Proceedings of Business and Economic Studies, 2024, Volume 7, Issue 1
http://ojs.bbwpublisher.com/index.php/PBES
Online ISSN: 2209-265X
Print ISSN: 2209-2641

Study on the Measurement of the Development Level of Common Prosperity

Kun Cai*

School of Big Data and Statistics, Anhui University, Hefei 230601, Anhui Province, China

***Corresponding author:** Kun Cai, ck18855058848@icloud.com

Abstract: Constructing a comprehensive prosperity evaluation index system from the dimensions of "affluence" and "commonality," consisting of 23 detailed indicators, this study utilizes the entropy method and provincial panel data from 2011 to 2020 to measure the level of common prosperity across Chinese provinces. The research findings indicate an overall upward trend in the common prosperity development level among provinces during the sample period. Beijing, Shanghai, Zhejiang, Guangdong, and Jiangsu exhibit the highest common prosperity indices at the provincial level. From a spatial perspective, significant disparities exist in the common prosperity levels among different regions. Consequently, policy recommendations are proposed: Tailoring strategies for regional development based on realities, reinforcing regional coordinated development, and promoting the advancement of common prosperity.

Keywords: Common prosperity; Comprehensive evaluation; Common prosperity index

Online publication: February 25, 2024

1. Introduction

The concept of "common prosperity" can be traced back to 1953, when Mao Zedong, in the "Resolution on Agricultural Cooperatives," emphasized the study of the path towards rural common prosperity based on sustainable agricultural development. The implementation of agricultural socialist transformation was proposed, aiming to transform small-scale individual economies into large-scale cooperative economies. This approach addressed the challenges of mismatched development between industry and agriculture, gradually enabling farmers to escape poverty and enjoy a life of shared prosperity and abundance. On August 17, 2021, one of the agenda items of the 10th meeting of the Central Finance and Economic Commission was to discuss "solidly promoting the issue of common prosperity." The meeting advocated for a gradual and orderly progression, recognizing the long-term, arduous, and complex nature of achieving common prosperity. Localities were encouraged to explore effective paths according to their local conditions, summarize experiences, and gradually implement these initiatives. The 20th National Congress of the Communist Party of China (CPC) report emphasized that achieving common prosperity for all people is not only a crucial feature of China's modernization but also an essential requirement for Chinese-style modernization. At the present moment, with the comprehensive completion of a moderately prosperous society and the historic resolution of absolute

poverty, the imperative to achieve common prosperity for all people has taken on an even more significant role in advancing Chinese-style modernization. Therefore, the scientific construction of an evaluation index system for common prosperity and the assessment of the current level of common prosperity in China is of paramount importance in driving the construction of common prosperity.

2. Literature review

Currently, scholars have researched the evaluation index system of common prosperity. Zhou and Shi argued that the concept of "wealth" falls within the domain of productivity, while "common" pertains to production relations. Common prosperity, as they contended, manifests the unity of productivity and production relations [1]. Li underscored that common prosperity is not synonymous with egalitarianism; it does not entail equal wealth distribution but rather involves equitable allocation based on continual economic expansion [2]. In light of the connotation of common prosperity, scholars generally employ two approaches to gauge the development level of common prosperity. Firstly, by assessing common prosperity levels through the comparison of a single economic indicator with those of developed nations. Liu and Chen utilized the benchmark of achieving per capita gross domestic product (GDP) at the level of medium-developed countries by 2035 for evaluating common prosperity [3]. Secondly, through the application of a comprehensive evaluation index system. Li and Yu constructed process and outcome evaluation index systems for common prosperity based on the core connotations of "common" and "wealth," calculating the level of common prosperity in Zhejiang Province from 2015 to 2020 [4]. Chen *et al*. considered developmental, shared, and sustainable dimensions as the three major evaluation criteria for common prosperity. Building upon this, they develop secondary and tertiary evaluation indicators and use the Analytic Hierarchy Process (AHP) to determine the weights of each level of indicators [5]. Drawing on the aforementioned research, this paper will establish an evaluation index system for the development level of common prosperity based on its inherent connotations. The entropy method will be applied to calculate the common prosperity level across various provinces in China. In comparison with existing research, this paper's contributions may lie in two aspects: firstly, the utilization of the entropy method to measure common prosperity levels across various Chinese provinces from 2011 to 2020 and conducting regional comparisons. Secondly, the application of the Time-Ordered Weighted Averaging (TOWA) method to compute the comprehensive common prosperity level in each province over the decade, categorizing provinces into different types of common prosperity processes. This may offer valuable insights for accelerating the realization of common prosperity for the entire population.

3. Research design

Common prosperity fundamentally entails the shared development outcomes of the entire national population as the overall wealth level continues to rise. Achieving "common prosperity" requires, first and foremost, affluence, followed by achieving a relatively "common" prosperity, encompassing both "wealth" and "inequality." Therefore, this paper draws on the methods of Liu *et al*. and Wan and Chen regarding the construction of the common prosperity index [6,7]. It measures the development level of common prosperity from two dimensions: the overall wealth level and the degree of sharing development outcomes. Building upon a review of relevant literature, this paper selects 23 secondary indicators under the primary indicators of overall wealth level and the degree of sharing development outcomes to form a comprehensive common prosperity development index for each province. In terms of the overall wealth level, considerations include per capita disposable income, the proportion of the added value of the tertiary industry to GDP, overall labor productivity,

the proportion of research and development (R&D) expenditure to GDP, patents per thousand people, the number of medical institution beds per thousand people, per capita public library holdings, the proportion of education expenditure to GDP, per capita urban road area, broadband internet users, passenger turnover, and per capita urban park green space area. These indicators comprehensively assess individual and societal economic vitality, providing a comprehensive and in-depth perspective for measuring the overall economic affluence of different regions. Regarding the degree of sharing development outcomes, considerations include the proportion of labor compensation to GDP, the proportion of personal income tax to total tax revenue, the proportion of rural residents' family spending on cultural and entertainment services to total household consumption expenditure, the proportion of basic pension insurance fund expenditure to GDP, the participation rate in basic medical insurance for urban and rural residents, the ratio of income levels and consumption levels between urban and rural residents, the Engel coefficient ratio between urban and rural residents, urban registered unemployment rate, the proportion of livelihood-oriented expenditure to the general public budget, and the resident burden coefficient. These indicators focus on the balanced distribution of social welfare, reflecting the fairness of living standards among residents in various social strata and regions.

In quantifying the Common Prosperity Development Index, this paper draws inspiration from the entropy weighting method employed by scholars Fang and Ma [8]. The advantages of the entropy method lie in two aspects. Firstly, compared to single indicators, it can accommodate a larger number of indicators, making the evaluation more comprehensive. Secondly, it can objectively and accurately reflect data characteristics, avoiding the bias introduced by personal subjective factors on the analysis results, and clearly illustrating the proportion of each indicator in the overall assessment. The specific steps are as follows:

(1) Faced with a comprehensive evaluation system, standardize the panel data composed of M provinces, T years, and N indicators using the max-min method. The specific calculation formula is as follows:
When X_{itj} is a positively oriented indicator:

$$Z_{itj} = \frac{X_{itj} - \min\left(X_{itj}\right)}{\max\left(X_{itj}\right) - \min\left(X_{itj}\right)}$$

When X_{itj} is a negatively oriented indicator:

$$Z_{itj} = \frac{\max\left(X_{itj}\right) - X_{itj}}{\max\left(X_{itj}\right) - \min\left(X_{itj}\right)}$$

where i represents the province, t represents the year, j represents the measurement index, $\max(X_{itj})$ denotes the maximum value observed for the j-th indicator, and $\min(X_{itj})$ represents the minimum value observed for the j-th indicator.

(2) Calculate the information entropy of each standardized indicator Z_{itj}:

$$E_j = ln^{-1}(MT)\sum_{i=1}^{M}\sum_{t=1}^{T} P_{itj} \times lnP_{itj}$$

$$P_{itj} = \frac{Z_{itj}}{\sum_{i=1}^{M}\sum_{t=1}^{T} Z_{itj}}$$

(3) Calculate the weight for each indicator:

$$G_j = 1 - E_j$$

$$W_j = \frac{G_j}{\sum_{j=1}^{J} G_j}$$

4. Analysis of common prosperity development level results

4.1. Analysis of common prosperity levels by province

The common prosperity levels of thirty provinces in China from 2011 to 2020 were calculated using the entropy weighting method. The specific results are presented in **Table 1**.

Table 1. Common prosperity levels by province (2011–2020)

Province	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Anhui	0.161	0.183	0.178	0.190	0.208	0.220	0.233	0.271	0.280	0.302
Beijing	0.442	0.468	0.479	0.487	0.520	0.539	0.560	0.594	0.617	0.643
Fujian	0.175	0.199	0.206	0.214	0.235	0.250	0.270	0.311	0.326	0.342
Gansu	0.146	0.168	0.179	0.193	0.219	0.233	0.241	0.252	0.262	0.272
Guangdong	0.300	0.329	0.323	0.335	0.355	0.376	0.408	0.451	0.476	0.484
Guangxi	0.129	0.140	0.150	0.157	0.176	0.194	0.217	0.237	0.244	0.253
Guizhou	0.126	0.143	0.165	0.170	0.183	0.197	0.204	0.226	0.232	0.233
Hainan	0.172	0.189	0.186	0.192	0.191	0.206	0.212	0.230	0.236	0.248
Hebei	0.162	0.174	0.177	0.191	0.209	0.221	0.238	0.261	0.277	0.275
Henan	0.161	0.179	0.184	0.198	0.215	0.232	0.250	0.273	0.286	0.288
Heilongjiang	0.186	0.197	0.200	0.212	0.228	0.244	0.251	0.270	0.295	0.304
Hubei	0.168	0.190	0.198	0.219	0.237	0.259	0.266	0.291	0.304	0.309
Hunan	0.154	0.170	0.176	0.195	0.210	0.230	0.245	0.272	0.287	0.294
Jilin	0.174	0.191	0.195	0.206	0.221	0.237	0.237	0.259	0.278	0.279
Jiangsu	0.303	0.339	0.336	0.337	0.376	0.391	0.410	0.441	0.453	0.484
Jiangxi	0.159	0.161	0.170	0.178	0.197	0.217	0.232	0.263	0.273	0.280
liaoning	0.230	0.247	0.259	0.261	0.279	0.294	0.300	0.316	0.318	0.315
Neimenggu	0.170	0.181	0.187	0.201	0.215	0.230	0.235	0.251	0.255	0.269
Ningxia	0.154	0.157	0.177	0.197	0.212	0.227	0.245	0.255	0.266	0.275
Qinghai	0.159	0.177	0.161	0.196	0.196	0.216	0.233	0.242	0.262	0.268
Shandong	0.227	0.251	0.253	0.256	0.281	0.297	0.311	0.325	0.332	0.345
Shanxi	0.167	0.185	0.205	0.206	0.219	0.239	0.227	0.244	0.254	0.250
Shaanxi	0.174	0.193	0.200	0.209	0.226	0.251	0.245	0.266	0.275	0.282
Shanghai	0.410	0.426	0.415	0.419	0.446	0.469	0.487	0.518	0.537	0.564
Sichuan	0.158	0.186	0.189	0.193	0.229	0.252	0.271	0.291	0.299	0.306
Tianjin	0.276	0.295	0.307	0.313	0.342	0.361	0.370	0.399	0.396	0.430
Xinjiang	0.184	0.190	0.203	0.214	0.241	0.265	0.265	0.271	0.273	0.266
Yunnan	0.124	0.136	0.143	0.151	0.164	0.198	0.205	0.219	0.215	0.215
Zhejiang	0.295	0.334	0.333	0.365	0.382	0.402	0.417	0.453	0.466	0.485
Chongqing	0.153	0.177	0.185	0.198	0.222	0.247	0.249	0.282	0.292	0.285

The results in **Table 1** indicate that the common prosperity development levels of various provinces in China from 2011 to 2020 mainly showed an upward trend, with significant differences among different provinces. Beijing, Shanghai, Zhejiang, Guangdong, and Jiangsu consistently held leading positions in common prosperity development during this period. Beijing and Shanghai consistently secured the first and second positions from 2011 to 2020, while Zhejiang gradually stabilized at the third position after ranking fourth before 2014, maintaining this position in the subsequent years. This suggests that Zhejiang, compared to other provinces outside the direct-administered municipalities, has been in a leading position in the development of common prosperity and has become the first demonstration area for common prosperity in China. The common prosperity development levels in the northeastern region (Liaoning, Jilin, and Heilongjiang) relatively declined in rankings from 2011 to 2020. Liaoning dropped from the 7th position in 2011 to the 9th position in 2020, Jilin fell from the 12th to the 19th position, and Heilongjiang went down from the 9th to the 12th position. This trend may be influenced by various factors, including geographical environment, industrial structure, and the business environment. The three northeastern provinces face challenges due to their geographical constraints, relatively single industrial structure, and poor business environment, making it difficult to boost economic volume. Additionally, the northeastern region has a relatively lower degree of openness to the outside world and lacks innovation strength, which may impede the development process of common prosperity.

4.2. Analysis of common prosperity levels by region

The results of regional calculations are presented in **Table 2**. Geographical entities or attributes are mutually correlated in spatial distribution, a phenomenon acknowledged as a crucial factor influencing economic development since Tobler [9]. Similar spatial correlations might exist in the development of common prosperity, aiding in reducing disparities between different regions, promoting coordinated regional economic development, and optimizing the overall economic spatial structure. Achieving the path to common prosperity must particularly focus on the question of whether "prosperity in the east can drive prosperity in the west." Based on this understanding, this paper adopts different criteria for division, such as the "three major regions of east, central, and west," "north and south," and "coastal and inland," to thoroughly examine the differences in the development index of common prosperity among various regions. This analysis helps to deepen the understanding of the characteristics of common prosperity levels under different regional divisions.

From the perspective of the "three major regions," the east, central, and western regions are typical regional divisions due to historical differences in development patterns. From the calculation results, each region exhibits the following characteristics in the common prosperity index and sub-item indices: firstly, the overall common prosperity level gradually weakens from east to west, with the eastern region having a significant lead over the central and western regions. Although the central region is generally higher than the western region, the difference is not substantial. Both the central and western regions have indices lower than the national average, indicating considerable development potential in various aspects.

Looking at the "north and south," the recent trend of "faster development in the south and slower development in the north" has gradually become a new feature of China's regional development imbalance. While the north-south difference in the common prosperity index is small, the affluence index in the south is higher than in the north, while the commonality index in the north is higher than in the south. This indicates that the southern economy is developing faster, but regional disparities and inequalities within the region have not been well addressed.

Finally, from the perspective of "coastal and inland" areas, the imbalance in economic development between coastal and inland provinces has been a prominent feature of China's development in recent years, as

coastal provinces have an advantage in foreign trade. In the common prosperity calculation system, coastal and inland areas show significant differences in the overall index. Coastal provinces have total indices and sub-item indices higher than the national average, while inland provinces have total indices and sub-item indices lower than the national average. Regardless of the criteria for regional division, significant differences exist among regions. In this situation, how to achieve coordinated development among regions, utilizing the leading role of advanced regions to guide the development of other regions, has become a crucial issue that requires focused research and resolution.

Table 2. Results of regional calculations

		Common prosperity level	Affluence index	Commonality index
National level		0.265	0.156	0.108
Three major regions	Eastern region	0.342	0.208	0.134
	Central region	0.227	0.129	0.098
	Western region	0.214	0.124	0.090
North and south	Northern region	0.261	0.148	0.113
	Southern region	0.268	0.164	0.103
Coastal and inland	Coastal region	0.311	0.191	0.120
	Inland region	0.238	0.136	0.102

5. Conclusion and implications

Based on existing research, this paper establishes an evaluation index system for common prosperity and uses the entropy method to measure and compare the common prosperity levels of provinces in China from 2011 to 2020. The following conclusions are drawn:

China's common prosperity level shows an overall upward trend, but significant disparities persist among provinces.

Regionally, a pattern of "strong east, weak west" is observed, with higher common prosperity levels in the south than in the north, and coastal regions outperforming inland areas.

In light of these conclusions, several recommendations are proposed to accelerate the construction of common prosperity:

(1) Deepen the strategy of innovation-driven development to expedite economic transformation.
(2) Increase investment in scientific research and development to elevate industrial levels.
(3) Implement targeted employment assistance policies to effectively leverage non-agricultural employment intermediation.
(4) Tailor employment assistance policies based on regional characteristics, effectively harnessing the intermediary role of non-agricultural employment.

These measures aim to address the existing challenges and promote a more balanced and inclusive development, contributing to the overall goal of achieving common prosperity.

Disclosure statement

The author declares no conflict of interest.

References

[1] Zhou W, Shi X, 2022, Connotation Features and Practical Approaches of Common Prosperity. China Review of Political Economy, 13(3): 3–23.

[2] Li S, 2021, China's Goal and Paths of Common Prosperity. Economic Research Journal, 56(11): 4–13.

[3] Liu W, Chen Y, 2021, Economic Development between the Two Centenary Goals: Tasks, Challenges and Strategies. Social Sciences in China, 2021(3): 86–102 + 206.

[4] Li J, Yu W, 2022, Discussion on Statistical Monitoring and Evaluation of Common Prosperity. Statistical Research, 39(2): 3–17.

[5] Chen LJ, Yu JX, Xu YN, 2021, Construction of the Common Prosperity Index Model. Governance Studies, 37(4): 5–16 + 2.

[6] Wan HY, Chen JP, 2021, Common Prosperity's Theoretical Connotation and Quantitative Method. Finance & Trade Economics, 42(12): 18–33.

[7] Liu PL, Qian T, Huang XH, et al., 2021, The Connotation, Realization Path and Measurement Method of Common Prosperity for All. Journal of Management World, 37(8): 117–129.

[8] Fang DC, Ma WB, 2019, Study on the Measurement of China's Inter-Provincial High-Quality Development and Its Spatial-Temporal Characteristics. Regional Economic Review, 2019(2): 61–70.

[9] Tobler WR, 1970, A Computer Movie Simulating Urban Growth in the Detroit Region. Economic Geography, 46(2): 234–240.