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Research on the Coupling Coordination Degree of China's Commercial Economy and Tourism Economy and Its Obstacle Degree Factors

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Abstract: *This study investigates the coupling coordination between China's tourism and commercial economies using 2012–2021 provincial panel data, applying entropy method, coupling coordination modeling, and obstacle diagnosis. Results indicate: (1) Both sectors show steady growth, with commercial economy development consistently stronger; (2) Coupling coordination exhibits an improving yet still low level, displaying significant regional disparities (eastern > central > western > northeastern regions); (3) The national relationship achieves "basic coordination," with provinces categorized into six distinct types; (4) Tourism benefits represent the primary systemic constraint, while inbound tourist numbers, express business volume, and environmental factors rank as top indicator-level obstacles. The findings suggest that enhancing investment, industrial scale, business environments, and economic benefits could foster synergistic development between these two economic systems.*

Keywords: *Commercial Economy Development Level; Tourism Economy Development Level; Coupling Coordination Degree; Obstacle Factors*

1. Introduction

The tourism economy is vital for national development, improving living standards and driving related industries. China, as the world's largest developing tourism market, has prioritized the sector in policies like the 14th Five-Year Plan for Tourism Development, yet structural inefficiencies persist, requiring optimization for sustainable growth.

Existing research covers international tourism potential [1], political economy dynamics [2], and links between tourism, foreign investment, and energy consumption [3]. Other studies analyze geopolitical and policy uncertainty's impact on tourism flows [4] and broader socioeconomic effects [5].

Recent work highlights industrial convergence and coupling coordination as key for economic upgrading. Regional resilience-tourism coupling rose overall but dipped in 2020 due to the pandemic [6], while digital economy growth boosted tourism quality, especially in western China [7]. Cultural heritage-tourism studies reveal spatiotemporal fluctuations and spillover effects, though market and cultural challenges remain [8,9].

Despite synergies in infrastructure, markets, and governance, commerce-tourism coupling is understudied. This paper analyzes their 2011–2021 trajectory, identifies coordination barriers, and proposes integrated development strategies.

2. Research methods and data sources

2.1 Indicators

Building upon the foundational research of scholars [10-13], this study integrates their theoretical frameworks with an analysis of the current development status of China's tourism economy. Through systematic synthesis, 11 key indicators were selected across three core dimensions—tourism elements, tourism economic benefits, and tourism environment—to construct a comprehensive evaluation system

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for assessing regional tourism economic development levels (see Table 1). Similarly, based on prior academic work by researchers [14,15], a 12-indicator evaluation system was developed focusing on three critical dimensions—investment scale, industrial scale, and economic benefits—to ensure a balanced and multidimensional assessment of commercial economy development (see Table 1).

Table 1: Evaluation index system for development level of tourism economy and commercial economy

System layer	Criteria layer	Indicator layer	Units	Indicator Attributes
Tourism Economy Development Level	Tourism elements	5A Scenic Area	Household	Positive
		Star rated hotel	Household	Positive
		Highway opening mileage	Ten thousand kilometers	Positive
	Economic benefits of tourism	Number of tourism professionals	Ten Thousand persons	Positive
		Domestic tourist arrivals	Ten thousand persons	Positive
		Number of inbound tourists	Ten thousand persons	Positive
		Total revenue of tourism industry	Hundred million yuan	Positive
	Tourism environment	Urban green area	Ten thousand hectares	Positive
		Green coverage rate of built-up area	%	Positive
		Per capita park green area	Square metres/person	Positive
		Industrial pollution control investment	Hundred million yuan	Positive
Commercial Economy Development Level	Investment	Investment in accommodation and catering	Hundred million yuan	Positive
		Transportation Investment	Hundred million yuan	Positive
		Wholesale and retail investment	Hundred million yuan	Positive
	Scale	Large scale express delivery business	Hundred million yuan	Positive
		Telecommunications Services	Hundred million yuan	Positive
		Postal services	Hundred million yuan	Positive
		Cargo turnover	Hundred million ton /kilometers	Positive
		Passenger turnover	Hundred million persons/km	Positive
	Benefits	Value added of accommodation and catering	Hundred million yuan	Positive
		Value added of transportation	Hundred million yuan	Positive
		Value added of wholesale and retail	Hundred million yuan	Positive
		Social sales volume and total retail sales	Hundred million yuan	Positive

2.2 Research methods

2.2.1 Entropy method

In this paper, drawing on the methodology proposed by some scholars [16], we employ the Entropy Method to determine the weights of each indicator. As an objective weighting approach, the Entropy Method can accurately reflect the underlying information characteristics of the data.Given the inconsistent dimensions of the original data, the range method is applied for standardization. Since all selected indicators in this study are positive indicators, the formula used for data standardization is as follows:

$$x_{ij}^{*} = \frac{x_{ij} - \min(x_j)}{\max(x_j) - \min(x_j)} . \tag{1}$$

Where x_{ij} represents the original data of the nth indicator, meanwhile $\min(x_j)$ and $\max(x_j)$ represent the minimum and maximum values of the jth indicator respectively.

Entropy of the jth indicator can be calculated as follows:

$$E_j = -\frac{1}{\ln m}\sum_{i=1}^{m} y_{ij} \ln y_{ij} . \tag{2}$$

Weight of the jth indicator can be calculated as follows:

$$w_j = -\frac{1 - E_j}{\sum_{j=1}^{n}\left(1 - E_j\right)} . \tag{3}$$

Where, $1\text{-}E_j$ represents the information redundancy of the jth indicator and is used to measure the

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importance of the indicator. The greater the value, the more important the indicator is.

The overall evaluation score for each sample is computed as:

$$z_i = \sum_{j=1}^{n} w_j x_{ij}^* \quad . \tag{4}$$

2.2.2 Coupling Coordination Degree Model

In physics, coupling describes the dynamic relationship formed between two or more systems due to mutual influence or interaction. Building upon the research of scholars [17,18], we apply this concept to analyze the interdependent relationship between the commercial economy and tourism economy. The coupling degree measures the strength of interaction between the two subsystems, calculated as:

$$C = \frac{(U_1 + U_2)^{\frac{1}{2}}}{(U_1 + U_2)/2}. \tag{5}$$

Where $D = \sqrt{C \times T},\ T = \alpha U_1 + \beta U_2, U_1$ and U_2 respectively represent the level of development of the commercial economy and tourism economy, *C* represents the coupling degrees of the two systems, and *D* represents the coupling coordination degrees of the two systems. The coupling degree values accurately reflect the interaction between the two systems: higher values indicate a mutually reinforcing virtuous cycle of development, while lower values suggest mutually constraining negative effects. Here, T represents the comprehensive coordination index, with α and β denoting the relative importance weights of commercial economy development level and tourism economy development level to the coupling coordination degree respectively, subject to the constraint that α + β =1.

This study holds that the development of commercial economy and tourism economy are equally important, therefore the weight coefficients in the coordination degree calculation are set as α = β =0.5. According to established research conventions, the coordination degree is generally classified into six main types (see Table 2), which helps to more accurately evaluate the coordinated development level between the two economic systems.

Table 2: Coupling coordination degree classification

Coupling Coordination Degree	Grade	Coupling Coordination Degree	Grade
D=[0.00,0.20]	Severe Imbalance	D=[0.41,0.60]	Basic Coordination
D=[0.21,0.30]	Moderate Imbalance	D=[0.61,0.80]	Moderate Coordination
D=[0.31,0.40]	Slight Imbalance	D=[0.81,1.00]	Good Coordination

2.2.3 Obstacle degree model

To systematically identify and quantify the constraining factors affecting the coordinated development between the commercial economy and tourism economy, we introduce an obstacle factor diagnosis model based on prior research [19,20]. The obstacle degree of the jth indicator is calculated as follows:

$$O_j = \frac{(1 - x_{ij}^*) \times w_j}{\sum_{j=1}^{n} (1 - x_{ij}^*) \times w_j} \times 100\% \quad . \tag{6}$$

To assess the overall obstacle effect of a criterion layer , we sum the obstacle degrees of all its underlying indicators:

$$Z = \sum O_j \quad . \tag{7}$$

2.3 Data source explanation

The data were sourced from the China Statistical Yearbook, China Regional Economic Statistical Yearbook, provincial statistical yearbooks, National Economic and Social Development Statistical

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Bulletins, and the National Bureau of Statistics official website (http://www.stats.gov.cn) covering the period 2012-2022. For missing data in certain years, linear interpolation was applied to ensure continuity. The study divides China's 31 provinces into four regions: eastern, northeastern, central, and western, following standard economic zoning classifications.

3. Results

3.1 Tourism economy development level

The study shows China's tourism economy grew steadily from 2011 to 2021 (0.2660 to 0.2931), averaging 0.2782. Regional disparities were stark: Guangdong (0.7868), Shandong (0.5861), and Jiangsu (0.5221) led, while Ningxia (0.089) and Tibet (0.0452) trailed. Most provinces improved, except high-performing ones like Beijing and Shanghai(see Table 3). Tourism elements scored highest among subsystems, followed by environment, with benefits being weakest , revealing persistent imbalances.

Table 4 reveal an east-west development gradient: eastern coastal areas lead (0.3737), followed by central (0.3085), western (0.2054), and northeastern regions (0.1903). While central and western regions show steady growth, eastern and northeastern areas experience gradual decline, reflecting China's dynamic regional disparities.

3.2 Commercial economy development level

China's commercial economy shows three key trends: 1) Slow growth (0.2527 in 2011 to 0.2688 in 2021); 2) Significant disparities (Guangdong 0.8891 vs. Tibet 0.0050); 3) Uneven progress, with most provinces improving except stagnant areas like Beijing and Shanghai (see Table 5). These patterns reveal regional development imbalances.

Regional analysis reveals a distinct east-to-west gradient in development levels, with the eastern coastal region maintaining the highest average (0.4099), followed by the central region (0.3038). The northeast (0.1684) and western regions (0.1454) trail significantly, establishing a clear East>Central>Northeast>West hierarchy (see Table 6). While eastern and western regions show stable development patterns, the central region demonstrates upward momentum, contrasting with the northeastern region's declining trajectory. These spatial disparities highlight the uneven regional dynamics.

The analysis of subsystem dimensions reveals distinct variations in performance: the investment dimension scores highest, followed by the scale dimension, while the benefits dimension registers the lowest performance (Table 7). This distribution pattern clearly reflects the existing structural imbalances in current development.

3.3 Coupling coordination degree

The coupling coordination degree analysis reveals three key characteristics: (1) Nationally, the average index of 0.4855 suggests a near-imbalanced state, showing modest improvement from 0.4752 in 2011 to 0.4940 in 2021; (2) Provincial disparities are pronounced, with Guangdong (0.9144) leading and Jiangsu, Shandong, and Zhejiang exceeding 0.7000, while Ningxia (0.1951), Qinghai (0.1636), and Tibet (0.1144) trail significantly - though most provinces show improvement, exceptions include Beijing, Tianjin, and several others; (3) Regionally, a clear East>Central>West gradient emerges. Based on these findings, provinces are classified into six coordination types: severe imbalance (Tibet, Qinghai, Ningxia), moderate imbalance (Hainan), slight imbalance (Tianjin, Gansu, etc.), basic coordination (Shanxi, Inner Mongolia, etc.), moderate coordination (Sichuan, Henan, etc.), and good coordination (Guangdong) (see Table 8), highlighting substantial inter-provincial disparities in development coordination.

3.4 Obstacle measurement and analysis

The Obstacle Degree Model reveals key constraints on tourism-commerce coordination in China, showing tourism effect as the most significant barrier and tourism elements as the least influential. Regional analysis identifies distinct obstacle patterns: severely imbalanced regions face tourism efficiency constraints; moderately imbalanced areas struggle with commercial scale; mildly/basically

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coordinated provinces encounter commercial scale barriers; and well-coordinated regions confront business environment limitations. This progression from tourism efficiency to commercial scale to business environment challenges reflects the evolving obstacles across development stages, providing a scientific foundation for targeted regional policies(see Table 9).

Table 9: Distribution of obstacle degree at the criterion layer

	Severe Imbalance Type	Moderate Imbalance Type	Slight Imbalance Type	Basic Coordination Type	Moderate Coordination Type	Good Coordination Type	Mean
Commercial Investment	11.3340	10.9097	10.4693	10.0282	7.7406	26.7075	12.8649
Commercial Scale	24.2485	24.5432	24.8794	25.7085	29.6946	6.2097	22.5473
Commercial Efficiency	15.6164	15.4166	15.6803	15.0245	10.4120	1.0915	12.2069
Tourism Elements	9.9336	10.1754	9.1970	9.1898	7.1829	18.9885	10.7779
Tourism Effect	24.6154	24.4036	24.7663	24.2872	28.7500	18.8777	24.2834
Tourism Environment	14.2522	14.5514	15.0077	15.7619	11.0097	28.1250	16.4513

The study reveals seven major obstacles to tourism-commerce coordination(see Figure 1): inbound tourists (most restrictive in Jiangsu at 31.2%), express delivery (Shandong 28.7%), green space coverage (Henan 25.4%), pollution control (Guangdong 22.6%), goods turnover (Jiangsu 18.7%), retail investment (Sichuan 16.9%), and tourism workforce (Guangdong 20.3%), with significant regional variations - for instance, inbound tourists affect Beijing (8.5%) and Shanghai (9.1%) minimally, while express delivery is least problematic in Shanghai (6.3%). These findings underscore the necessity for region-specific policies to address distinct coordination challenges across provinces.

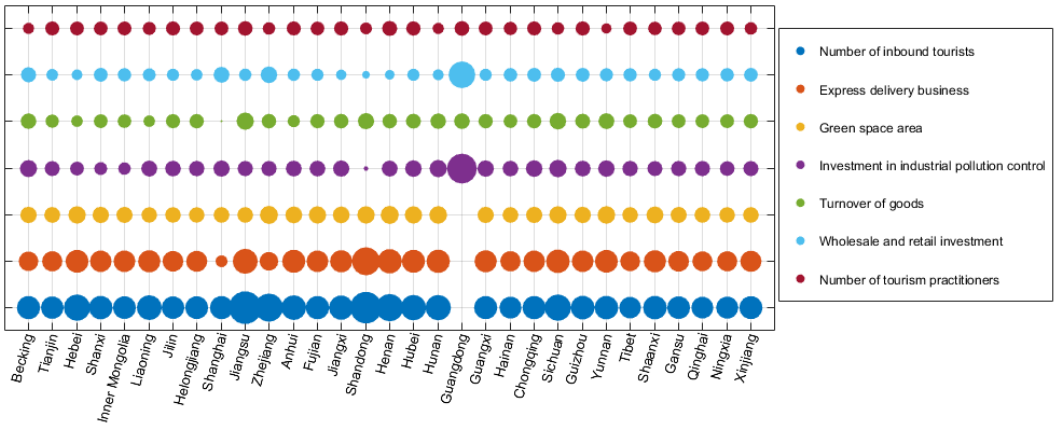

Figure 1: Distribution of obstacle degree at the indicator layer

4. Conclusions and suggestions

4.1 Conclusions

This study conducts a systematic evaluation of the coordinated development between China's tourism and commercial economies at the provincial level from 2011 to 2021. Key findings reveal: (1) While both sectors showed steady growth, development remained relatively slow with notable regional disparities - eastern coastal provinces led development, central regions showed intermediate performance, while western and northeastern regions consistently lagged behind, forming a clear east-to-west gradient pattern. (2) The coupling coordination degree exhibited marginal improvement but remained stagnant at the "near imbalance" threshold throughout the decade, with coordination levels progressively decreasing along the east-central-west gradient. (3) Obstacle factor analysis identified seven primary constraints including inbound tourism volume, logistics capacity, urban green coverage, pollution control investment, goods turnover rate, retail sector investment, and tourism workforce size, with significant regional variations in their relative impacts. These findings highlight persistent coordination challenges and regional imbalances in China's tourism-commerce integration.

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4.2 Suggestions

To enhance the coupling coordination between China's tourism and commercial economies for sustainable and balanced regional development, this study proposes four key policy recommendations: (1) Strengthening commercial investment and logistics infrastructure in underdeveloped western regions (e.g., Qinghai, Tibet, Ningxia) to support modern service industry growth; (2) Improving regional environments through pollution control, ecological conservation, and disaster management to boost green development; (3) Expanding tourist arrivals by innovating tourism products, branding, and services while leveraging domestic and inbound markets; (4) Developing distinctive regional products by capitalizing on unique natural, cultural, and industrial advantages—such as western provinces (Yunnan, Xinjiang) utilizing Belt and Road opportunities, and advanced regions (Beijing, Shanghai) leveraging financial and policy strengths to drive broader development.

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References

[1] Alhanaqtah O. Tourism potential of China and its relevance for Jordan's economic openness[J]. International Business Research, 2023, 16(1): 24-24.
[2] Wooyeal P. The politics of Chinese tourism in South Korea: political economy, state-society relations, and international security[J]. The Pacific Review, 2020, 33(3): 331-355.
[3] Ntom E. Triangular nexus between foreign direct investment, international tourism, and energy consumption in the Chinese economy: accounting for environmental quality[J]. Environmental Science and Pollution Research International, 2019, 26(24): 24819-24830.
[4] Kumar A, Debojyoti D, Anupam D. Geopolitical risk, economic policy uncertainty and tourist arrivals: Evidence from a developing country[J]. Tourism Management, 2019, 75: 323-327.
[5] Dobbs P. Chinese tourism and its impact to Thailand economy[J]. European Journal of Business and Management, 2018, 10(12): 182-199.
[6] Xun C. Research on the coupling coordination degree of tourism economy and regional resilience and its obstacle degree factors based on the obstacle degree model[J]. Journal of Economics, Business and Management, 2024, 12(1): 50-56.
[7] Wang J, Wang Q, Feng L. Coordination pattern and driving mechanism of digital economy and high-quality tourism development in China[J]. Scientia Geographica Sinica, 2024, 44(2): 130-139.
[8] Yue J, Dai X. Coupling mechanism and coordination effect between regional cultural heritage and tourism development: an empirical study of Beijing-Tianjin-Hebei[J]. Economic Geography, 2024, 44(3): 231-240.
[9] Yu J, Wu Q. Spatial-temporal pattern of coordinated development of tourism economy and ecological civilization in the Yellow River Basin[J]. Journal of Arid Land Resources and Environment, 2024, 38(4): 181-188.
[10] Zhang X, Gao N, Wang L. A study on the spatio-temporal evolution characteristics and formation mechanism of the integration quality of Chinese culture and tourism industry[J]. Statistics and Decision Making, 2023, 39(5): 96-100.
[11] Shu X, Min Z, Guo X, He Y, Zhang Q. Coupling coordination between digital economy and tourism high-quality development at the provincial level and its driving factors[J]. Economic Geography, 2024, 44(3): 231-240.
[12] Yin J, Yang Y. The characteristics and driving factors of the coordinated development of exhibition industry and tourism in China[J]. Economic Geography, 2020, 40(5): 194-202.
[13] Gong Y, Guo Z. Empirical analysis of coupled coordination development between tourism and finance: a case study of Jiangsu province[J]. Tourism Tribune, 2017, 32(8): 74-84.
[14] Lu C. Research on the space-time evolution of the coupling and coordination between the trade circulation industry and the high-quality economic development[J]. Commercial and Economic Research, 2023, 19(10): 33-36.
[15] Huang Q. The impact of trade agglomeration on the resilience of urban economic development[J]. Commercial and Economic Research, 2023, 9(5): 18-21.
[16] Yuan Y, Yu F. Evaluation on the coupling and coordination level of cultural resources, tourism industry and economic development——taking 50 key tourism cities as an example[J]. Statistics and

ISSN 2616-5902 Vol. 7, Issue 6: 76-85, DOI: 10.25236/AJBM.2025.070612

Decision Making, 2024, 40(2): 114-119.
[17] Sun J, Cui Y, Zhang H. Spatio-temporal pattern and mechanism analysis of coupling between ecological protection and economic development of urban agglomerations in the Yellow River Basin[J]. Journal of Natural Resources, 2022, 37(7): 1673-1690.
[18] Gao X, Peng C, Wang H. Research on the coupling coordination degree between the development of digital economy and innovation and entrepreneurship[J]. Statistics and Decision Making, 2024, 40(3): 16-21.
[19] Yang Y, Peng A, Wang R. Spatio-temporal evolution and obstruction factors identification of environmental vulnerability of tourism industry system in the Trunk Stream region of Yangtze River Economic Belt[J]. Economic Geography, 2022, 42(5): 212-221.
[20] Zhang H, Li S. Analysis of the spatial-temporal characteristics and barriers of the level of China's endowment service capacity[J]. Statistics and Decision Making, 2024, 40(4): 86-90.

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Table 3: Tourism economy development level of provinces

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Mean
Beijing	0.3319	0.3498	0.3187	0.3159	0.3120	0.2975	0.3025	0.2666	0.2756	0.2412	0.2368	0.2953
Tianjin	0.1245	0.1144	0.0936	0.0891	0.1077	0.0934	0.1014	0.0782	0.0794	0.0847	0.0624	0.0935
Hebei	0.2849	0.2877	0.2848	0.3032	0.3077	0.2861	0.3288	0.4382	0.3510	0.2999	0.2921	0.3150
Shanxi	0.2250	0.2376	0.2279	0.2008	0.2143	0.2180	0.2698	0.2640	0.2851	0.2774	0.2522	0.2429
Inner Mongolia	0.2241	0.2109	0.2236	0.2183	0.2252	0.2227	0.2379	0.2487	0.2483	0.2337	0.2982	0.2356
Liaoning	0.2954	0.3032	0.2895	0.3316	0.2904	0.2466	0.2621	0.2426	0.2532	0.2373	0.2530	0.2732
Jilin	0.1341	0.1274	0.1177	0.1225	0.1428	0.1405	0.1337	0.1301	0.1456	0.1286	0.1420	0.1332
Heilongjiang	0.2102	0.2012	0.1942	0.1590	0.1705	0.1588	0.1472	0.1386	0.1359	0.1312	0.1638	0.1646
Shanghai	0.2944	0.2848	0.2344	0.2182	0.2273	0.2463	0.2618	0.1879	0.2143	0.1961	0.2231	0.2353
Jiangsu	0.5915	0.6146	0.6067	0.5724	0.5890	0.5879	0.5522	0.5954	0.5533	0.5623	0.4680	0.5721
Zhejiang	0.4708	0.5039	0.4953	0.4668	0.4800	0.4707	0.4620	0.4508	0.4409	0.5195	0.4157	0.4706
Anhui	0.2544	0.2877	0.3089	0.2956	0.3199	0.3517	0.3566	0.3493	0.3713	0.3751	0.3779	0.3317
Fujian	0.2528	0.2963	0.2908	0.2798	0.3091	0.2871	0.2883	0.2955	0.3057	0.3278	0.3176	0.2955
Jiangxi	0.2129	0.2261	0.2204	0.2359	0.2644	0.2703	0.2830	0.3161	0.3327	0.3155	0.2860	0.2694
Shandong	0.6185	0.5957	0.5634	0.5859	0.5814	0.6055	0.6211	0.5882	0.6185	0.5442	0.5250	0.5861
Henan	0.3352	0.3239	0.3421	0.3312	0.3304	0.3831	0.3907	0.3701	0.4097	0.3714	0.3772	0.3605
Hubei	0.2840	0.3057	0.3143	0.3260	0.3296	0.3377	0.3310	0.3001	0.3095	0.3728	0.3704	0.3256
Hunan	0.2845	0.3029	0.2882	0.3237	0.3413	0.3397	0.3106	0.2851	0.3117	0.3476	0.3959	0.3210
Guangdong	0.8066	0.8114	0.8000	0.7915	0.8124	0.7837	0.7908	0.7496	0.7527	0.7555	0.8005	0.7868
Guangxi	0.2049	0.2189	0.2060	0.2171	0.2513	0.2458	0.2618	0.2708	0.2915	0.3089	0.3634	0.2582
Hainan	0.1078	0.1124	0.0841	0.0843	0.0827	0.0899	0.0863	0.0719	0.0807	0.0731	0.0798	0.0866
Chongqing	0.2328	0.2488	0.2219	0.2127	0.2259	0.2230	0.2237	0.2241	0.2392	0.2504	0.2036	0.2278
Sichuan	0.3382	0.3441	0.3678	0.3510	0.3715	0.3657	0.3862	0.3798	0.4150	0.4657	0.4415	0.3842
Guizhou	0.1657	0.1764	0.1834	0.1797	0.2036	0.2173	0.2428	0.2590	0.2884	0.3070	0.3062	0.2299
Yunnan	0.2714	0.2925	0.2836	0.2801	0.2904	0.2969	0.3270	0.3289	0.3939	0.4415	0.4828	0.3354
Tibet	0.0340	0.0326	0.0237	0.0500	0.0498	0.0194	0.0313	0.0376	0.0524	0.0605	0.0631	0.0413
Shaanxi	0.2446	0.2607	0.2500	0.2486	0.2790	0.2643	0.2766	0.2713	0.2979	0.2969	0.2788	0.2699
Gansu	0.1123	0.1316	0.1267	0.1185	0.1193	0.1368	0.1386	0.1406	0.1458	0.1441	0.1630	0.1343
Qinghai	0.0443	0.0413	0.0347	0.0373	0.0405	0.0376	0.0490	0.0477	0.0636	0.0454	0.0552	0.0452
Ningxia	0.0842	0.0849	0.0808	0.0806	0.0829	0.1043	0.0808	0.0977	0.1029	0.0949	0.0882	0.0893
Xinjiang	0.1693	0.1725	0.1863	0.1914	0.1926	0.2061	0.2102	0.2167	0.2476	0.2564	0.3033	0.2139
Total	0.2660	0.2743	0.2666	0.2651	0.2756	0.2753	0.2821	0.2787	0.2907	0.2925	0.2931	0.2782

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Table 4: Development level of tourism economy in four regions

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Mean
East	0.3884	0.3971	0.3772	0.3707	0.3809	0.3748	0.3795	0.3722	0.3672	0.3604	0.3421	0.3737
Northeast	0.2132	0.2106	0.2005	0.2044	0.2012	0.1820	0.1810	0.1704	0.1782	0.1657	0.1863	0.1903
Central	0.2660	0.2806	0.2836	0.2855	0.3000	0.3167	0.3236	0.3141	0.3367	0.3433	0.3433	0.3085
West	0.1771	0.1846	0.1824	0.1821	0.1943	0.1950	0.2055	0.2102	0.2322	0.2421	0.2539	0.2054

Table 5: Development level of commercial economy of provinces

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Mean
Beijing	0.2462	0.2325	0.2241	0.2248	0.2201	0.2073	0.1901	0.1783	0.1648	0.1504	0.1516	0.1991
Tianjin	0.1612	0.1492	0.1242	0.1169	0.1158	0.1233	0.1212	0.1202	0.1076	0.1074	0.0984	0.1223
Hebei	0.3659	0.3681	0.4138	0.3733	0.3525	0.3484	0.3474	0.3874	0.4051	0.4036	0.3884	0.3776
Shanxi	0.1496	0.1437	0.1438	0.1244	0.1280	0.1252	0.0994	0.0995	0.1086	0.1171	0.1259	0.1241
Inner Mongolia	0.1909	0.1750	0.1780	0.1764	0.1456	0.1419	0.1444	0.1146	0.1118	0.1051	0.1036	0.1443
Liaoning	0.3406	0.3421	0.3850	0.3371	0.2813	0.2218	0.2013	0.1770	0.1647	0.1451	0.1429	0.2490
Jilin	0.1281	0.1359	0.1246	0.1216	0.1129	0.1329	0.1338	0.1198	0.1030	0.0918	0.0946	0.1181
Heilongjiang	0.1367	0.1339	0.1493	0.1431	0.1338	0.1502	0.1666	0.1556	0.1397	0.1024	0.1077	0.1381
Shanghai	0.4036	0.3930	0.3986	0.4043	0.4073	0.4064	0.3882	0.3821	0.3776	0.3679	0.3814	0.3919
Jiangsu	0.6484	0.6484	0.6712	0.6451	0.6796	0.6655	0.6630	0.6503	0.6706	0.6210	0.6213	0.6531
Zhejiang	0.4836	0.4797	0.5088	0.5135	0.5373	0.5469	0.5248	0.5155	0.5198	0.5437	0.5490	0.5202
Anhui	0.2706	0.2757	0.3252	0.3214	0.3209	0.3373	0.3077	0.3408	0.3363	0.3462	0.3569	0.3217
Fujian	0.2755	0.2761	0.2913	0.2865	0.3041	0.2990	0.3142	0.3713	0.3323	0.3558	0.3519	0.3144
Jiangxi	0.1938	0.1939	0.2070	0.2013	0.2146	0.2257	0.2170	0.2430	0.2653	0.2503	0.2901	0.2275
Shandong	0.6358	0.6121	0.5809	0.5551	0.5732	0.5819	0.5968	0.5845	0.5433	0.5377	0.5441	0.5769
Henan	0.3709	0.3709	0.3999	0.4025	0.4252	0.4342	0.4701	0.5401	0.5190	0.5441	0.5485	0.4569
Hubei	0.3164	0.2993	0.3254	0.3370	0.3589	0.3688	0.3626	0.3993	0.4090	0.3381	0.3742	0.3535
Hunan	0.3059	0.2891	0.3149	0.3234	0.3301	0.3431	0.3677	0.3787	0.3662	0.3596	0.3527	0.3392
Guangdong	0.8632	0.8749	0.9048	0.9246	0.9095	0.9139	0.9095	0.8821	0.8828	0.8588	0.8555	0.8891
Guangxi	0.1817	0.1903	0.2024	0.1918	0.1945	0.2084	0.2188	0.2746	0.2575	0.2396	0.2515	0.2192
Hainan	0.0575	0.0603	0.0543	0.0521	0.0513	0.0535	0.0472	0.0485	0.0473	0.0547	0.0711	0.0543
Chqongqing	0.1393	0.1364	0.1549	0.1648	0.1836	0.1783	0.1802	0.1850	0.1941	0.1994	0.1999	0.1742
Sichuan	0.3097	0.3187	0.3343	0.3468	0.3538	0.3624	0.3785	0.4089	0.4113	0.4218	0.4355	0.3711
Guizhou	0.0957	0.0988	0.1148	0.1189	0.1393	0.1608	0.1829	0.2096	0.2013	0.2060	0.1781	0.1552
Yunnan	0.1728	0.1618	0.1718	0.1780	0.1902	0.2062	0.2588	0.2833	0.2936	0.2947	0.2876	0.2272
Tibet	0.0030	0.0033	0.0013	0.0019	0.0016	0.0033	0.0071	0.0099	0.0084	0.0081	0.0069	0.0050
Shaanxi	0.1986	0.1922	0.2129	0.2128	0.2129	0.2208	0.2343	0.2713	0.2682	0.2647	0.2331	0.2293
Gansu	0.0821	0.0824	0.0960	0.0996	0.1104	0.1222	0.0955	0.0911	0.0930	0.0928	0.0865	0.0956
Qinghai	0.0107	0.0117	0.0117	0.0139	0.0139	0.0161	0.0235	0.0254	0.0198	0.0170	0.0167	0.0164
Ningxia	0.0206	0.0218	0.0177	0.0168	0.0168	0.0173	0.0174	0.0144	0.0124	0.0135	0.0129	0.0165
Xinjiang	0.0756	0.0798	0.0965	0.0887	0.0947	0.0827	0.1066	0.0811	0.0892	0.0961	0.1142	0.0914
Total	0.2527	0.2500	0.2626	0.2587	0.2617	0.2647	0.2670	0.2756	0.2717	0.2663	0.2688	0.2636

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Table 6: Development level of commercial economy in four regions

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Mean
East	0.4141	0.4094	0.4172	0.4096	0.4151	0.4146	0.4102	0.4120	0.4051	0.4001	0.4013	0.4099
Northeast	0.2018	0.2040	0.2196	0.2006	0.1760	0.1683	0.1672	0.1508	0.1358	0.1131	0.1151	0.1684
Central	0.2679	0.2621	0.2861	0.2850	0.2963	0.3057	0.3041	0.3336	0.3341	0.3259	0.3414	0.3038
West	0.1234	0.1227	0.1327	0.1342	0.1381	0.1434	0.1540	0.1641	0.1634	0.1632	0.1605	0.1454

Table 7: Development level of subsystem of commercial economy

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Mean
Investment	0.3096	0.3107	0.3235	0.3314	0.3164	0.3266	0.3512	0.3572	0.3566	0.3330	0.3189	0.3305
Scale	0.2075	0.2011	0.2204	0.2102	0.2172	0.2185	0.2081	0.2144	0.2075	0.2060	0.2203	0.2119
benefits	0.1856	0.1813	0.1794	0.1787	0.1881	0.1895	0.1896	0.1976	0.1956	0.1994	0.1993	0.1895

Table 8: Coupling coordination degree among provinces

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Mean
Beijing	0.5346	0.5340	0.5170	0.5162	0.5119	0.4984	0.4897	0.4669	0.4617	0.4364	0.4353	0.4911
Tianjin	0.3764	0.3615	0.3284	0.3195	0.3342	0.3275	0.3330	0.3114	0.3040	0.3088	0.2799	0.3259
Hebei	0.5682	0.5705	0.5859	0.5800	0.5739	0.5619	0.5814	0.6419	0.6141	0.5898	0.5803	0.5862
Shanxi	0.4283	0.4298	0.4255	0.3976	0.4069	0.4065	0.4047	0.4026	0.4195	0.4246	0.4222	0.4153
Inner Mongolia	0.4548	0.4383	0.4467	0.4430	0.4255	0.4216	0.4306	0.4109	0.4082	0.3959	0.4193	0.4268
Liaoning	0.5632	0.5675	0.5778	0.5782	0.5346	0.4836	0.4793	0.4552	0.4519	0.4308	0.4360	0.5053
Jilin	0.3620	0.3627	0.3480	0.3494	0.3563	0.3696	0.3657	0.3533	0.3499	0.3296	0.3405	0.3534
Heilongjiang	0.4118	0.4051	0.4127	0.3884	0.3886	0.3930	0.3957	0.3832	0.3712	0.3404	0.3645	0.3868
Shanghai	0.5871	0.5784	0.5529	0.5450	0.5516	0.5625	0.5646	0.5176	0.5334	0.5183	0.5401	0.5501
Jiangsu	0.7869	0.7945	0.7989	0.7795	0.7954	0.7909	0.7778	0.7888	0.7805	0.7687	0.7343	0.7815
Zhejiang	0.6908	0.7012	0.7085	0.6997	0.7126	0.7123	0.7017	0.6943	0.6919	0.7290	0.6912	0.7030
Anhui	0.5122	0.5307	0.5630	0.5552	0.5660	0.5869	0.5756	0.5874	0.5945	0.6003	0.6060	0.5707
Fujian	0.5137	0.5348	0.5395	0.5321	0.5537	0.5413	0.5486	0.5755	0.5645	0.5844	0.5782	0.5515
Jiangxi	0.4507	0.4575	0.4622	0.4668	0.4881	0.4970	0.4978	0.5264	0.5450	0.5301	0.5367	0.4962
Shandong	0.7919	0.7771	0.7564	0.7552	0.7598	0.7704	0.7803	0.7657	0.7614	0.7355	0.7311	0.7622
Henan	0.5938	0.5887	0.6082	0.6043	0.6122	0.6386	0.6546	0.6687	0.6791	0.6705	0.6744	0.6357
Hubei	0.5475	0.5500	0.5655	0.5757	0.5865	0.5941	0.5886	0.5884	0.5965	0.5958	0.6102	0.5817
Hunan	0.5431	0.5440	0.5489	0.5688	0.5794	0.5843	0.5813	0.5732	0.5812	0.5946	0.6113	0.5737
Guangdong	0.9135	0.9179	0.9224	0.9249	0.9271	0.9199	0.9209	0.9017	0.9029	0.8975	0.9097	0.9144
Guangxi	0.4393	0.4518	0.4519	0.4517	0.4702	0.4758	0.4892	0.5222	0.5234	0.5216	0.5498	0.4861
Hainan	0.2807	0.2870	0.2600	0.2575	0.2553	0.2634	0.2526	0.2430	0.2486	0.2514	0.2744	0.2613
Chongqing	0.4244	0.4292	0.4306	0.4327	0.4513	0.4466	0.4481	0.4512	0.4642	0.4727	0.4492	0.4454
Sichuan	0.5689	0.5755	0.5922	0.5907	0.6021	0.6034	0.6184	0.6278	0.6428	0.6657	0.6622	0.6136
Guizhou	0.3549	0.3634	0.3809	0.3824	0.4103	0.4323	0.4590	0.4827	0.4909	0.5015	0.4832	0.4310
Yunnan	0.4654	0.4664	0.4698	0.4725	0.4848	0.4974	0.5393	0.5525	0.5832	0.6006	0.6104	0.5220
Tibet	0.1006	0.1015	0.0744	0.0984	0.0944	0.0898	0.1221	0.1388	0.1448	0.1490	0.1444	0.1144
Shaanxi	0.4695	0.4731	0.4803	0.4796	0.4937	0.4915	0.5045	0.5209	0.5316	0.5295	0.5049	0.4981
Gansu	0.3099	0.3227	0.3321	0.3296	0.3388	0.3596	0.3392	0.3364	0.3412	0.3400	0.3446	0.3358
Qinghai	0.1475	0.1482	0.1421	0.1509	0.1541	0.1568	0.1843	0.1865	0.1883	0.1667	0.1743	0.1636
Ningxia	0.2042	0.2073	0.1946	0.1917	0.1932	0.2060	0.1935	0.1935	0.1890	0.1891	0.1837	0.1951
Xinjiang	0.3364	0.3425	0.3661	0.3609	0.3675	0.3613	0.3869	0.3641	0.3855	0.3962	0.4314	0.3726