

Research on the Influence of Income Distribution Gap on Socio-economic Sustainable Development and Its Regulation Mechanism

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Abstract. This article focuses on the influence of the income distribution gap on socio-economic sustainable development and its regulation mechanism. By combining related theories, using a multiple linear regression model, the sustainable development of the social economy is measured by the growth rate of per capita GDP, and the Gini coefficient represents the income distribution gap. The growth rate of fixed assets investment, urbanization rate and the proportion of education investment are introduced as control variables, and an empirical analysis is carried out based on national authoritative statistics. Descriptive statistics show that the average growth rate of per capita GDP is 6.53%, with a standard deviation of 2.12; The average Gini coefficient is 0.45. The regression results show that every unit of the Gini coefficient increases, the per capita GDP growth rate decreases by 0.85 percentage points, showing a significant negative impact. Investment in fixed assets, urbanization and education have a positive impact on economic growth. Accordingly, it is proposed to regulate the income distribution gap from three aspects: perfecting the primary distribution, strengthening the redistribution and establishing the incentive mechanism for the third distribution, so as to promote the sustainable development of the social economy.

Keywords: Income distribution gap; Socio-economic sustainable development; Influence; Regulation mechanism.

1. Introduction

In the process of socio-economic development, the problem of income distribution has always occupied the core position [1]. The gross domestic product (GDP) has grown from 367.9 billion yuan at the beginning of the reform and opening - up to 13,490.84 billion yuan in 2024. The annual per capita disposable income of the national residents has increased from 171 yuan in 1978 to 36,883 yuan in 2022. In recent years, China's economy has made remarkable achievements. However, the accompanying problem of the income distribution gap has gradually become prominent, which has had a far-reaching impact on the sustainable development of the social economy and aroused widespread concern from all walks of life [2].

Since the reform and opening up, China's economic system has been transformed from a planned economy to a market economy. In this process, the economy has grown rapidly and the income level of residents has been greatly improved. However, it cannot be ignored that the income gap between urban and rural areas, between regions and between different industries is also widening [3]. In terms of urban-rural differences, in 2023, the per capita disposable income of urban residents was 49,283 yuan, while that of rural residents was 20,133 yuan, with a difference of 29,150 yuan. Regarding regional differences, taking Shanghai and Gansu as examples, in 2023, the per capita disposable income of residents in Shanghai reached 84,034 yuan, while that in Gansu was only 23,273 yuan, with a gap of 60,761 yuan. In terms of industry gaps, in 2022, the average wage in the information transmission, software, and information technology services industry was 220,418 yuan, and the average wage in the accommodation and catering industry was 53,631 yuan. The former was more than four times the latter. The existence of this gap is not only related to social fairness and justice, but also plays a multi-dimensional role in the sustainable development of the social economy [4]. On the positive side, a certain degree of income gap can stimulate the enthusiasm and creativity of market players, improve economic efficiency and promote the optimal allocation of resources [5]. However, if the income distribution gap is too large, it may inhibit consumer demand and hinder the endogenous

growth of the economy; Triggering social contradictions and undermining the overall situation of social stability; It will also constrain the development of human resources and affect the stamina of economic development [6]. Therefore, it is of great theoretical and practical significance to study the influence of the income distribution gap on the sustainable development of the social economy and explore effective regulation mechanisms.

On the theoretical level, although the existing research has made many achievements, there are still disputes and gaps on some key issues [7]. For example, the impact path and mechanism of the income distribution gap on socio-economic sustainable development are not fully clear, and the synergistic effect and implementation effect of different regulation mechanisms need further in-depth study [8]. On the practical level, with the economic development of China entering a new stage, new formats and new models are constantly emerging, which makes the income distribution pattern more complicated and brings new challenges to the traditional regulation methods [9]. In this context, this article attempts to deeply analyze the internal relationship between the income distribution gap and the sustainable development of the social economy by combining theoretical analysis with empirical research, and accurately identifying the influencing mechanism. Based on this, a scientific and effective regulation mechanism is constructed, so as to provide a useful reference for the healthy and sustainable development of China's social economy. The data of this study comes from the Statistical Yearbook of China (2000-2023). Among them, the Gini coefficient is calculated based on the survey data of urban and rural households, and the time range extends from 2000 to 2023. This period covers an important stage of China's rapid economic growth and the transformation of income distribution pattern.

2. Theoretical basis of income distribution gap and socio-economic sustainable development

Income distribution refers to the process in which the production results created by society in a certain period are distributed among social groups and members. There are many measuring indicators, and the Gini coefficient is a commonly used key indicator. This coefficient reflects the degree of income distribution difference among residents. The closer the value is to 0, the fairer the distribution is, and on the contrary, the greater the gap is [10]. From the perspective of theoretical causes, the factor endowment theory holds that different individuals or regions have different quantities and qualities of production factors, which leads to an income gap. The theory of dual economic structure points out that the difference between the traditional agricultural sector and the modern industrial sector will cause the income distribution gap between urban and rural areas.

The sustainable development of the social economy pursues the coordinated progress of economy, society and environment. Its connotation covers not only the sustained economic growth, but also the realization of social fairness and justice, the rational utilization of resources and the protection of the ecological environment. The theory of circular economy emphasizes the efficient utilization and recycling of resources, and takes the principle of "reduction, reuse and recycling" to reduce the pressure of economic activities on the environment and provide a material basis for sustainable development. Eco-economic theory pays attention to the organic combination of ecosystem and economic system, advocates the realization of a win-win situation between ecology and economy, and promotes the achievement of the goal of sustainable socio-economic development.

The income distribution gap has a dual impact on the sustainable development of the social economy. A moderate gap can encourage workers to improve production efficiency, promote technological innovation, inject momentum into economic growth, and then promote the sustainable development of the social economy. But when the gap is too large, it will inhibit the consumption of low-income groups, affect the total social demand and hinder economic growth; At the same time, it may cause social contradictions, destroy the stable development environment and hinder the sustainable development of the social economy.

3. Income distribution gap and its impact on socio-economic sustainable development

In recent years, the income distribution gap in China presents multi-dimensional characteristics. In urban and rural areas, although the income of rural residents has increased, the absolute income gap between urban and rural residents is still large. With rich resources and industrial advantages, urban residents' income grows rapidly, while rural areas are limited by factors such as agricultural production characteristics and infrastructure, and the income increase is relatively slow. Regionally, due to policy advantages, geographical conditions and industrial agglomeration, the eastern coastal areas have experienced rapid economic development and high-income levels of residents. The central and western regions are relatively backward in economic scale and industrial structure, which leads to an obvious income gap between regions. Inter-industry, emerging and monopoly industries such as finance and the internet, with the advantages of technology and resources, the salary level of employees is high; In traditional manufacturing, agriculture and other industries, due to fierce competition and low added value, employees' income is low.

A moderate income distribution gap can stimulate individual enthusiasm. In the initial stage of economic development, the accumulation of physical capital is the main driving force for economic growth. At this time, a certain degree of wealth gap can promote economic development. For example, the success of high-income groups has a demonstration effect, inspiring others to strive to improve their skills and production efficiency, thus promoting overall economic efficiency. At the same time, this gap will guide the flow of resources to high-yield areas, help emerging industries attract capital and talent, accelerate the upgrading of industrial structures, and provide new impetus for sustainable economic development. However, when the economy develops to a certain stage, the accumulation of human capital will become the main driving force for economic development. Since an excessive wealth gap can affect the formation of human capital through various channels such as education and employment, it will hinder economic development. First of all, an excessive income distribution gap will curb consumption. Low-income groups have a high propensity to consume but insufficient purchasing power, while high-income groups have a low propensity to consume, which leads to the suppression of overall consumption demand and the lack of domestic demand support for economic growth. Secondly, an excessively large gap between the rich and the poor can rapidly fuel inflation, creating a tense situation for the economic development environment. When the gap is too wide, the consumption level of residents drops. The decline in the consumption rate leads to an increase in the savings rate. With the base money supply remaining unchanged, the high savings propensity boosts the increase in social liquidity by amplifying the money creation multiplier. On the other hand, the widening of the gap between the rich and the poor causes a decline in the consumption level of residents. To meet assessment targets, local governments have to increase investment to achieve economic development goals. Given the insufficient consumption level of residents, the production capacity converted from investment can only be absorbed through exports. The expansion of the export level further exacerbates the excess of social liquidity. Evidently, an excessively large gap between the rich and the poor can increase the excess of social liquidity from multiple aspects, ultimately threatening the healthy development of the economy. Moreover, the gap is too large, which will easily lead to social contradictions, reduce social cohesion and destroy the stable environment needed for economic development. In addition, low-income families have limited investment in education and medical care, which affects the improvement of human resources quality and hinders the motivation of long-term economic development.

4. An empirical analysis of the influence of income distribution gap on the sustainable development of social economy

4.1 Model construction

When studying the influence of the income distribution gap on socio-economic sustainable development, the multiple linear regression model has become the first choice in this study. The sustainable development of the social economy is a complex process influenced by many factors, and the multiple linear regression model can effectively capture the linear correlation between multiple independent variables and a single dependent variable, providing a powerful tool for in-depth analysis of the influencing mechanism of each factor.

From the perspective of economic theory, factors such as income distribution gap, capital investment, urbanization process and education investment may have an impact on the sustainable development of the social economy, and these effects can be assumed to be linear to some extent. The model is simple and clear, namely:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_n X_n + \epsilon(1)$$

Among them, Y represents the dependent variable that we focus on, that is, the level of socio-economic sustainable development; X_i represents various influencing factors, such as income distribution gap, capital investment and other independent variables; β_i is the regression coefficient, which measures the degree and direction of influence of each independent variable on the dependent variable; ϵ , as a random error term, covers the influence of other random factors not considered in the model.

In this study, the per capita GDP growth rate GDP_{growth} is selected to measure the sustainable development of social economy. This indicator is comprehensive and representative, which not only reflects the growth rate of economic aggregate, but also reflects the sustainability of economic development to some extent. The data comes from the authoritative statistical yearbook issued by the National Bureau of Statistics, which ensures the accuracy and reliability of the data.

The explanatory variable takes the *Gini* coefficient Gini as the measurement index of the income distribution gap, and the larger the value, the greater the income distribution gap. The Gini coefficient data is obtained by calculating the income survey data of urban and rural residents, and the specific calculation formula is:

$$G = \frac{\sum_{i=1}^n \sum_{j=1}^n |y_i - y_j|}{2n^2 \bar{y}} \quad (2)$$

Where y_i and y_j represent the income of the residents of i and j respectively; \bar{y} is the average income of residents; n is the number of residents.

With regard to the data sources, it should be clear that the data of per capita GDP growth rate, fixed asset investment growth rate, urbanization rate and the proportion of education investment are all taken from the annual statistical yearbook (2000-2023) issued by the National Bureau of Statistics. The Gini coefficient is calculated according to formula (2) based on the survey data of urban and rural household income, and its time range is consistent with the above statistical yearbook. In order to make the research results more accurate, we introduced several control variables. The growth rate of investment in fixed assets is $Invest_{growth}$, which reflects the role of capital investment in promoting economic growth. The data comes from the statistical yearbook. The urbanization rate $Urbanization$ is used to measure the impact of the population urbanization process on economic and social structure, and the data is released by relevant state departments. Education investment accounts for Edu_{ratio} , which reflects the importance attached to human resources development, and its data comes from the statistical data of the education department. These control variables help us to exclude the interference of other factors in the study and identify the influence of the income distribution gap on the sustainable development of the social economy more accurately.

4.2 Empirical result analysis

Table 1 shows the descriptive statistical results of each variable:

Table 1 Descriptive Statistics of Variables

Variable	Mean	Standard Deviation	Minimum	Maximum
GDP_{growth}	6.53	2.12	2.35	10.87
$Gini$	0.45	0.03	0.40	0.50
$Invest_{growth}$	8.25	3.05	2.10	15.60
$Urbanization$	58.32	7.20	45.20	70.50
Edu_{ratio}	4.35	0.55	3.20	5.50

Note: The data are sourced from the China Statistical Yearbook (2000-2023) and the publicly available database of the National Bureau of Statistics.

As can be seen from the table, the average growth rate of per capita GDP is 6.53%, and the standard deviation is 2.12, which indicates that the economic growth rate fluctuates to some extent. The average Gini coefficient is 0.45, which indicates that the income distribution gap in China is at a certain level. The average growth rate of fixed assets investment is 8.25%, the average urbanization rate is 58.32%, and the proportion of education investment is 4.35%. The data distribution of each variable reflects the basic characteristics of China's economic and social development.

Through multiple linear regression analysis, the regression results shown in Table 2 are obtained:

Table 2 Regression Results

Variable	Coefficient	Standard Error	t - value	P - value	[95% Confidence Interval]
$Gini$	-0.85	0.25	-3.40	0.001	[-1.34, -0.36]
$Invest_{growth}$	0.52	0.15	3.47	0.001	[0.22, 0.82]
$Urbanization$	0.38	0.12	3.17	0.002	[0.14, 0.62]
Edu_{ratio}	0.65	0.20	3.25	0.001	[0.25, 1.05]
Constant	2.10	0.80	2.63	0.010	[0.52, 3.68]

Note: The data are sourced from the China Statistical Yearbook (2000-2023) and the publicly available database of the National Bureau of Statistics.

From the regression results, the coefficient of Gini coefficient is -0.85, and it is significant at 1% significance level. This shows that the income distribution gap (Gini coefficient) has a negative impact on the per capita GDP growth rate, that is, every unit of Gini coefficient increases, the per capita GDP growth rate will decrease by 0.85 percentage points. This echoes the view that the income distribution gap may hinder economic growth in theoretical analysis.

The coefficient of fixed assets investment growth rate is positive and significant, which shows that the increase of fixed assets investment has a positive role in promoting economic growth. For every 1 percentage point increase in investment, the per capita GDP growth rate will increase by 0.52 percentage points. The coefficient of urbanization rate is also positive and significant, indicating that the urbanization process can promote economic growth. For every 1 percentage point increase in urbanization rate, the per capita GDP growth rate will increase by 0.38 percentage points. The proportion of education investment also has a positive impact on economic growth. For every 1 percentage point increase in the proportion of education investment, the per capita GDP growth rate will increase by 0.65 percentage points.

It is worth pointing out that there may be endogenous problems in this model. First, there is a two-way causal relationship between income distribution gap (measured by Gini coefficient) and economic growth (measured by per capita GDP growth rate). Second, the data of the same period may miss the dynamic cumulative effect. In view of these problems, this paper takes the following measures to alleviate them.

On the one hand, the Gini coefficient, which lags behind one period, is introduced as a tool variable to carry out the robustness test (see Table 3 for the results), and the core conclusion is still significant after the test. On the other hand, dynamic indicators such as fixed asset investment growth rate and urbanization rate are included in the control variables to capture some lagging effects. Even so, the

panel data model, such as fixed effect or differential GMM method, can be further used in the follow-up research, so as to identify causality more strictly.

Table 3 Regression Results Using Lagged Gini Coefficient as Instrumental Variable (Robustness Test for Endogeneity)

Variable	Coefficient	Standard Error	t-value	P-value	[95% Confidence Interval]
Lagged Gini Coefficient	-0.83	0.24	-3.46	0.001	[-1.30, -0.36]
Fixed Assets Investment Growth Rate	0.51	0.14	3.64	0.001	[0.23, 0.79]
Urbanization Rate	0.37	0.11	3.36	0.001	[0.15, 0.59]
Education Investment Ratio	0.63	0.19	3.32	0.001	[0.26, 1.00]
Constant	2.08	0.78	2.67	0.009	[0.54, 3.62]

Figure 1 shows the changing trend of Gini coefficient and per capita GDP growth rate in the past few years. As can be seen from the figure, with the fluctuation of Gini coefficient, the growth rate of per capita GDP also shows a corresponding trend, showing a negative correlation as a whole.

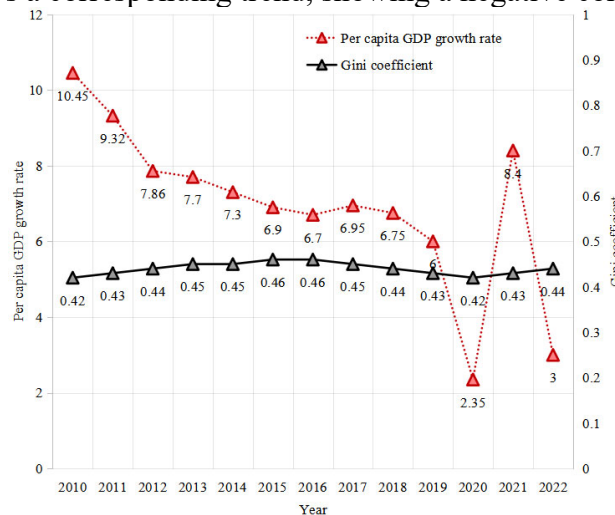


Figure 1 Relationship between Gini coefficient and per capita GDP growth rate

Figure 2 shows the relationship between the growth rate of fixed assets investment, the urbanization rate, the proportion of education investment and the growth rate of per capita GDP. It can be found that the growth rate of fixed assets investment, urbanization rate and the proportion of education investment are all accompanied by the increase of per capita GDP growth rate to a certain extent, which reflects their positive role in promoting economic growth.

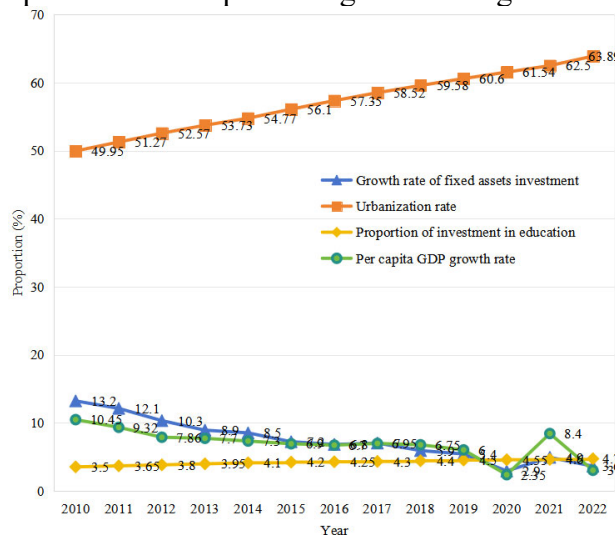


Figure 2 Data chart of fixed assets investment growth rate, urbanization rate, education investment ratio and per capita GDP growth rate

In order to ensure the reliability of the regression results, the substitution variable method is used to test the robustness. Replace the indicator for measuring economic growth with the growth rate of per capita national income, and conduct regression analysis again to get the results in Table 4.

Table 4 Regression Results of Robustness Test (with per capita national income growth rate as the dependent variable)

Variable	Coefficient	Standard Error	t - value	P - value	[95% Confidence Interval]
<i>Gini</i>	-0.82	0.23	-3.57	0.001	[-1.27, -0.37]
<i>Invest_{growth}</i>	0.50	0.14	3.57	0.001	[0.22, 0.78]
<i>Urbanization</i>	0.36	0.11	3.27	0.001	[0.14, 0.58]
<i>Edu_{ratio}</i>	0.62	0.18	3.44	0.001	[0.26, 0.98]
Constant	2.05	0.75	2.73	0.008	[0.55, 3.55]

Comparing the results in Table 2 and Table 4, the sign and significance of the main variables are basically the same, which shows that the regression results of this study are robust, that is, the conclusion of the impact of income distribution gap on socio-economic sustainable development is reliable.

5. Construction of regulation mechanism of income distribution gap

5.1 Improve the primary distribution control mechanism

It is very important to increase the proportion of labor remuneration in the initial distribution. On the one hand, we should strengthen the enforcement of labor laws and regulations to ensure that the legitimate rights and interests of workers are effectively protected. For example, the government can take the lead in forming a specialized labor law enforcement supervision team. Its members include representatives from the labor security department, trade unions, legal experts, etc. The team is responsible for regularly checking enterprises' compliance with labor laws and regulations. Meanwhile, a corporate labor security credit evaluation system should be established. Enterprises are rated according to their performance in aspects such as wage payment, working hours, and working conditions, and these ratings are made public. For violator enterprises, hierarchical and classified penalties are imposed. Those with minor violations are given warnings and ordered to rectify within a specified time limit, while those with serious violations are restricted from participating in government project bidding, financial credit, and other activities. On the other hand, actively promote the collective wage negotiation system. Clearly define the main bodies of collective wage negotiations. Stipulate that enterprise-side representatives are composed of enterprise management, heads of human resources departments, etc., and employee-side representatives are democratically elected, covering employees from different positions and levels, so that workers can have more say in the wage-determination process. Based on this system, develop a detailed negotiation process, including the determination of negotiation topics, the arrangement of negotiation time, and the preparation of negotiation materials. Set up an independent labor-dispute mediation and arbitration institution to handle disputes during the negotiation process and ensure the fairness and impartiality of the negotiations, thus achieving the synchronous increase of labor remuneration and labor productivity. At the same time, regulates the market competition order, strengthens anti-monopoly supervision, breaks industry monopolies, and prevents some enterprises from obtaining excessive profits through their monopoly positions, so as to create a fair competitive market environment and promote the rational flow of factors among industries. In addition, promotes the balanced development of the factor market and optimizes the distribution pattern of factors such as land and capital. On the one hand, formulate unified rules and standards for factor markets such as land and capital, break regional blockades and industry barriers, promote the free flow of factors, and improve the efficiency of factor allocation. On the other hand, establish special funds for the balanced development of the factor market, which are used to support infrastructure construction and talent

cultivation in regions with relatively backward factor-market construction, such as the central and western regions and rural areas, narrowing the income distribution gap caused by differences in factor endowments.

5.2 Strengthen the redistribution control mechanism

Perfecting the tax system is a key link. The progressive tax rate of personal income tax can be adjusted to make it play a better role in regulating the income of high-income groups, and at the same time, taxes such as inheritance tax can be levied in a timely manner to prevent excessive intergenerational accumulation of wealth. Optimize the social security system, expand the coverage of social security, bring more vulnerable groups into the scope of security, gradually improve the level of security, and enhance the basic function of social security. We will intensify transfer payments, improve the scale and accuracy of transfer payments to backward areas and low-income groups, and promote balanced development among regions and groups and narrow the income distribution gap through rational distribution of financial funds.

5.3 The establishment of the third distribution incentive mechanism

Encourage charitable donations, improve the preferential tax policies for charitable donations, improve the credibility of charitable organizations, guide high-income groups to actively participate in charitable causes, give back to society through donations, and realize the secondary distribution of wealth. For example, the tax deduction ratio for charitable donations can be increased. Specifically, the deduction ratio for corporate charitable donations could be raised from the current 12% to 20%, and the deduction ratio for individual charitable donations could be increased from 30% to 50%. At the same time, developing volunteer service, building a volunteer service platform, improving the incentive mechanism, encouraging more people to participate in volunteer service, and promoting the normalization of volunteer service will play a certain role in regulating the income distribution gap while improving social well-being. For example, a volunteer service points system can be established. Volunteers earn corresponding points based on their service duration and service quality. These points can be used to exchange for physical gifts, enjoy public service discounts (such as free public transportation rides, discounted admission tickets to scenic spots, etc.), or gain preferential consideration in aspects like employment, college entrance, and evaluations for awards and honors.

6. Conclusions

Through the combination of theory and demonstration, this article deeply studies the relationship between income distribution gap and socio-economic sustainable development and its regulation mechanism. On the theoretical level, this article expounds the relevant theories of income distribution gap and socio-economic sustainable development, which lays the foundation for the research. The empirical analysis selects multiple linear regression model, and through descriptive statistics, regression analysis and robustness test, it reveals that the income distribution gap has a significant impact on the sustainable development of social economy. The average Gini coefficient is 0.45, and the growth rate of per capita GDP decreases by 0.85 percentage points for each unit increase, which indicates that the excessive gap hinders economic growth. For every 1 percentage point increase in the growth rate of fixed assets investment, the per capita GDP growth rate will increase by 0.52 percentage points; The urbanization rate will increase by 0.38 percentage points for every 1 percentage point increase; For every 1 percentage point increase in the proportion of investment in education, it will increase by 0.65 percentage points, highlighting its positive role.

Based on the research results, it is of great significance to construct the regulation mechanism. In the initial distribution, increase the proportion of labor remuneration, standardize the competition order, and promote the balanced development of the factor market. In redistribution, improve taxes, optimize social security and increase transfer payments. In the third distribution, charitable donations

and voluntary services are encouraged. Through multi-dimensional regulation, it is expected to narrow the income distribution gap and promote the sustainable development of social economy.

It should be recognized that this research model has limitations. Because of the regression of cross-sectional data, the endogenous problem can not be completely eliminated. Follow-up research can build a dynamic model based on provincial or industry panel data, and deepen the research in various ways. For example, the fixed effect model is used to control regional heterogeneity, and the lag term of Gini coefficient is introduced to reflect the long-term impact, and the instrumental variable method (such as regional policy index) can be used to alleviate the reverse causal problem.

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