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Measuring the Inclusive Growth of China's Coastal Regions

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Abstract: Inclusive growth captures the need to alleviate the problems of global income disparity and poverty, particularly in Asia. The study's goal is to construct an indicator system that measures the inclusive growth of 11 coastal provinces and cities in China from five aspects, namely, survival, capacity, development, freedom, and opportunity, examining the area from 2000 to 2015. The system is based on Bossel's basic orientor indicator framework. Dynamic changes in overall levels in the five fields are investigated and spatial differences calculated using the Gini coefficient. Among the provinces, Guangxi shows the strongest survival conditions, giving it an advantage over other regions. Shanghai has the highest level of capacity and freedom. Guangdong has the strongest development momentum, but this appears to be weakening. Finally, Shandong shows many more social opportunities. The study suggests that inclusive growth in the area has increased as a result of the area's rapid development, but the growth rates remain low. The level of inclusive growth shows a large gap across the regions. Gini coefficient differences show that the eastern coastal areas have strong development trends, whereas the northern and southern coastal areas show weaker ones. We also offer suggestions on how to promote inclusive growth in these regions.

Keywords: coastal regions; inclusive growth; indicator system; Gini coefficient

1. Introduction

The concept of sustainability, of which the organizing principle is sustainable development, emphasizes a series of harmonious changes and enhances both current and future potential to meet human needs and aspirations [1]. Inclusive growth has been put forward as a concept that aims to improve people's lives by alleviating the problems of increasing income disparity and outstanding poverty in the world, particularly in Asia. When comparing the two concepts, the former focuses on coordinating the relationships among the economy, society, and environment, while the latter emphasizes people's equality and sharing in the social domain based on sustainable economic growth. In other words, inclusive growth has an important role in achieving sustainable development.

In 2007, the Asian Development Bank first defined and proposed inclusive growth as advocating growth strategies that favor equal opportunity. Subsequently, it was approved in the bank's Strategy 2020 [2]. Du et al. [3] defined it as open development and generally favored growth at both the international and domestic levels. Ultimately, inclusive growth is mainly a mode of economic growth that promotes sharing and fair development [4–6]. Initially, countries such as India and Laos used it as a new development strategy to achieve poverty reduction [7,8]. In China, scholars have also conducted a large number of studies on poverty alleviation considering inclusive growth [9–11]. In the development context, increasingly more scholars have shifted their attention from the poverty

problem itself to identifying ways to offer more social opportunity and social welfare, as well as to promote coordinated development of the economy, society, and environment to realize inclusive growth from various aspects [12,13]. The studies also gradually shifted from qualitative analysis to quantitative analysis.

At present, research on the measures of inclusive growth is at the exploration stage, and no mature metrics system or method has been formed yet. Nevertheless, some international scholars have considered this subject. Ali and Son [14] constructed a social opportunity function based on a social welfare function and judged whether growth was inclusive using an opportunity index and opportunity curve. Silber and Son [15] introduced a Bonferroni index to measure the level of income inequality, combining Ali and Son's [14] opportunity index and opportunity curve with concepts such as inclusive growth. McKinley [16] constructed a composite inclusive growth index at the country level to nationally evaluate the achievement of inclusive growth. In addition, Ianchovichina and Lundstrom [17] analyzed the constraints of Zambia's inclusive growth and proposed suggestions for improving secondary and tertiary education and government effectiveness through an empirical study of Zambia. Anand et al. [18] identified the foundations for achieving inclusive growth, as well as the active roles of globalization with the dynamic measure of macroeconomy. Yun, Won, et al. [19] and Yun, Lee, et al. [20] built mathematical models to investigate the effects of human and technological factors on firms' sustainable performance. Shim and Park [21] and Shim et al. [22] addressed the use of production scheduling and open innovations for sustainability in a manufacturing business. Han [23] used Ali and Son's [14] social opportunity function to conduct an empirical study of the inclusive growth of China's healthcare. Jiang and Song [24] built a healthy urbanization project under the guidance of the inclusive growth policy by applying the "*carrying-supporting-attractive-evolutionary-developing*" capability model. Chen and Qin [25] used the Malmquist–Luenberger and Hicks–Moorsteen indexes to estimate and analyze the inclusive provincial total factor productivity in China.

Based on these studies, building an evaluation indicator system is the most popular and applicable method to measure inclusive growth. According to the determination of the weights, we can assess the level of inclusive growth. The research can be separated into the following three categories: The first involves adjusting and improving on specific indicators based on McKinley's [16] evaluation indicator system. Researchers can generate specific indicators according to the research area, such as Wang and Gong's [26] inclusive measurement of economic growth in Xinjiang. The second involves rebuilding a new evaluation indicator system based on differences in understanding and perspectives of inclusive growth. For example, Huang [27] built indicators and measured Fujian's inclusive growth level in terms of the economy, society, resources, and environment. The third is integrating the evaluation indicator system with the model method. For instance, Xu et al. [28] introduced the convergence theory to test the spatial convergence of China's inclusive growth based on construction of the evaluation indicator system.

In summary, these scholars have approached the whole country as the research area, which enables a better understanding of the development of inclusive growth in China. However, several problems still exist in the current development of China, as well as for other developing countries. Inclusive growth is at the core of these development problems. As the largest developing country, China takes an active part in inclusive growth. With this background, it is of great operational significance to study the inclusive growth of China's coastal regions to provide a reference for the improvement of inclusive growth in other developing countries.

Therefore, this study takes the coastal regions as the research area and aims to introduce a theoretical guide for promoting inclusive growth. At the same time, it provides guidance for the gradual realization of inclusive growth in the whole country. Moreover, in the indicator system, inclusive growth for individuals receives less attention and recognition by scholars as realizing and measuring inclusive growth for citizens is not generally included in existing indicator systems. To address this gap, we construct an indicator system of inclusive growth composed of 25 basic

indicators (see Table 1) based on previous studies [29,30]. The rest of the paper is organized as follows. In Section 2, we present the thinking behind the measurements chosen. In Section 3, we present our methodology and data sources. In Section 4, we present the results and discussion together. In Section 5, we present the main conclusions and three suggestions.

Table 1. Indicator system of inclusive growth.

Target Layer	Primary Target	Secondary Target	Unit	Data Interpretation	Weight
Inclusive growth	Survival	Number enjoying the minimum living allowance	Person	-	0.05
		Population density *	Capita/square kilometer	Resident population/land area	0.01
		Per capita water resource	Cubic meter/person	Total water resources/total number of people	0.07
		Per capita urban construction area	Square meter	-	0.02
		Per rural capita housing area	Square meter	-	0.05
	Capacity	Number of college students per 10,000 people	Person	Ordinary institutions of higher learning in college students/total number of people × 10,000	0.05
		Urbanization level in the region	%	Urban population/resident population	0.03
		Employment rate in the secondary and tertiary industries	%	Employment population of the secondary and tertiary industry/total employment population	0.03
		Urban capita net income	Yuan	-	0.05
		Rural capita net income	Yuan	-	0.04
	Development	Secondary industry's share of gross domestic product (GDP)	%	Secondary industry value/GDP	0.02
		Tertiary industry's share of GDP	%	Tertiary industry value/GDP	0.04
		Research and development (R&D) expenditure on GDP	%	R&D funds expenditure/GDP	0.03
		Total social fixed assets investment	Million yuan	-	0.03
		Energy consumption elasticity	-	Annual average increased rate of energy consumption/annual average increased rate of national economy	0.03
	Freedom	Total import and export	Million yuan	-	0.08
		Road density	km/square kilometer	Highway mileage open to traffic/land area	0.03
		Number of mobile phones per 100 people	Piece	Mobile users/total number of people × 100	0.03
		Daily reception of tourists at home and abroad	Person time	(Received ingress tourists + received domestic tourists)/annual days	0.02
		Possession of books per 1000 people	Volume	The total number of public library collection/total number of people × 1000	0.08
	Opportunity	Financial opportunity index	-	Per capita local fiscal expenditure	0.04
		Educational opportunity index	-	Number of primary and secondary school students (including ordinary primary, junior high, and high schools)	0.04
		Medical opportunity index	-	Number of beds per thousand population in health agencies	0.04
		Employment opportunity index	-	Employment share of the total population	0.04
		Ecological opportunity index	-	Built-up area green coverage	0.04

Note: * marked for the reverse indicator.

2. Conceptual Foundations of Inclusive Growth Measurements

Inclusive growth provides a value orientation for the development of the economy with the aim to shift from a material-centered value orientation to a people-centered one [31]. Here, we examine citizens' survival, capacity, development, freedom, and opportunity using an indicator framework. We follow a scientific, systematic, comprehensive, and maneuverable principle, supplementing the core of each human being as a social subject and referencing Bossel's basic orientor indicator

framework [32]. The framework addresses the sustainable level of a system in a particular direction or interest. The indicators are divided into survival, energy efficiency, freedom, safety, adaptation, and coexistence, reflecting the main characteristics of sustainable development. The sustainability of each subsystem in a certain system environment determines the sustainable development ability of that system [33]. This system is often used in the study of water environments [34,35]. The most prominent feature of inclusive growth is equality and sharing. Therefore, we construct an indicator system for inclusive growth based on survival, capability, development, freedom, and opportunity, which are selected as follows.

Survival is the premise of achieving development and inclusive growth. It is also the most basic condition for maintaining human life. In terms of survival, we select the following as measures: population density, number of people enjoying the minimum living allowance, per capita water resource, per capita urban construction area, and per rural capita housing area. Population density reflects the density of various provinces and cities. The smaller the indicator value, the greater the living space and the greater the potential for supporting the population in the area. The minimum living allowance is part of the government's social security system, which guarantees a basic living by giving a subsidy to those whose income falls below the minimum standard of living. The more people it covers, the higher the chance of survival for these citizens. Per capita water resource is one of the most basic conditions of survival, as water is an irreplaceable resource for human development; the indicator measures the available water resources in a specific region as a necessary living condition to measure inclusive growth. Housing is also a basic survival need and is important for the development of mankind. The housing numbers can usually intuitively reflect the differences in living conditions and levels. The urban per capita construction area and rural per capita housing area are introduced here because of different housing systems in the two areas in China.

Capacity can be a critical component in achieving inclusive growth. Fairness is a core concept of inclusive growth, whereas unfairness is mainly created by both congenital and acquired factors such as family background, gender, learning ability, and choice difference. Fairness can effectively close the gap caused by inborn factors. The differences in capacity are mainly reflected through five indicators: urbanization level in the region, number of college students per 10,000 people, employment rate in the secondary and tertiary industries, urban capita net income, and rural capita net income. The level of urbanization plays a pivotal role in appraising the process of urban development, and such improvement helps perfect a public service system and achieve inclusive growth. The number of college students per 10,000 people reflects the level of investment in higher education in a specific region, which can indirectly reflect the level of human capital there. Employment is the embodiment of individual ability, which is reflected by the employment rate of secondary and tertiary industries, because although the primary industry can accommodate a large number of the employed population, its threshold is low and the per capita added value of income and gross domestic product (GDP) is too low. In terms of income, we use both urban per capita net income and rural per capita net income to reflect the level of coordination between urban and rural areas due to their different income structures.

Development aims to improve inclusive growth, targeting both the economy and society. Accordingly, it is measured from four aspects, namely, industrial structure, investment in scientific research, economic construction, and energy utilization, as inclusive growth must achieve the simultaneous development of the economic and social environment. The indicator consists of the secondary industry's share of GDP, tertiary industry's share of GDP, research and development (R&D) expenditure of GDP, total social fixed asset investment, and energy consumption elasticity. GDP proportions of the secondary and tertiary industries highlight the reasonable level of industrial structure in the region. The R&D expense is the main way to measure the area's independent innovation activities and inferred abilities. The assumption is that the larger the proportion of R&D expenditure, the stronger the area's innovation ability and the higher the potential for economic development. Total social fixed asset investment reflects the speed of economic growth and social construction. The energy consumption elasticity coefficient reflects the changes in and utilization of energy demand.

Freedom is a concrete manifestation of inclusive growth. Freedom is characterized in five dimensions, namely, total imports and exports, road density, number of mobile phones per 100 people, possession of books per 1000 people, and daily number of tourists at home and abroad. Measuring the total amount of imports and exports indicates the scale of international trade in terms of the economy. The density of roads expresses accessibility. The number of mobile phones per 100 people reflects the level of communication. The collection of books and number of tourists can fully reflect social awareness, cultural openness, and inclusiveness.

Gaining opportunities is a specific goal of inclusive growth. It becomes a reality when access to social opportunities increases in a relatively balanced manner, rather than experiences an absolute increase. Therefore, the measure of opportunity is further quantified through the opportunity index based on data. The larger the opportunity index, the more opportunities are offered by the society and the fairer the opportunities become for different groups. In this study, the specific indicators include financial opportunities, educational opportunities, medical opportunities, employment opportunities, and ecological opportunities. We calculate our results by using per capita fiscal expenditure, number of primary and secondary students per 10,000 children, hospital beds per 1000 people, proportion of employment to the total population, and coverage of green in built-up areas. Among them, per capita fiscal expenditure can reflect the benefits residents enjoy through development of the local infrastructure, social welfare, and other undertakings. As for education, the requirements for education increase when the overall social level rises. We measure the size of educational opportunities through the number of ordinary primary and secondary school students to the proportion of resident population, with the thought that society can expand the scope of educational opportunities. Hospital beds per capita reflect the accessibility of healthcare services. The proportion of total resident population to the whole society is adopted as an employment opportunity to distinguish the employment capacity of the secondary and tertiary industries. To a certain extent, built-up areas' green coverage rate captures the ability of residents to enjoy the state of the ecological environment.

3. Method and Materials

3.1. Method

As discussed above, our indicator system for inclusive growth includes five aspects—survival, capacity, development, freedom, and opportunity—which consist of 25 indexes. In this study, we use the entropy method to determine the weighting and calculate the scores of the five aspects in the coastal regions to analyze each region's advantages and disadvantages for inclusive growth. Based on this information, we assess inclusiveness and use the Gini coefficient to measure the spatial disparities of inclusive growth across all coastal regions.

3.1.1. Opportunity Index

The indicators in the opportunity index use the inclusive measurement methods of Ali and Son [14] and Silber and Son [15] as follows.

Suppose personal income is ranked from high to low as $x_1, x_2, x_3, \ldots \ldots, x_n$; then, we define the social opportunity function as

$$O = O(y_1, y_2, y_3, \ldots\ldots, y_n), \tag{1}$$

where the independent variable y_i is the opportunity enjoyed by the ith person whose income is x_i. Opportunities here are defined as access to various services such as a resident's access to education and health and labor's access to work. The value of y_i ranges from 0 (no corresponding chance) to 100 (with corresponding chance); it is 0 if the ith person misses a chance and 100 if the ith person has a chance. The average opportunity for residents is defined as

$$\overline{y} = \frac{1}{n}\sum_{i=1}^{n} p y_i, \tag{2}$$

where p is the weighting of y_i. The social opportunity function will increase along with the increase in opportunity for anyone. Economic growth will inevitably widen people's average opportunity. Not only the average social opportunity, but also different opportunities in income groups are captured by inclusive growth. Therefore, the social opportunity function should be consistent with transfer principles; it will become smaller when any opportunity transfers from the poor to the rich. In general, suppose an opportunity shifts from a relatively poor man x_1 to his counterpart x_2; then, the poor man has $y_1 - t$ opportunities and the rich man has $y_2 + t$ opportunities. This formula must meet the following condition:

$$O(y_1 - t, y_2 + t, y_3, \ldots\ldots, y_n) \leq O(y_1, y_2, y_3, \ldots\ldots, y_n). \tag{3}$$

In the above formula, t is non-negative. The population is ranked from low to high according to income. Let $\overline{y}_p$ be the average chance enjoyed by the lowest p% of the society ($0 < p < 100$), and let $\overline{y}$ be the average social opportunity. When $p = 100$, $\overline{y}_p = \overline{y}$. According to the different p, one $\overline{y}_p$ curve can be drawn, which is the cumulative mean distribution curve and the opportunity curve. The higher the position of the opportunity curve, the greater the social opportunity index. The level of inclusiveness depends on two factors: the size of upward displacement of the opportunity curve and change in the opportunity distribution during the upward movement (as shown in Figure 1). To obtain the number of distributing opportunities, we need to make assumptions about the social opportunity index and define the area under the opportunity curve as the opportunity index:

$$OI = \overline{y}^* = \int_0^1 \overline{y}_p dp. \tag{4}$$

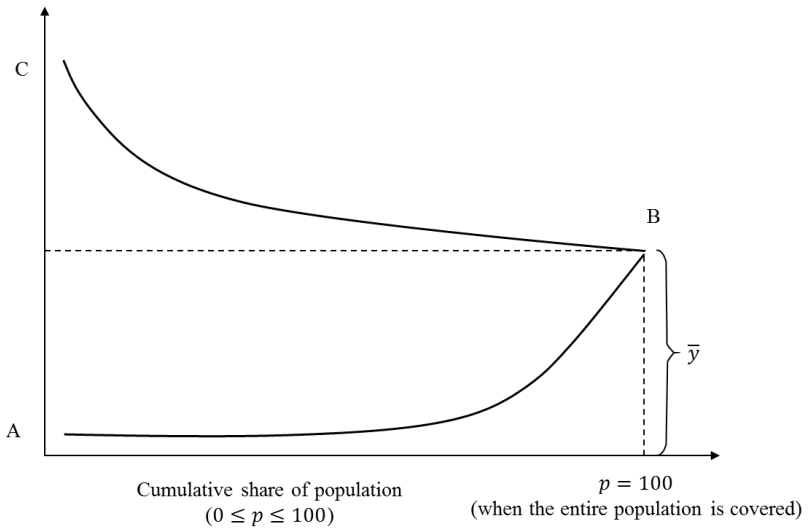

Figure 1. Opportunity curves.

The greater the opportunity index value, the more opportunities the community has to offer. The goal of social development should be to maximize the value of the opportunity index. The city and county are regarded as the basic unit. The per capita income is replaced by the per capita GDP of each city (district and county), and the value of p is determined according to the number of specific cities, as well as districts and counties. Relative to the city (district and county) index values according to per capita GDP from the high to low social opportunity functions, the final calculation of the index in the opportunity index results represents the opportunity inclusive level of the province (city) results.

3.1.2. Entropy Method

Information entropy weighting is an objective weighting method that can reduce and avoid subjective factors and objective limitations of weighting to a certain extent. This method originates from physics and is widely used in social and economic research fields. Generally, the smaller the information entropy of an indicator, the larger the amount of information it provides, and the greater the weight of the indicator; conversely, the larger the information entropy, the smaller the weight of the indicator. The calculation steps of the entropy method are as follows:

Calculate the proportion of the index of the *j*th item in the *i*th year:

$$Y_{ij} = \frac{x_{ij}^*}{\sum_{i=1}^{m} x_{ij}^*}. \tag{5}$$

Calculate the index information entropy:

$$e_j = -k\sum_{i=1}^{m}\left(Y_{ij} \times \ln Y_{ij}\right) \tag{6}$$

Calculate the information entropy redundancy:

$$d_j = 1 - e_j \tag{7}$$

Calculate indicator weights:

$$W_i = \frac{d_j}{\sum_{j=1}^{n} d_j} \tag{8}$$

Calculate the score of the single indicator evaluation:

$$S_{ij} = W_i \times x_{ij}^* \tag{9}$$

It is important that inclusive growth covers survival, capacity, development, freedom, and opportunity. Therefore, giving an equal weight to the five aspects, the subsystem indexes for all of them are weighted using this method. Finally, the weighted inclusive growth of coastal provinces and cities is obtained. All sub-indicators measured by the opportunity index cover economic, social, and environmental aspects in the opportunity layer. As a result of uniform and equal importance, the five aspects need to be given equal weights and need to be standardized after the weighting.

3.1.3. Gini Coefficient

The Gini coefficient, initially used as an index to judge the level of fair income distribution, is also commonly used to describe the spatial distribution differences of elements in geography [36,37]. In this study, a simple Gini coefficient formula is adapted from Zhang [38], as follows:

$$G = 1 - \frac{1}{n}\left(2\sum_{i=1}^{n-1} w_i + 1\right), \tag{10}$$

where G is the Gini coefficient, n is the number of coastal provinces and cities, and w_i is the cumulative number of the total weight ratio. The value of G is generally 0–1. Furthermore, The larger the value, the greater the non-equilibrium. Generally, a Gini coefficient lower than 0.2, 0.2–0.3, 0.3–0.4, 0.4–0.5, and over 0.5 represent the absolute average, better than average, relatively reasonable, relatively large disparity, and great disparity, respectively.

3.2. Data Sources

In this study, 11 coastal provinces and cities in China (excluding Hong Kong, Macao, and Taiwan) are the study objects. The original data come from the China Statistical Yearbook 2000–2016, China Urban Statistical Yearbook, China Regional Economic Statistical Yearbook, Statistical Yearbook, Statistical Yearbook of China's Urban Construction, Statistical Yearbook of Provinces, Water Resources Bulletin, and Statistical Bulletin of National Economic and Social Development. A small amount of indicator data were obtained from official websites, official reports, and other online channels.

4. Results and Discussion

4.1. Field Level Analysis

The weights obtained (Table 1) are for the five aspects. The scores for these aspects in the coastal provinces and cities from 2000 to 2015 are examined and visualized in Microsoft Excel (Figure 2). The aim is to understand the advantages and disadvantages of inclusive growth and to provide guidance for its improvement across the country.

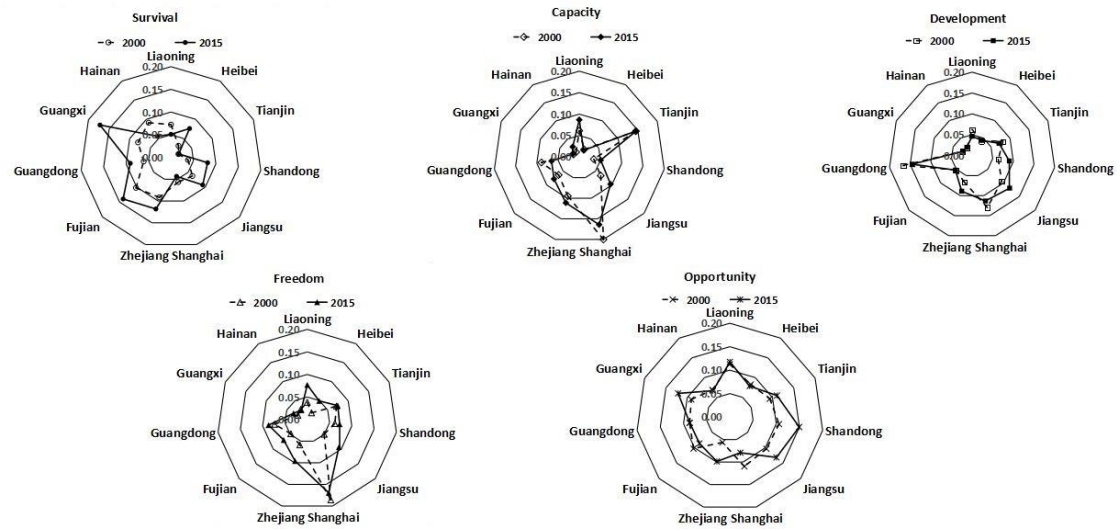

Figure 2. Radar chart of field level in coastal regions. (Note: There are five aspects of inclusive growth at the field level. The scores of these aspects in the coastal provinces and cities in 2000 and 2015 were examined and visualized between 0.00 to 0.20. The closer the value is to 0.20, the higher the level of that aspect. Through the radar chart, the changes that took place in these two years can be clearly seen. To understand the advantages and weaknesses of inclusive growth in all provinces and municipalities, we can provide a basis for promoting inclusive growth in all directions.)

The survival conditions in all the coastal provinces and cities in 2000 scored below 0.10, although Fujian, Zhejiang, and Hainan had better living conditions. Survival conditions in 2015 saw an overall improvement. Guangxi's survival rate increased by 0.09 and became its advantage in inclusive growth. Tianjin remained at the bottom among the coastal regions, and so its survival condition became its roadblock to inclusive growth. There was little change in capacity levels, but a clear disparity in capabilities across regions. Hebei, Guangxi, and Hainan scored in the 0.01–0.03 range with the levels in Guangxi and Hainan decreasing. Compared with Tianjin and Shanghai, which had higher levels, Hebei, Guangxi, and Hainan were clearly at a disadvantage. At the same time, the levels of Shandong, Jiangsu, Zhejiang, and Fujian increased slightly. Development was the strongest in Guangdong, but decreased compared with the 2000 level. In addition, development strength in Liaoning, Tianjin, Shanghai, and Guangxi all decreased. Hebei, Fujian, and Hainan remain unchanged. Only Shandong, Jiangsu, and Zhejiang saw improvement. Shanghai was far ahead in terms of freedom, and it scored a

high degree for being open as an international metropolis. Its freedom score reached 0.19 in 2000 and dropped slightly in 2015, but it still occupied the dominant position. Except for Shanghai, the freedom levels in Tianjin and Guangdong were relatively high in 2000, and in 2015, there was a marked increase in Jiangsu and Zhejiang provinces. The opportunity level scores were relatively higher than scores for the other four aspects, and opportunities among the 11 provinces and cities were relatively balanced. Among them, social opportunity in Shandong increased by 0.4 in 2015, higher than in the other provinces and cities, which was a strong point promoting inclusive growth. Hebei and Hainan scored lower and did not show any increase in 2015.

4.2. Inclusive Growth as a Whole

By calculating the comprehensive score of inclusive growth in 2000 and 2015, we can analyze the overall dynamic changes and development of inclusive growth in the coastal regions. The comprehensive score of inclusive growth ranges from 0 to 1. The results show that only 29 values were over 0.5 in the data during the 16 years, accounting for 16% of the total. Except for Shanghai, inclusive growth in the other provinces and cities was concentrated in the range of 0.2–0.5. Although the overall level of inclusive growth was low, it did show a slight increase in all provinces and municipalities, which indicates that the rapid economic development of the coastal regions had laid a solid foundation for inclusive growth. The level of it in coastal regions from 2000 to 2015 are shown in Figure 3.

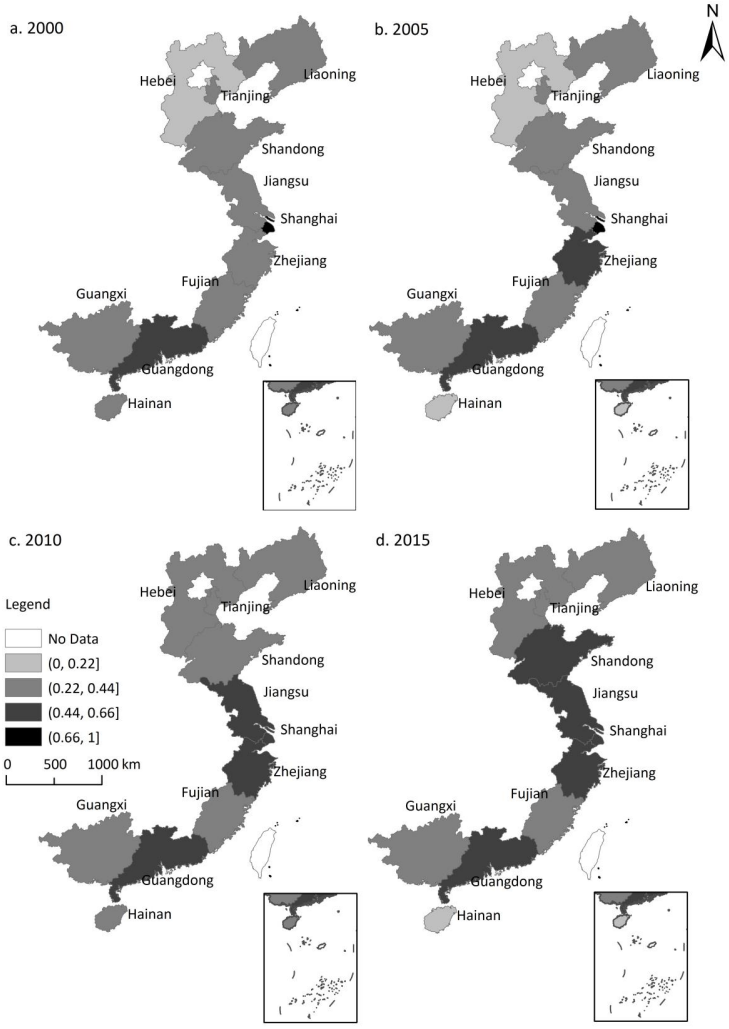

Figure 3. Level of inclusive growth in coastal regions from 2000 to 2015.

The overall levels of inclusive growth in Shandong, Jiangsu, Zhejiang, and Guangxi have been increasing at a rapid rate. The total growth in 2000 to 2015 was above 0.13. Based on the above aspects of the various fields, we can see that there are more opportunities for survival and opportunity in Shandong, which saw the largest increase in employment opportunities and expansion in labor resources. Furthermore, economic development expanded the employment scale, which resulted in the improvement in inclusive growth. The rate of inclusive growth has been steadily increasing in Guangxi, and the inclusive level of Guangxi has increased significantly. However, the overall level of Guangxi is still relatively low. Guangxi's urbanization level, imports, exports, and road density all score at the bottom of the coastal regions, which also reflects Guangxi's lack of capacity and development in 2015.

The inclusive growth in Liaoning, Tianjin, and Fujian was relatively slow, with a relatively small increase and decrease at all levels. The dynamic change of inclusive growth was relatively stable. Hebei scored slightly higher than Liaoning and the other regions. While its level was low, its value was the highest in 2011, mainly affected by energy consumption in the development field. The development of Hebei's traditional industries was hindered after the global financial crisis, combined with policy-oriented development. The industry's gradual restructuring and transformation significantly reduced energy consumption, thereby promoting the development of inclusive growth. The overall level of inclusive growth declined slightly in 2015 in terms of the volume of imports and exports. Moreover, the weakness of global economic growth and surplus production of Hebei's cement and other industries were contributing factors.

The inclusive growth of Hainan showed a weak downward trend, and its stability was weak as well. Its score decreased from 0.223 in 2000 to 0.154 in 2006, mainly due to a sharp drop in various indicators in terms of freedom. Among them, the tourism industry in Hainan's advantageous industries was limited in scale. Since 2006, the number of domestic tourist visits has gradually dropped and it weakened further in 2011. The opportunity level increased significantly by 0.114 in 2011 and decreased to 0.199 in 2015 (see Table A1, Appendix A).

The low level of development capacity also reduced overall inclusive growth. Thus, inclusive growth declined in Shanghai and Guangdong. Although the basic conditions for inclusive growth in Guangdong were good, it had the development advantage, and its secondary and tertiary industries, as well as R&D expenditure, were more prominent. Inclusive growth reached its highest value of 0.516 in 2006 and gradually declined as the development momentum weakened. Shanghai has long-term superiority in terms of capacity and freedom. Its inclusive growth was 0.682 in 2000 and 0.570 in 2015, which was much higher than the other provinces and cities; although it saw a decrease of 0.112 over 2000, it was still nearly three times higher than Hainan in the same year and maintained its top position. This underscores the fact that there is a gap in inclusive growth across the coastal provinces and cities.

4.3. Spatial Difference Analysis

The extent of spatial heterogeneity was assessed using the Gini coefficient of inclusive growth in the coastal regions. In this method, the 11 coastal areas are separated into three parts [39] to further analyze the differences among the regions. These are the northern coastal region (Liaoning, Hebei, Tianjin, and Shandong), eastern coastal region (Jiangsu, Shanghai, and Zhejiang), and southern coastal region (Fujian, Guangdong, Guangxi, and Hainan). The specifics are shown in Table 2.

According to Table 2, the Gini coefficient of inclusive growth in the coastal regions fluctuates between 0.758 and 0.767. However, it is relatively stable despite the different rates of inclusive growth. After China's inclusion in the World Trade Organization in 2001, it became important to develop international trade to boost the economy of the coastal regions. As a whole, the coefficient shows a slow downward trend since 2004, and the difference in inclusiveness levels has narrowed. In numerical terms, the overall Gini coefficient is over 0.5, indicating a large imbalance.

Table 2. Gini coefficient of inclusive growth in coastal regions.

Year	Coastal Regions	Northern Coastal Region	Eastern Coastal Region	Southern Coastal Region
2000	0.767	0.307	0.227	0.316
2001	0.766	0.305	0.242	0.312
2002	0.767	0.309	0.240	0.315
2003	0.768	0.305	0.241	0.314
2004	0.767	0.310	0.227	0.312
2005	0.766	0.311	0.240	0.310
2006	0.763	0.320	0.236	0.306
2007	0.762	0.315	0.228	0.304
2008	0.763	0.311	0.230	0.302
2009	0.765	0.302	0.234	0.303
2010	0.761	0.308	0.229	0.301
2011	0.763	0.302	0.235	0.303
2012	0.761	0.313	0.232	0.299
2013	0.760	0.307	0.234	0.298
2014	0.761	0.313	0.230	0.299
2015	0.758	0.319	0.230	0.298

The level of inclusive growth in the coastal regions is at the stage of slow increase, and there is a downward trend in the spatial differences. However, the gap between the economic and social levels in various provinces and municipalities inevitably leads to an imbalanced state. In terms of the northern, eastern, and southern coasts, the Gini coefficient shows a range from 0.2 to 0.4 and a maximum value of 0.320. Inclusive growth in the three regions is relatively balanced and reasonable.

The Gini coefficient in the northern coastal regions in 2000 was higher than in the East and lower than in the South. Moreover, the northern coastal regions showed a large gap in their capabilities. Tianjin is a municipality directly under the central government, with a high urbanization level and large secondary and tertiary industry values. In addition, universities brought an obvious advantage in capacity compared with other northern provinces along the coast, which is reflected in its inclusive growth score. In 2005, the Gini coefficient in the northern coast surpassed that in the southern coast, and the northern coast became the region with the most spatial difference, showing the expanding trend of the Gini coefficient and disparity. In the eastern coastal regions, Jiangsu, Shanghai, and Zhejiang had the smallest differences in inclusiveness. Although Shanghai is superior in terms of capacity and freedom, Jiangsu and Zhejiang rose in terms of ability, development, freedom, and opportunity in recent years. Moreover, their survival conditions were better than in Shanghai. The Gini coefficient of inclusive growth among the three areas also gradually decreased. The coefficient in the southern coastal region showed a continuous downward trend. In 2000, Guangxi and Hainan differed significantly from the other provinces in many aspects, while Guangdong's development and freedom ranked in the forefront of the coastal regions. At the time, its maximum was 0.316. During the tenth Five-Year Plan, implementing western development became an important national strategy. In 2001, Guangxi enjoyed preferential policies in terms of openness, resources, and talents, which improved survival conditions, social opportunity, and inclusive growth. At the same time, the inclusiveness of Fujian was also growing steadily. In 2015, the Gini coefficient of inclusive growth in the southern coastal regions dropped to 0.298, and inclusiveness tended to be balanced in space. At present, inclusive growth in the coastal regions is mainly characterized by high development in the eastern coast and low development in the northern and southern coasts. However, the northern region's overall inclusiveness is better than that of the southern region, although the former's spatial difference is higher than that of the latter.

5. Conclusions and Policy Implications

In the context of human-orientation, this study investigates inclusive growth in 11 coastal provinces and cities of China. We select indicators from the five aspects (layers) of survival, capacity, development, freedom, and opportunity to construct an evaluation indicator system based on the Bossel basic orientor indicator framework. The Gini coefficient is used to characterize the spatial differences of inclusive growth in the coastal regions. Finally, we analyze the strengths and weaknesses of the area in terms of those aspects. The following conclusions are drawn.

First, the realization of inclusive growth is affected by distinctions at the different layers in the coastal provinces and cities. Second, the overall trend shows a slow upward movement, although it is weak in terms of the level and stability of inclusive growth in the coastal provinces and cities. Third, the level of inclusive growth shows an imbalance in the region with a decreasing trend in Shanghai and on the northern and southern coasts. The Gini coefficient for all coastal regions has been relatively stable.

From the study results, we can see that there has been only moderate improvement in current inclusive growth in the coastal provinces and cities of China. There is still a series of problems blocking its achievement. The level of early inclusive growth was based on rapid economic growth, but it is impossible to guarantee long-term inclusive growth when it is only tied to total economic output. Therefore, coastal provinces and cities need to gradually move closer to a path to inclusive growth based on sound economic foundations in the context of the fourth industrial revolution. Specifically, it is important to pay attention to human development and human orientation. In this way, we can encourage people to take an active part in social activities and enjoy the benefits of development. Our specific recommendations are as follows.

First, the living conditions of residents should be optimized and population growth should be controlled properly in coastal regions. We should improve the social security system to guarantee the minimum standard of living of residents and work hard to solve the existing poverty problem. Further, urban areas need to ensure housing prices do not rise too fast beyond price control policies, while, at the same time, rural areas need to strengthen rural planning and construction, guiding local residents in construction and renovation to avoid the excessive pursuit of spaciousness and other conditions that cause land resources to be wasted.

Second, it is important to improve the capacities of the vulnerable provinces and cities. We should promote urbanization in many aspects through household registration, urban infrastructure, and employment. There is no doubt that innovation needs to be the source of development, and, to that end, more investment needs to be made in science and technology and talent growth. Moreover, provinces and cities with higher levels of capacities should allocate labor resources efficiently and use high-quality talent to improve development. Further, all provinces and cities should take full advantage of the coastal location; transform and upgrade the industrial structure in the course of economic growth; and increase the energy utilization rate, thereby alleviating the pressure on energy and resources in the coastal regions.

Third, social and cultural characteristics should be protected and developed by strengthening cultural exchange and economic cooperation among provinces and cities. Residents should be encouraged to participate in social, economic, and ecological activities. Further, social opportunities should be expanded, particularly medical opportunities. If all of this can be accomplished, all citizens can enjoy them equitably and inclusive growth can become a reality.

As a new perspective, measurements of the inclusive growth concerned with China's coastal regions are an evolving field of research. Like all measures, they are imperfect and leave something to be desired. In our future work, there will be some improvements in the indicator system, in which such aspects as civic rights, old-age right, freedom of speech, and so on are considered much more in the freedom layer. On the other hand, a further study will be made to check whether inclusive growth solved the problems of income disparity and outstanding poverty.

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Appendix

The following tables are the source of Figures 2 and 3. The numbers start from No. 3 in case of a confusion to the article. Tables A1 and A2 are the source of Figure 2. While Table A3 is the source of Figure 3.

Table A1. The Level of Five Fields of Coastal Regions in 2000.

Region	Survival	Capacity	Development	Freedom	Opportunity
Liaoning	0.07	0.06	0.06	0.04	0.11
Hebei	0.03	0.02	0.04	0.02	0.08
Tianjin	0.02	0.14	0.08	0.07	0.09
Shandong	0.04	0.03	0.06	0.06	0.11
Jiangsu	0.06	0.07	0.09	0.05	0.10
Shanghai	0.06	0.20	0.13	0.19	0.11
Zhejiang	0.09	0.09	0.07	0.06	0.06
Fujian	0.10	0.06	0.05	0.05	0.10
Guangzhou	0.06	0.09	0.17	0.07	0.09
Guangxi	0.08	0.01	0.03	0.02	0.09
Hainan	0.09	0.01	0.02	0.03	0.07

Note: This table shows the 2000 source of Figure 2.

Table A2. The Level of Five Fields of Coastal Regions in 2015.

Region	Survival	Capacity	Development	Freedom	Opportunity
Liaoning	0.05	0.09	0.05	0.08	0.12
Heibei	0.08	0.02	0.04	0.05	0.08
Tianjin	0.02	0.15	0.07	0.07	0.11
Shandong	0.08	0.05	0.09	0.07	0.15
Jiangsu	0.09	0.10	0.12	0.09	0.13
Shanghai	0.04	0.16	0.11	0.17	0.08
Zhejiang	0.12	0.11	0.09	0.10	0.10
Fujian	0.14	0.08	0.05	0.07	0.09
Guangdong	0.09	0.07	0.15	0.09	0.09
Guangxi	0.17	0.02	0.02	0.03	0.12
Hainan	0.06	0.03	0.02	0.02	0.07

Note: This table shows the 2015 source of Figure 2.

Table A3. The Results of Inclusive Growth in Coastal Regions from 2000 to 2015.

Year	Liaoning	Hebei	Tianjin	Shandong	Jiangsu	Shanghai	Zhejiang	Fujian	Guangdong	Guangxi	Hainan
2000	0.347	0.193	0.409	0.304	0.375	0.682	0.368	0.369	0.477	0.233	0.223
2001	0.360	0.197	0.424	0.266	0.412	0.668	0.405	0.353	0.490	0.247	0.205
2002	0.366	0.223	0.405	0.290	0.420	0.706	0.413	0.355	0.509	0.278	0.193
2003	0.366	0.217	0.405	0.294	0.428	0.702	0.410	0.349	0.493	0.245	0.213
2004	0.361	0.223	0.387	0.319	0.426	0.710	0.440	0.387	0.492	0.242	0.192
2005	0.364	0.216	0.414	0.326	0.437	0.688	0.454	0.371	0.507	0.245	0.203
2006	0.357	0.231	0.407	0.352	0.467	0.666	0.462	0.386	0.516	0.222	0.154
2007	0.360	0.253	0.399	0.389	0.463	0.640	0.476	0.378	0.512	0.247	0.178
2008	0.360	0.273	0.403	0.404	0.485	0.645	0.473	0.367	0.495	0.257	0.203
2009	0.346	0.269	0.405	0.406	0.485	0.643	0.464	0.329	0.475	0.257	0.246
2010	0.381	0.279	0.396	0.407	0.511	0.604	0.469	0.370	0.486	0.284	0.225
2011	0.387	0.294	0.426	0.443	0.546	0.634	0.482	0.363	0.491	0.286	0.268
2012	0.396	0.279	0.401	0.433	0.526	0.617	0.520	0.412	0.497	0.348	0.238
2013	0.456	0.289	0.402	0.441	0.528	0.570	0.500	0.403	0.486	0.310	0.268
2014	0.419	0.276	0.396	0.434	0.519	0.605	0.516	0.404	0.471	0.356	0.244
2015	0.379	0.265	0.421	0.444	0.533	0.570	0.513	0.426	0.474	0.368	0.199

Note: This table shows the 25 sub-indicator results included in Figure 3.

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