie Wendong, 2023)^[15]. It can provide more sources of income for rural residents, reduce the employment difficulties faced by rural residents due to their geographic location, and is conducive to narrowing the urban-rural income gap. In terms of indirect impact, the pilot of national e-commerce demonstration cities can promote the inflow of foreign direct investment through the optimization of industrial structure and the improvement of business environment (Zhou Kechuan and Yu Linwei, 2021)^[16], which in turn spawns more employment opportunities and innovative technologies, narrows the income gap between urban and rural areas, and realizes common prosperity. Liu Naiquan et al. (2021)^[10] pointed out that the construction of e-commerce model cities can realize common wealth through three channels: industrial structure upgrading effect, economic agglomeration effect and transaction cost reduction effect. E-commerce has a significant role in narrowing the income gap between urban and rural areas, improving the inclusiveness and balance of economic growth, narrowing the gap between regions, industries and incomes, and bringing a positive impact on the common wealth. The construction of e-commerce model cities can also effectively promote the development of rural e-commerce, which can significantly increase the participation of individuals in rural society in the e-commerce economy (Qiu Zixun et al., 2021)^[17], which in turn alleviates villagers' information asymmetry, raises the income level of farm households, and narrows the urban-rural income gap.

In view of this, this paper has marginal contributions in the following aspects: firstly, this paper examines the impact of national e-commerce demonstration city construction on common wealth for the first time from the perspective of e-commerce development, expanding and deepening the existing academic literature on the field of common wealth development. Second, this paper combs the mechanism of the impact of national e-commerce demonstration cities on common wealth from the theoretical aspect, and adopts the multi-period double-difference method (DID) to quantitatively and empirically test the impact of e-commerce demonstration city construction on common wealth, which provides a new way of thinking for the quantitative analysis of the e-commerce related research. Third, based on the parallel trend test and placebo test method, this paper better solves the endogeneity problem on the basis of the benchmark regression model by changing the instrumental variables such as the time point of policy occurrence, PSM-DID and exogenous shock test.

2. Theoretical mechanisms and research hypotheses

The construction of national e-commerce model cities is an exploratory practice in China's reform process. This paper argues that the construction of national e-commerce model cities can narrow the income gap between urban and rural areas through industrial clusters and employment resources, and help to solidly promote the common prosperity, with the following specific mechanisms:

First, the construction of national e-commerce demonstration cities contributes to common prosperity through industrial clustering. On the one hand, model cities form a large e-commerce industrial ecosystem by attracting e-commerce enterprises and related industries to cluster together (Qiu, Zeqi and Qiao, Tianyu, 2021)^[18]. This industrial agglomeration promotes cooperation and innovation among enterprises (Ni Jinfeng and Li Hua, 2018)^[19] that improves the competitiveness and efficiency of the whole industry. Through the growing e-commerce industry, the city creates a large number of business cooperation opportunities and effectively raises the income level of

residents. On the other hand, the model cities focus on promoting the integration and development of e-commerce and traditional industries. Through the construction and promotion of e-commerce platforms, traditional industries can use the power of the Internet and e-commerce to broaden market channels and improve product sales and service levels (Li Cunchao, 2014)^[20]. This kind of integrated development makes traditional industries glow with new vitality, which can reduce the transaction costs of enterprises and expand the wide margins of enterprises (Yue Yunsong and Li Bing, 2018)^[21], which in turn promotes enterprise development. In addition, model cities can also form industrial clusters in rural areas through e-commerce development (Wang Zhihui et al., 2021)^[22], promote the development of rural characteristic industries, the economic benefits brought by the development of characteristic industries will change the original planting structure of farmers, large-scale planting of characteristic products, bringing about the expansion of the scale of production, which is conducive to the advancement of mechanization, the massive liberation of laborers, and the enhancement of the scale effect of the operation of the single person's land, which will in turn increase the productivity of labor (Tan Lyric et al., 2022)^[14], promoting the development of the rural economy, thus narrowing the income gap between urban and rural areas, and thus promoting the realization of common wealth.

Second, the construction of national e-commerce demonstration cities promotes common prosperity by expanding employment resources, mainly in the following ways: first, the demonstration cities encourage the development of the e-commerce industry and attract more e-commerce enterprises to set up their operations in the demonstration cities through the provision of policy support, preferential tax policies and entrepreneurial funds, among other measures. This can increase the number and scale of e-commerce enterprises and create more job opportunities. Due to the human capital level gap, jobs are mainly provided to the farmer group, and such jobs enhance the quality of rural employment and narrow the urban-rural income gap (Zhang Guangsheng et al., 2023)^[23]. Secondly, the model cities focus on the cultivation and introduction of e-commerce talents by offering relevant professional courses, organizing training courses and introducing outstanding talents (Chen Shi, 2016)^[24]. This can improve the professionalism and skill level of talents and provide more employment opportunities for the employed while meeting the needs of enterprises. At the same time, the construction of e-commerce demonstration cities can actively guide capital to encourage e-commerce applications by small and medium-sized enterprises, farmers' professional cooperative organizations, rural residents and people with disabilities, promote the development of rural e-commerce, and thus reduce the income gap between urban and rural areas (Liu Naiquan et al., 2021)^[10]. Third, the construction of model cities is conducive to the development of rural entrepreneurial activities, and model cities set up entrepreneurial support funds and entrepreneurial guidance centers. On the one hand, it can provide policy and financial support for rural entrepreneurs. Through the establishment of special funds, the provision of entrepreneurial loans and venture capital, etc., it can solve the financing problems of rural entrepreneurs, reduce the risk of entrepreneurship, and encourage more people to devote themselves to rural entrepreneurship (Cheng Xuanmei et al., 2015)^[25]. On the other hand, the guidance center provides professional training and guidance services for rural entrepreneurs. The training includes business plan writing, marketing skills, e-commerce platform operation and other aspects. The guidance center provides support such as entrepreneurial consulting, business guidance and entrepreneurial project evaluation to help entrepreneurs improve their entrepreneurial success rate. Summarizing the above analysis, this paper proposes the following research hypotheses:

H1: The construction of national e-commerce model cities is conducive to promoting the realization of common wealth.

3. Indicator construction, data sources and identification strategies

3.1. Indicator Construction

3.1.1. Dependent variable

The nature of common prosperity requires that measurement must simultaneously measure both the enlargement of the cake and the rational distribution of the cake, taking into full consideration its three main characteristics of development, sharing and sustainability. To this end, on the basis of the analysis of the connotation of common prosperity in the previous paper, considering the availability of data, and with extensive reference to the existing literature, this paper analyzes the common prosperity from the perspective of economic development, social security and ecological development.^[26-28] this paper presents a multidimensional evaluation system composed of three aspects: economic development, social security and ecological protection. Finally, the common prosperity level of 282 prefectural-level cities in the country from 2011 to 2021 is measured, and the common prosperity level obtained is denoted as *PROSPERITY*.

Table 1. Indicator system for the level of shared prosperity

Level 1 indicators	Secondary indicators	Tertiary indicators	prediction method
mutual enrichment	economic development	Ratio of income between urban and rural areas	Annual net income per capita of rural households/annual disposable income per capita of urban households
		GDP per capita	GDP per capita
		Engel's coefficient	Per capita household consumption expenditure on food/per capita disposable income of households
		Agricultural productivity	Grain production/cultivated land area
	social security	Industrial productivity	Total industrial output value above scale/total area of the region
		Educational benefits	Per capita expenditure on education
		Transportation accessibility	Road mileage per capita
		Improvement of cultural facilities	Public library holdings per capita
	ecological protection	Improvement of medical facilities	Number of beds in medical institutions per 1,000 population
		Greening coverage in built-up areas	Greening coverage in built-up areas
		PM2.5	PM2.5
		Green space per capita in parks	Green space area of parks/total population
		Comprehensive utilization rate of general industrial solid waste	General industrial solid waste generation/GDP

3.1.2. Independent variable selection

The construction of national e-commerce model cities is the core explanatory variable of the article. The article generates time dummy variables with the specific implementation time of different demonstration city constructions (defined as 1 in the year of policy implementation and beyond, and 0 otherwise), generates policy dummy variables with specific pilot cities (defined as 1 if it is a demonstration city, and 0 otherwise), and uses dummy variable cross-multiplier terms as the core explanatory variables.

3.2. Model Design

The construction of national e-commerce demonstration cities is an exogenous shock variable, and the pilot cities are randomly selective and will vary according to the implementation of the policy, so the construction of demonstration cities can be regarded as a quasi-natural experiment. In China, a total of 68 prefecture-level cities were planned as model cities in three batches in 2011, 2014 and 2017. In order to verify the policy effect of national e-commerce demonstration city construction on

the common wealth of Chinese cities, this paper takes the national e-commerce demonstration city construction as a quasi-natural experiment and constructs a double difference model as follows:

$$prosperity_{it} = \alpha_0 + \alpha_1 treated_i \cdot time_t + \alpha_2 Z_{it} + \mu_i + \delta_t + \varepsilon_{it} \quad (1)$$

In the above equation, *PROSPERITY* is the explanatory variable, which indicates the common wealth level of the city. *TREATED-TIME* is the core explanatory variable, which indicates whether the city implements the construction of national e-commerce demonstration city or not, and takes the value of 1 if the city *i* implements the construction of national e-commerce demonstration city in the year *t*, and takes the value of 0 otherwise, and α_1 is the coefficient of its estimation. This paper introduces control variables, which are represented by the vector Z_{it} : population density (*pnd*), which is measured by the ratio of total population to the area of the region at the end of the year. Foreign capital openness (*fdi*), measured as the ratio of FDI to GDP in the host city. Degree of financial development (*fin*), measured as the ratio of the amount of loans from financial institutions to GDP. Degree of infrastructure sophistication (*trans*), which is expressed in terms of highway mileage/total area of the region. The level of urbanization (*urban*), which is expressed as the share of non-farm employment in total employment in each city. At the same time, the model adds μ_i for individual fixed effects and δ_t for time fixed effects to avoid individual heterogeneity in within-group regression; and clusters the random error term ε_{it} to the city level to solve the systematic heteroskedasticity problem of the model.

Further, in this paper, PSM-DID estimation is utilized for robustness testing by first using kernel matching to find the control group that is closest to the characteristics of the experimental group for matching, and then using propensity score-matched experimental and control groups for DID regression. The model is constructed as follows:

$$prosperity_{it}^{psm} = \alpha_0 + \alpha_1 treated_i \cdot time_t + \alpha_2 Z_{it} + \mu_i + \delta_t + \varepsilon_{it} \quad (2)$$

The meaning of the symbols in Eq. (2) is consistent with the benchmark regression.

3.3. Data sources and descriptive statistics

The relevant data in this paper come from the China Urban Statistical Yearbook, China Rural Statistical Yearbook, Wind and Aiqiqi databases. Some of the missing value data make the interpolation method to fill in. The descriptive statistics of the data are shown in Table 2.

Table 2. Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max.
<i>prosperity</i>	3948	0.183	0.046	0.058	0.518
<i>nlight</i>	3948	7.724	9.254	0.102	60.053
<i>did</i>	3948	0.137	0.343	0.000	1.000
<i>pnd</i>	3948	7.238	3.966	0.043	15.435
<i>fin</i>	3948	1.571	3.450	0.022	49.500
<i>fdi</i>	3948	0.016	0.017	0.000	0.192
<i>trans</i>	3948	1.574	4.541	0.056	99.973
<i>urban</i>	3948	0.392	0.208	0.076	1.091

4. Empirical Analysis

4.1. Baseline return

Table 3 shows the results of the benchmark regression of the model city construction on the urban-rural income gap. The results in column (1) of Table 3 show that when controlling only for individual fixed effects and time fixed effects without adding other control variables, the coefficient of DID, which is the focus of this paper, is positive and significant at the 1% level, suggesting that the

construction of the national e-commerce model city significantly contributes to the level of common wealth. Columns (2) to (6) are the regression results of adding control variables step by step, after adding control variables, the coefficient of DID is still significantly positive, indicating that the conclusion that the construction of e-commerce demonstration cities significantly promotes the level of common wealth is robust after controlling the other factors affecting the common wealth, and the results of this test validate the hypothesis of this paper. From the perspective of economic implications, the regression results in column (6) show that after the implementation of the national e-commerce demonstration city construction, the level of urban-rural common wealth will increase in the average sense by 0.007, which is equivalent to about 4% of the average value of common wealth water (0.183). From the perspective of control variables, population density and infrastructure improvement have a significant contribution to the increase in the level of common wealth, while the effects of foreign investment openness and financial development are not significant.

Table 3. Benchmark regression

	(1)	(2)	(3)	(4)	(5)	(6)
<i>did</i>	0.008*** (0.003)	0.007** (0.003)	0.007** (0.003)	0.007** (0.003)	0.007** (0.003)	0.007*** (0.003)
<i>pnd</i>		0.004*** (0.000)	0.004*** (0.000)	0.004*** (0.000)	0.004*** (0.000)	0.003*** (0.000)
<i>fdi</i>			0.108 (0.076)	0.107 (0.076)	0.111 (0.076)	0.090 (0.072)
<i>fin</i>				-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
<i>trans</i>					0.001** (0.000)	0.001** (0.000)
<i>urban</i>						-0.069** (0.028)
_cons	0.182*** (0.000)	0.155*** (0.003)	0.154*** (0.003)	0.155*** (0.003)	0.154*** (0.003)	0.183*** (0.012)
<i>City FE</i>	Y	Y	Y	Y	Y	Y
<i>Year FE</i>	Y	Y	Y	Y	Y	Y
<i>N</i>	3948	3948	3948	3948	3948	3948
<i>adj. R²</i>	0.911	0.918	0.918	0.918	0.918	0.920

4.2. Parallel trend test

Satisfying the parallel trend hypothesis test is an important prerequisite for the DID model, i.e., before the implementation of the pilot policy of the construction of national e-commerce demonstration cities, the level of common wealth in the pilot cities and non-pilot cities should have a consistent trend of change. In this paper, we refer to the existing studies to conduct the parallel trend test^[16]. The specific steps are as follows: first, we set a series of time dummy variables, taking 1 for the current year and 0 for the other years. at the same time, we generate city dummy variables, which are set to 1 if the city is a pilot city for the construction of national e-commerce demonstration cities and 0 otherwise. second, we construct the interaction terms of the time dummy variables and the city dummy variables. Figure 1 reports the analysis results. From the results, all regression results before 2013 are not significant, indicating that before the implementation of the pilot policy of national e-commerce demonstration city construction, the trend of the treatment group and the control group is the same, and there is no significant difference, which means that the parallel trend hypothesis is satisfied.

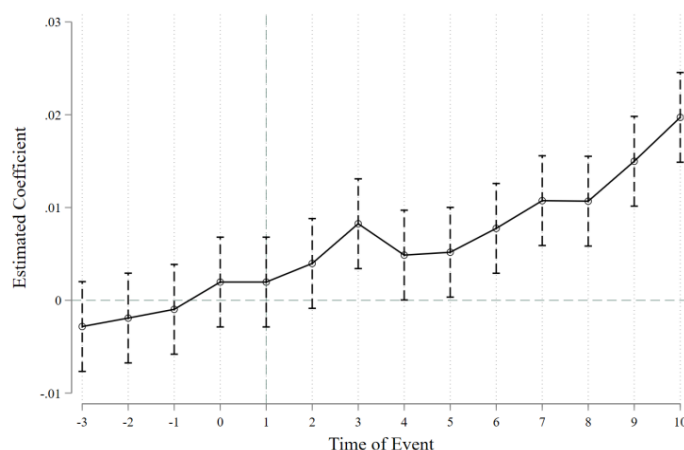


Figure 1. Parallel trend graph

4.3. Robustness check

4.3.1. PSM-DID

In order to reduce the problem of sample selection bias under the pilot policy of national e-commerce demonstration city construction, with reference to existing scholarly research^[29], this paper further adopts PSM-DID model to assess the net effect of the policy. The specific operational steps are as follows: first, regress the dummy variables and control variables between groups using Logit model. Second, the kernel matching method is used to find cities with the same propensity score for the experimental group to reduce the selectivity bias, and the matching results are shown in Figure 2. Then, the city-level control variables were used as matching covariates for matching and balance test. Based on satisfying the balance test, PSM-DID regressions are conducted on the matched samples and the estimation results are shown in columns (3) and (4) of Table 3. The estimation results show that the estimated coefficients of the National E-commerce Demonstration City Construction Policy are significantly positive after using PSM-DID, which indicates that the policy effect of the National E-commerce Demonstration City Construction Policy to promote urban common wealth still exists, further verifying that the benchmark regression results in the previous section are robust.

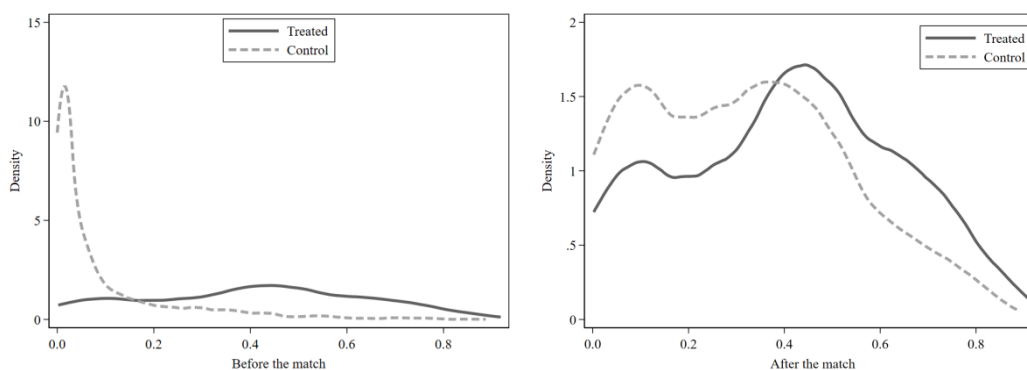


Figure 2. Density function plot of probability distribution of propensity score values

4.3.2. Substitution of variables

By virtue of their relative objectivity and high geospatial resolution, nighttime lighting data can reflect the true level of economic development of a region in a more comprehensive and detailed manner. As the nighttime lighting data from 2011-2021 are extracted from different satellites, the measurement scale is not uniform as well as the error phenomenon, which requires correction of the original lighting data. We refer to the existing scholars' studies^[30] We select Jixi City in Heilongjiang Province as the base correction location, which meets the calibration criteria of stable development and small changes in light brightness. In the benchmark regression, common wealth is measured based on multidimensional indicators, and the nighttime lighting data is used as a proxy variable for

the common wealth index in the robustness analysis here. Before the regression, we conduct a correlation test between the corrected nighttime lighting data and the city's common wealth index in the current year, and the result is 0.704, which has a strong correlation. The results are shown in columns (3) and (4) of Table 7. It is found that the coefficients of the core explanatory variables are significantly positive, consistent with the benchmark results.

4.3.3. Replacement of fixed effects

In addition, due to historical and geographic factors, the effects among different regions may have a systematic trend over time. For this reason, this paper adds the interaction fixed effects of province and time by adding $Pro * Year$ to equation (1). As the results in column (5) of Table 3 show, the construction of national e-commerce model cities still significantly promotes urban common wealth after considering different fixed effects.

4.3.4. Exclusion of other policies

During the sample study period, there are other policies that can have an impact on common wealth, and studies have confirmed the impact of the Broadband China strategy on high-quality economic development (Zhao Tao et al., 2020)^[31] and national-level comprehensive pilot zones for big data (Chang Haoliang et al., 2023)^[32]. The impact of policies on regional total factor productivity (Qiu Zixun and Zhou Yahong, 2021)^[17]. Therefore, in order to control the impact of other policies on the level of shared prosperity, and considering that both the broadband China strategy and the pilot policy of the national-level big data comprehensive experimental zone are promoted in batches, the policy dummy variables constructed by the broadband China strategy and the pilot policy of the national-level big data comprehensive experimental zone, respectively, are included in the baseline regression as the control variables. The regression results are shown in columns (6) and (7) of Table 3, which indicate that the regression coefficients of the pilot policy of national e-commerce demonstration city construction are all significantly positive, once again enhancing the robustness of the conclusions.

Table 4. Robustness test

	(1) PSM-DID	(2) PSM-DID	(3) nlight	(4) nlight	(5) interaction fixed effect	(6) Exclusion of other policy effects	(7) Exclusion of other policy effects
<i>did_psm</i>	0.008*** (0.003)	0.007*** (0.003)					
<i>did</i>			1.969*** (0.454)	1.899*** (0.436)	0.004* (0.002)	0.007*** (0.003)	0.007*** (0.003)
<i>pnd</i>		0.003*** (0.000)		0.152** (0.066)	0.002*** (0.000)	0.003*** (0.000)	0.003*** (0.000)
<i>fdi</i>		0.090 (0.072)		-21.763** (9.091)	0.060 (0.048)	0.091 (0.073)	0.082 (0.071)
<i>fin</i>		-0.000 (0.000)		-0.136*** (0.043)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
<i>trans</i>		0.001** (0.000)		0.286 (0.177)	0.000 (0.001)	0.001** (0.000)	0.001** (0.000)
<i>urban</i>		-0.069** (0.028)		-7.099*** (2.282)	-0.021 (0.036)	-0.069** (0.028)	-0.069** (0.029)
<i>_cons</i>	0.182*** (0.000)	0.183*** (0.012)	7.454*** (0.062)	9.264*** (1.038)	0.172*** (0.014)	0.183*** (0.012)	0.183*** (0.012)
<i>City FE</i>	Y	Y	Y	Y	Y	Y	Y
<i>Year FE</i>	Y	Y	Y	Y	Y	Y	Y
<i>Pro*Year FE</i>	N	N	N	N	Y	N	N
<i>N</i>	3948	3948	3948	3948	3878	3948	3948
<i>adj. R²</i>	0.911	0.920	0.953	0.955	0.940	0.920	0.920

4.3.5. Placebo testing

In order to exclude the influence of other unobservable urban characteristics that change over time on the estimation results, this paper refers to existing studies (Renjun Li and Hanyue Zhang, 2023)^[33], which is confirmed by using the replacement test method of randomly selecting policy intervention

groups. The specific idea is as follows: repeat the random sampling of new policy intervention groups 1,000 times in the 282 prefecture-level and above cities used in this paper, randomize the experimental group, and the estimated coefficients of the 1,000 pilot policies for the construction of national e-commerce demonstration cities will be obtained as a result, and the kernel density distribution of the coefficients will be plotted. Since the policy intervention groups are randomly drawn, the simulated policy dummy variables will have no effect on the explanatory variables. Therefore, if the kernel density plot of the coefficients of the randomized observations is centered around 0 and obeys a normal distribution, it can be shown that the change in the level of common wealth is due to the implementation of the pilot policy of building national e-commerce demonstration cities rather than other unobservable random factors.

The results of the replacement test are reported in Figure 3, where the area enclosed by the solid black line shows the kernel density curve of the estimated coefficients obtained from the randomly sampled policy intervention group of the pilot policy of building a national e-commerce model city. As can be seen from Figure 3, the distribution of the estimated coefficients after random sampling is in the neighborhood of zero and obeys a normal distribution, which is in line with the expectation of the placebo test and further illustrates the robustness of the findings of this paper.

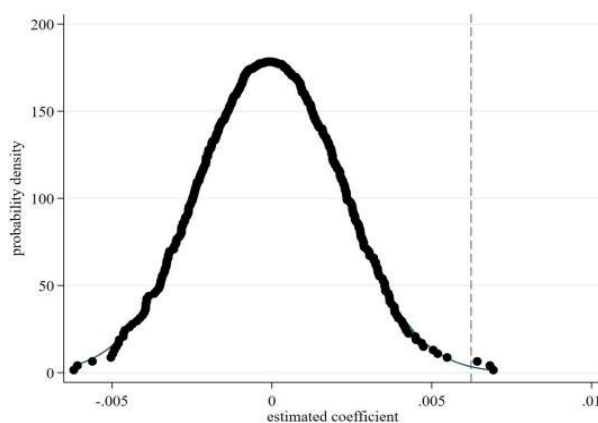


Figure 3. Placebo test

5. Conclusion and Insights

5.1. Findings

Shared prosperity is the key to realizing comprehensive, coordinated and sustainable development in the process of social development, and it is therefore necessary to take multiple measures to promote shared prosperity. The construction of e-commerce model cities, as an important national policy, has a non-negligible impact on the reduction of the urban-rural income gap. Therefore, based on the national e-commerce model city policy, this paper empirically examines the impact of model city construction on the urban-rural income gap and the mechanism of its effect by using DID, PSM-DID and other models based on theoretical analysis, using the panel data of 282 prefectural-level cities nationwide in China from 2011-2021, and draws the following conclusions: e-commerce model city construction can increase the level of common wealth, and the conclusion still holds after a series of robustness tests.

5.2. Recommendations for countermeasures

Based on the conclusions of the study, the following policy recommendations are proposed: (1) Strengthen the construction of national e-commerce model cities. The State can summarize the successful experience of model city construction and form typical cases, and promote the construction of model cities through learning from successful cases. Meanwhile, it should strengthen supervision to ensure that the development direction of the model cities is in line with the goal of common

prosperity. (2) Provide policy guarantee according to local conditions. Due to the differences in city size and location conditions, the policy implementation effect is different, so it is necessary to realize policy innovation according to local conditions. The policy guarantee tailored to local conditions can better optimize the allocation of resources and improve the efficiency of resource utilization. In addition, for different regions of the characteristic industries, resource endowment and market demand, the development of corresponding policy measures, can better play the role of e-commerce in the regional economy. (3) Reasonable layout of the construction around the demonstration city. Reasonable layout of peripheral construction can provide industrial chain supporting support, optimize transportation and logistics, attract talent and technology agglomeration, and provide a good environment and conditions for the development of e-commerce industry. In addition, it can promote regional synergistic development. The construction around the demonstration city can form a complementary and synergistic effect with the demonstration city, promoting the development of the e-commerce industry in the whole region and realizing the synergistic growth of the regional economy through the complementary advantages, resource sharing and cooperative development.

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