



Diversified demand for health tourism matters: From a perspective of the intra-industry trade

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ABSTRACT

Previous studies on health tourism were limited to a small range of topics related to medical tourism. At present, the concept of health tourism has become profound because medical care has been altered from “disease-centered” to “health-centered”. The main purpose of this study is to identify the key factors influencing the development of health tourism in China. To this end, in the first stage, an intra-industry trade theory was introduced and quantitative methods were applied to discover the important factors. In the second stage, multiple sources, including empirical studies, official data, research reports, and notably field investigations and case studies were incorporated to take in-depth discussions. The results indicated the foremost factors affecting the health tourism trade were total health expenditure per capita and the number of domestic health consumers. Notably, health tourism was substantially determined by the “willingness to spend on health” of domestic health consumers. In addition, Chinese health tourists were more likely to positively accept health tourism services in China. An important conclusion is that China should diversify health tourism offerings for different consumer groups. Once diversified products for health tourism are provided, the number of health tourism consumers will soar accordingly, which thus contributes to forming economies of scale, lowering the average costs of health treatment, increasing health tourism profit, and stimulating economic development.

1. Introduction

“Sustainable health tourism” can be broadly defined as tourism that involves medical and wellness activities that enhance both physical and mental health (Hei and Xiang, 2020). However, health tourism is a dynamic phenomenon, that is to say, there is no uniform standard for the concept. Before exploring health tourism in more depth, it is important to note that early studies in tourism were not attentive to the role of health—this is not surprising given that for many years most tourism-related businesses (e.g., hotels) and destinations have primarily provided regular tourism resources. During this period, medical services and facilities did not play a meaningful role in attracting tourists (Goodrich and Goodrich, 1987). However, of late, the role of healthcare is becoming increasingly important, with travelers “specifically seeking treatment for diseases and travel health services from other countries” (Goodrich, 1993). This trend has clarified the concept of the “health traveler”, which represents the collection of all phenomena associated with temporarily leaving one’s place of residence to seek health services

for the purpose of maintaining and promoting health (Mueller and Kaufmann, 2001). This gradual expansion of the cognitive boundary of health tourism has given rise to “a commercial phenomenon of improving health tourism services” (Hall, 2003).

The concepts of medical tourism and health tourism are often mutually confused. A perspective of resources may help better understand the two concepts. The former mainly relies on medical resources (Nahai, 2009), while the latter relies on all resources related to health and is, therefore, a broader concept. Furthermore, from a tourism perspective, medical tourism involves a trip to seek a specific medical treatment (Global Wellness Institute, 2019), while generally, health tourism involves a trip to maintain or improve health. Besides, many scholars emphasize the concept of the frontier when defining medical tourism (Cormany and Baloglu, 2011; Edelheit, 2008; Beland and Zarzeczny, 2018). However, the definitions of health tourism do not specifically emphasize the frontier. Along these lines, we consider that health tourism is a broader concept and includes medical tourism. Notably, health tourism is not limited to international tourism—it

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should also include the flow of health tourists between various regions within a country. For the sake of continuity, we recognize the definition of health tourism defined by the National Bureau of Statistics of China, which is as follows:

Based on tourism resources—leisure and recuperation institutions and health and tourism integration services, such as scenic tourism services, and those oriented toward physical exercise and management services, such as camping sites—are provided for tourists. Travel agencies and related services concerning health and wellness or medical tourism, specifically those providing consultations, tourism schedules, suggestions, and schedules for customers, are also available for all sectors of the society. Note that medical rehabilitation services provided by medical institutions, rehabilitation nursing institutions, and nursing homes are excluded (National Bureau of Statistics of China, 2019).

The health tourism service industry has a huge potential to become a global growth industry. According to the Global Wellness Institute, the output value of health tourism grew from 563 billion in 2015 to 639 billion USD in 2017 at an annual growth rate of 6.5% during this period—twice than that of the whole travel industry (specifically, 3.2%). By 2022, health tourism is forecasted to grow at an average annual growth rate of 7.5%, which is considerably faster than the 6.4% growth rate estimated for overall tourism during this period (Global Wellness Institute, 2018). China is the largest source of outbound tourists in the world (China Tourism Academy, 2019). However, the increasing trend could reverse in the past two years. In 2019, Chinese tourists made 155 million overseas trips, an increase only by 3.3% over the previous year. Outbound spending by outbound tourists increased only by 2%—133.3 billion USD in 2019. Meanwhile, the number of tourists visiting China is rapidly growing. In 2019, inbound tourist arrivals to China and inbound revenue reached 145 million and 131.25 billion USD, an increase by 2.9% and 3.3% compared with 2018, respectively (Song, 2021).

In China, health tourism is a new form of a business integrating health services and tourism. It has been regarded as a new economic growth engine and an important part of the health industry. China has a big deficit between inbound and outbound tourism, and a large number of health tourism consumers are migrating to other Asian countries. The development of China's health tourism is still in its "primary stage": it has not yet formed a complete industrial chain and lacked mature models and experience. On the other hand, we believe that health tourism can be treated as a comprehensive health service trade. Specifically, overseas health tourism is regarded as an intra-industry trade while domestic health tourism is treated as a domestic trade. The purpose of this study is to identify and analyze the key elements of the development of the health tourism industry using an intra-industry trade theory, which is conducive to the theoretical and practical development of the health tourism field. Moreover, it is also a pioneering study to apply the intra-industry trade model in the analysis of health tourism. It explains the development trend and the key determinants of China's health tourism industry in the global value chain. Ultimately, by combining field research and quantitative analysis, this research provides a research basis for the development of health tourism in China and a market reference for other countries seeking to conduct intra-industry trade with China's health tourism sector.

2. China's policies for promoting health tourism

After some success with the new health care reform, China continued to promote the development of the health service industry through a set of policies, for example, strengthening the use of traditional Chinese medicine (TCM) health resources to develop health tourism and intra-industry trade. Since then, health tourism has much been emphasized in several official documents, such as China's Tourism Industry Development (State Council of the People's Republic of China, 2014), Tourism

Investment and Consumption (General Office of the State Council of the People's Republic of China, 2015), Healthy China 2030 Plan (CPC Central Committee and State Council, 2016). For more details, see Fig. 1. It is envisaged that by 2025, TCM health tourism is projected to reach 5% of all health tourism and its revenue to reach 500 billion RMB (People.cn, 2020; National Health Commission of China, 2017).

However, the implementation of TCM health tourism has limitations and involves more departments, the concept of "health tourism" has been broadened in subsequent policies. The export scope of the health tourism service trade is also expanding, particularly strengthening health tourism cooperation with "the Belt and Road" countries and neighboring countries. From the perspective of health policy, health tourism is centered on health promotion in the healthcare industry, which encompasses medical ingredients and focuses on physiological treatment. In addition, from the perspective of tourism planning, health tourism is concentrated on leisure tourism, which encompasses more health elements and focuses on psychological recuperation.

On the whole, according to the current policy implemented, China's health tourism is not limited to TCM tourism; rather, the scope is widening. Accordingly, the health tourism trade market has expanded from one-way trade mode to two-way intra-industry trade and is attempting to reverse the trade deficit by promoting the development of diversified health tourism products. Besides, China is also encouraging the development of health service industry agglomeration, with the aim of forming economies of scale and lowering costs.

3. Theoretical models and empirical analyses

Since 2014, our team has been engaged in China's health tourism planning for multiple regions, including Guizhou, Chongqing, Hainan, Shandong, and Yunnan provinces, to name but a few. In our work, we have conducted an in-depth exploration of cities, counties, and villages in these regions, mainly in the form of participant and group discussions with local "Health Commission", "Bureau of Culture and Tourism", "Development and Reform Commission", and "Bureau of Agriculture and Rural Affairs". In addition, by immersing ourselves in these regions during our work, we have accumulated rich practical experience. From the perspective of the intra-industry trade in the new trade theory, we in this study adopted both qualitative and quantitative research methods. Also, we combined our field investigations and case studies with the collection and analyses of a large number of studies, secondary data, and research reports. Because the indicators of China's health tourism were not included in the statistics until 2019, and the very exact figures are not yet available, the data related to tourists' health care from the Yearbooks of China Tourism Statistics were alternatively used in our empirical analysis.

Also, it should be noted that in the economic analysis, the market is divided into four types of markets: perfect competition, monopolistic competition, oligopolistic, and monopolistic markets. Perfect competition and monopoly markets usually exist only in theory, and in real life, there exist, typically, only monopolistic competition and oligopolistic markets. The health tourism market is widely considered a monopolistic competition market, whose basic characteristic is that there are many firms in the market that produce and sell differentiated products. It is not like an oligopolistic market, where only a few manufacturers control the production and sale in the whole market. The enterprises existing in a monopolistic competition market are called monopolistic competition enterprises. To clarify this point, it is necessary to elaborate on the hypotheses and the analyses of the model in our study. Besides, to better present the structure and the logic of the research, an analysis procedure flow chart is given in Fig. 2.

3.1. Theoretical models

3.1.1. Hypotheses

Some basic assumptions must be made about the theoretical model

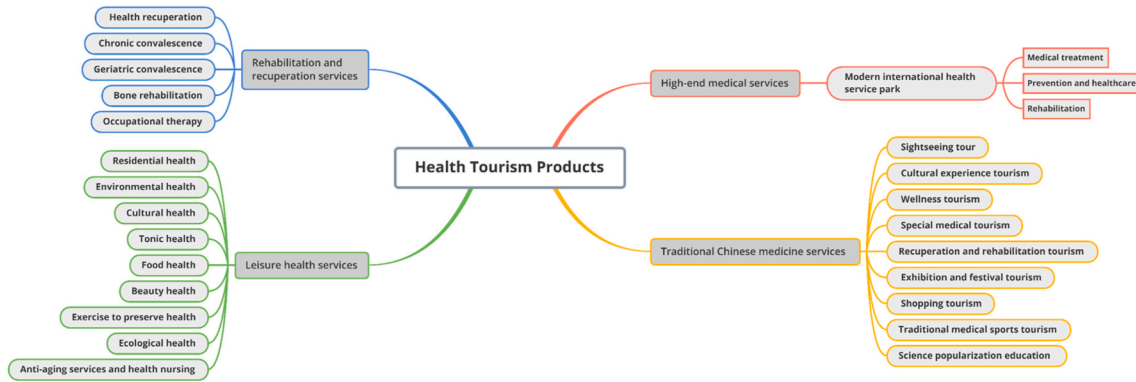


Fig. 1. Various health tourism products.

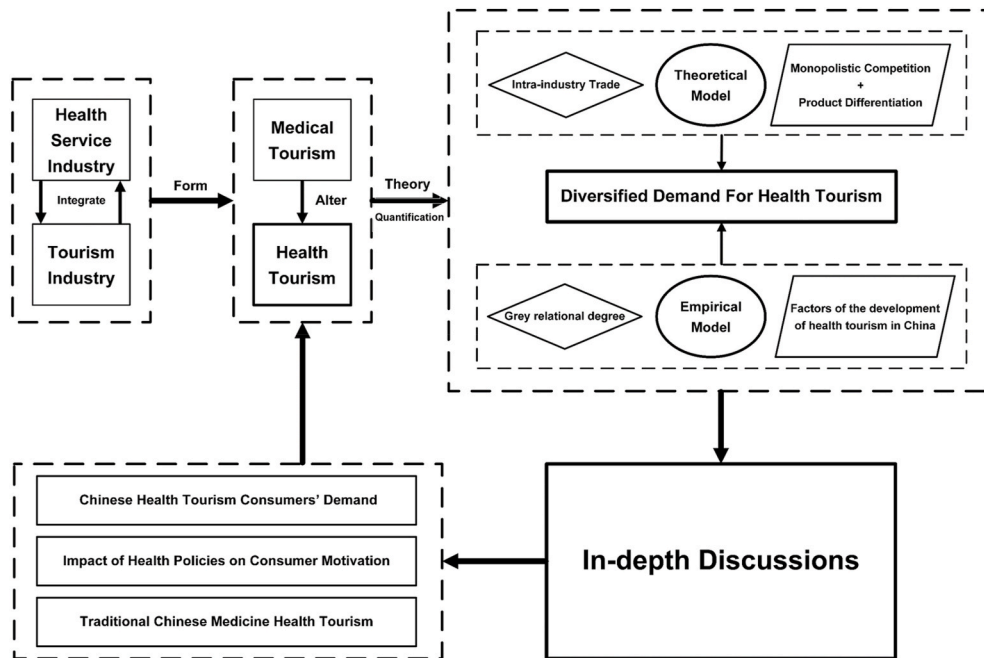


Fig. 2. Analysis procedure flow chart.

before it is established. In economics, assumptions are made not to describe reality but rather, to facilitate a discussion of similar market equilibrium problems so that the whole market can be theoretically explained in a general equilibrium state, meaning that the knowledge derived can be used to analyze the trade market based on “empirical evidence”. In Krugman’s model, the basic assumptions are the following (Krugman, 1979a):

First, to simplify the analysis and highlight the core elements, it is assumed that labor is the only input factor of production.

Second, assuming that all goods are produced at the same cost function, the labor required to produce each good is a linear function of output. Equation (1) describes the function of the labor input required (Hai et al., 2012; Krugman, 1979a).

$$l_i = \alpha + \beta x_i, \alpha > 0, \beta > 0 \tag{1}$$

where subscript i denotes goods. l_i is labor input used in producing good i ; x_i is the output of good i ; and α is a constant term, denoting a fixed input. β is a coefficient that reflects the input-output relationship. Equation (1) indicates that the enterprise has economies of scale, that is, increasing returns to scale (Hai et al., 2012; Krugman, 1979a).

$$L = \sum_{i=1}^n l_i = \sum_{i=1}^n (\alpha + \beta x_i) \tag{2}$$

Equation (2) represents the equilibrium of supply and demand in the labor market. L is the total labor force (with the implicit assumption that the whole society is fully employed), which is equal to the sum of each enterprise labor demand l_i (Hai et al., 2012; Krugman, 1979a).

$$x_i = Lc_i \tag{3}$$

Equation (3) represents the equilibrium of the product market. c_i is the consumption of the i th good; Lc_i represents the total demand for good i , and x_i is the total output of good i (Hai et al., 2012; Krugman, 1979a).

Third, suppose that the utility function of all individuals is represented by Equation (4), where $c(i)$ is the consumption of the i th good, and n is the total number of products available. Equation (4) provides a positive value for the increased availability of goods (Krugman, 1979a, b).

$$U = \left\{ \sum_{i=1}^n c(i)^\theta \right\}^{\frac{1}{\theta}}, 0 < \theta < 1 \tag{4}$$

In addition, it is assumed that consumers have potential demand for

goods that have not yet been produced. In other words, if additional goods are provided for consumers, they will maximize their utilities while nominal wages remain unchanged, as shown in Equation (5) (Krugman, 1979b). It reads below.

$$U = \sum_{i=1}^{n+\Delta n} c(i)^{\theta}, \quad 0 < \theta < 1 \quad (5)$$

3.1.2. Derivation of the curve formula

Enterprises in the health tourism market are monopolistic competitive enterprises. Like other types of enterprises, their goals are to maximize their profits. We analyze the short- and long-term equilibrium conditions of enterprise profit maximization.

First, the short-term equilibrium condition of enterprise profit maximization is: Marginal Revenue (MR) = Marginal Cost (MC).

Because $MR(x_i) = \lim_{\Delta x_i \rightarrow 0} \frac{\Delta TR(x_i)}{\Delta x_i} = \frac{dTR(x_i)}{dx_i}$, $TR(x_i) = p \cdot x_i$; then, $MR(x_i) = \frac{p \cdot dx_i + x_i \cdot dp}{dx_i} = p + \frac{x_i \cdot dp}{dx_i} = p \left[1 + \left(\frac{dp}{dx_i} \right) * \left(\frac{x_i}{p} \right) \right]$, and because $\varepsilon = \lim_{\Delta p \rightarrow 0} - \frac{\Delta x_i}{\Delta p} \frac{p}{x_i} = - \frac{dx_i}{dp} \frac{p}{x_i}$, there are $MR(x_i) = p \left(1 - \frac{1}{\varepsilon} \right)$ and $MR = p_i \left(1 - \frac{1}{\varepsilon(c)} \right)$, and $\varepsilon > 0$ is the absolute value of the price elasticity of demand.

Since labor is the only input factor of the enterprise, given the labor wage rate w , the total cost of enterprise i is $wl_i = w(\alpha + \beta x_i)$. Because $MC(x_i) = \lim_{\Delta x_i \rightarrow 0} \frac{\Delta TC(x_i)}{\Delta x_i} = \frac{dTC}{dx_i}$, then, $MC = \beta w$. According to the short-term

equilibrium condition of enterprise profit maximization, $p_i \left(1 - \frac{1}{\varepsilon(c)} \right) = \beta w$, which leads to Equation (6) as follows (Hai et al., 2012; Krugman, 1979a; Krugman et al., 2015)

$$\frac{p_i}{w} = \frac{\beta \varepsilon(c)}{\varepsilon(c) - 1} \quad (6)$$

Second, the long-term profit of monopolistic competitors is zero. It can be seen from Equation (6) that $\frac{p}{w}$ depends on the elasticity of demand, and the elasticity of demand is related to the output. Therefore, we need to quantify the output at which point the profit is maximized. As the enterprise enters the market, the final profit will be zero. Then, $px - (\alpha + \beta x)w = 0 \rightarrow \frac{p}{w} = \beta + \frac{\alpha}{x} = \beta + \frac{\alpha}{Lc_i}$ and Equation (7) can be obtained as follows (Hai et al., 2012; Krugman, 1979a; Krugman et al., 2015)

$$\frac{p_i}{w} = \frac{\alpha}{Lc_i} + \beta \quad (7)$$

3.1.3. PP-ZZ model

The enterprises in the health tourism market are considered monopolistic competition enterprises, as they produce and sell

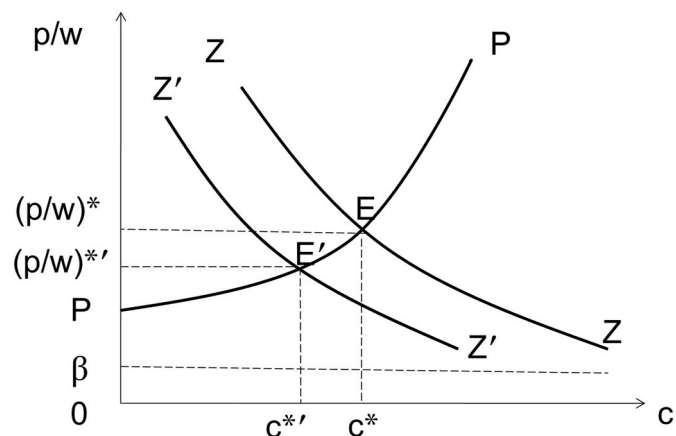


Fig. 3. Pre- and post-trade curve.

differentiated products. Fig. 3 is given to present trade in a monopolistic competition market. The X-axis represents per capita consumption (c), and the Y-axis represents the ratio of commodity prices to wage levels (p/w). There are two relations between c and p/w . One is derived under the principle of profit maximization, called the PP curve and the other is derived under the principle of zero profit under long-term competition, called the ZZ curve by Krugman (1979a). Hence, it is referred to as the PP-ZZ model, which has been widely recognized in the international trade field. Massive consumption leads to economies of scale, but with it comes falling prices and ultimately, zero corporate profits.

The PP curve is derived from Equation (6) and the ZZ curve from Equation (7). Equation (6) is derived under the principle of maximizing corporate profits, while Equation (7) is derived under the principle of zero profits for long-term competition. The intersection E of the PP and ZZ curves represents the equilibrium price of each health tourism product and the consumption (demand) amount of each health tourist for the product (Fig. 3) (Hai et al., 2012; Krugman, 1979a).

3.1.4. Impact of international trade

Pre-open trade: Under the assumption of full employment, the product category (number of enterprises) is equal to the total labor divided by the labor input of enterprises. L is the total labor force; $\alpha + \beta x$ is the labor force required to produce a product; and n is the product type (Equation (8)) (Hai et al., 2012; Krugman, 1979a).

$$n = \frac{L}{\alpha + \beta x} = \frac{1}{\frac{\alpha}{L} + \beta c} \quad (8)$$

Open trade: Assume that both countries have the same preferences, endowments, and technical levels, and have population L^* . When the two sides conduct free trade, they almost always expand the population of consumers. Because the technology is given and reflects the relationship between the input and output coefficient, β will not change as a result of trade; therefore, in the PP-ZZ models, the PP curve has no effect. However, trade increases by L^* the number of people consuming each product, which causes the ZZ curve to shift to the left. At the new equilibrium point ($Z'Z' = PP$), the per person consumption of any one product from c^* to $c^{*'}$, causing the price of the product relative to wages to fall from $(p/w)^*$ to $(p/w)^{*'}$ (Fig. 3) (Hai et al., 2012; Krugman, 1979a).

It can be seen from Equation (8) that the increase of consumer population L (from L to $L + L^*$) and the decrease of consumption of each good c (from c^* to $c^{*'}$) mean the increase of product categories. Based on Equation (8), the new commodity category after trading is represented by Equation (9) (Hai et al., 2012; Krugman, 1979a).

$$n' = \frac{1}{\frac{\alpha}{L+L^*} + \beta c'} \quad (9)$$

After trading, the individual utility function is Equation (10), which means that the sum of Equations (4) and (5) in our hypothesis is realized (Krugman, 1979a,b).

$$U = \left\{ \sum_{i=1}^n c(i)^{\theta} \right\}^{\frac{1}{\theta}} + \left\{ \sum_{i=1}^{n+\Delta n} c(i)^{\theta} \right\}^{\frac{1}{\theta}} \quad (10)$$

3.1.5. Conclusions regarding the theoretical model

Conducting international trade leads to the following consequences. (1) For enterprises, the number of consumers increases; thus, they expand production to achieve economies of scale, and the average cost and product price decrease. (2) For consumers, the increased varieties of commodities lead to an increase in personal utilities and a rise in the real wage level. (3) For the country, through the implementation of trade policies, the health and welfare of the whole society will eventually be improved. As can be seen above, consumers are the key factors affecting the development of the health tourism trade. Further analysis shows that what enterprises (the supply side) should consider is how to attract more consumers with diversified products to achieve the ultimate goal of

profit maximization. The key is to understand consumers' demand preferences. Moreover, what consumers (the demand side) should consider is how to choose diversified products to maximize their health and welfare while nominal wages remain unchanged. Therefore, in what follows, we have verified the key factors obtained via the intra-industry trade model by quantitatively analyzing China's health tourism service trade.

3.2. Empirical analysis

Next, the main aim of this subsection is to investigate what factors affect the trade of health tourism products in China. To this end, we introduce an ordinary least squares (OLS) model to confirm the impacts of the driving factors on the development of health tourism in China. It reads as follows.

$$y = Z\beta + \mu \tag{11}$$

where y is the dependent variable. It is measured as foreign exchange income of tourism service. Z denotes a set of exogenous explanatory variables, including a core variable, daily per capita spending for the purpose of health and medical care for inbound overnight visitors. For more details, see Table 1. Besides, μ is an error term.

The data for the tourism variables are collected from the "Yearbooks of China Tourism Statistics" released by the Ministry of Culture and Tourism of China and the socio-economic data are available from the "China Statistical Yearbooks" compiled by the National Bureau of Statistics of China. However, due to the limited data availability of the core variable "daily per capita spending for the purpose of health and medical care for inbound overnight visitors", the sample spans a short time, namely, from 2010 to 2018. Hence, it is unlikely to consider all the mentioned-above explanatory variables and conduct the OLS model. Moreover, it may also suffer from a serious multicollinearity problem. An alternative solution to multicollinearity may be a Pearson correlation coefficient, which is a measure of linear correlation between the dependent variable and independent variables. It is able to determine the strength and direction of the correlation. Besides, to overcome the small sample size, we consider a bootstrapping technique. The Pearson correlation coefficient is presented below.

$$\rho_{ZY} = \frac{Cov(Z, Y)}{\sigma_Z \sigma_Y} \tag{12}$$

where ρ is the Pearson correlation coefficient. $Cov(Z, Y)$ denotes covariance between Z and Y . σ_Z and σ_Y are the standard deviation values of Z and Y , respectively.

Besides, another best solution to the two shortcomings may be a grey relational degree analysis, which was firstly proposed by Deng (1982). It has been gained popularity to quantify the correlation between two

variables due to two important merits. One is able to work with a small sample size and avoid statistical problems (Bai et al., 2019), and the other can better reveal the inner correlations (Wang et al., 2020). Besides, another merit will not require data samples to satisfy some specific probability distribution, like the normal distribution. For example, the OLS model is assumed to satisfy the Gauss-Markov theorem. Otherwise, biased conclusions may be obtained. In practice, it is relatively difficult to know the distribution of the sample data. Hence, the grey relational degree analysis outperforms the classical Pearson correlation. Then, it is presented below.

A reference sequence y_0 has a set of comparison sequences y_j . In this case, y_0 and y_j are the dependent variable and a set of dependent variables. y_j can be written as $y_j(i) = y_j(1), y_j(2), \dots, y_j(n)$, where i denote year and j represents indicator. Then, the grey relational degree between the reference sequence and each comparison sequence can be computed as follows.

$$\xi_j(i) = \frac{\min_i |y_0(i) - y_j(i)| + \rho \max_i |y_0(i) - y_j(i)|}{|y_0(i) - y_j(i)| + \rho \max_i |y_0(i) - y_j(i)|} \tag{13}$$

where ξ is referred to as the grey relational degree. $\min_i |y_0(i) - y_j(i)|$ and $\max_i |y_0(i) - y_j(i)|$ are the smallest and largest absolute differences, respectively. Besides, ρ is referred to as a distinguishing coefficient, which is employed to differentiate the degree of proximity of y_0 and y_j . Empirically, ρ is taken 0.5.

Lastly, the grey relational degree can be obtained by using Equation (14).

$$\gamma_i = \frac{1}{n} \sum_{i=1}^n \xi_j(i) \tag{14}$$

where γ is the grey relational degree between y_0 and y_j . Besides, it is restricted to the interval [0, 1]. Furthermore, the higher value, the stronger correlation.

For the sake of comparison, both the Pearson coefficients and the grey relational degrees are shown in Fig. 4.

As shown in Fig. 4, we observe that for each variable the Pearson coefficient is greater than grey relational degree value. It may imply that the Pearson correlation analysis may lead to overestimated conclusions. In other words, it exaggerates the correlations. Fig. 4 presents the Pearson coefficients of these variables in descending order. We find that the variable of *Inbound* has the smallest value, indicating that the number of inbound tourists has a weaker impact on the health tourism trade than the other factors. Also, we notice that the variable of *Marketization* has the strongest impact, indicating that the marketization level determines health tourism trade. Besides, except for the variables

Table 1
Definitions, units and descriptive statistics of variables involved in this study.

Variable	Definition	Unit	Mean	S.D.	Min	Max
Foreign	Foreign exchange income of tourism service	Billion USD	87.28	36.86	45.81	127.10
Inbound	Number of inbound tourists	Million persons	134.68	4.42	128.50	141.20
Domestic	Number of domestic tourists	Billion persons	3.73	1.13	2.10	5.54
Agency	Number of travel agencies	Firm	27401.67	4304.66	22691.00	37309.00
Trade	Total trade	Billion USD	25296.58	2876.54	20172.23	30500.81
Spending	Daily per capita spending for the purpose of health and medical care for inbound overnight visitors	USD	216.58	22.34	193.89	248.46
Technician	Medical technical personnel in health care per 1000 persons	Capita	5.55	0.84	4.39	6.83
Expenditure	Total expenditure on health per capita	Yuan	2737.34	924.05	1490.06	4236.98
Ratio	Ratio of expenditure on health to GDP	%	5.66	0.63	4.84	6.57
GDPPC	GDP per capita	Yuan	47247.33	10907.68	30808.00	64644.00
Marketization	Marketization	NA	6.32	0.60	5.41	7.12
POP	Population	Billion	1.37	0.19	1.34	1.40

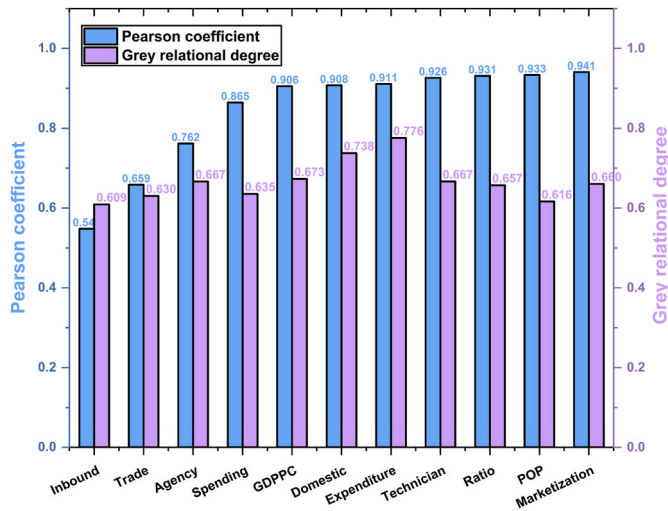


Fig. 4. Pearson correlation coefficients and grey relational degrees.

of *Trade*, *Agency* and *Spending*, the Pearson coefficients of the rest variables are greater than 0.9.

Different from the results of the Pearson coefficients, most of the grey relational degree values of these variables are not greater than 0.7. We observe that the variable of *Expenditure* has the largest value, indicating that daily per capita spending for the purpose of health and medical care for inbound overnight visitors is the foremost contributor to health tourism trade, which is in line with our expectations that it is the core factor determining foreign exchange income of tourism service trade export. Hence, we can draw a conclusion that the grey relational degree analysis has an ability to detect quantitative correlations between two variables notably in the context of a small sample size. Overall, we have identified that they are all the important determinates of the health tourism trade.

According to the results of the grey relational degrees, we observe that the values of two factors are greater than 0.7, namely total health expenditure per capita (*Expenditure* = 0.776) and the number of domestic health consumers (*Domestic* = 0.738), indicating that they are the foremost contributors. Furthermore, they have an intertwined effect on the health tourism trade. Specifically, on the one hand, the financing of China's total health expenditure has three sources, namely: governments, societies, and individuals. Different sources not only imply the cost burdens they share, but also signal the importance of the three parts to health. Besides, the statistics reveal that less than 30% was paid by individuals themselves, while the majority of the health costs were charged by the government. According to the Health Development Research Center of the National Health Commission, China's total health expenditure will continue to increase from 2021 to 2025, and it is projected that the governments and societies will actively take more responsibilities than before while the share of health expenditure paid by the individuals will become decreasing year by year. This optimization of the financing structure aims at reducing the costs of personal health care. On the other hand, with the rising domestic income level (*GDPPC* = 0.673), not only has the demand for health service products increased, but the government has also continued to subsidize the costs of personal health consumption. In other words, in the context of ever-growing income and subsidies, the domestic demands for health consumption are increasingly stimulated, which results in a larger health tourism trade market.

Specifically, China has a huge demographic dividend of consumption (*POP* = 0.616), which is key to the formation of a large health tourism market. In China, the market plays a decisive role in the allocation of resources, which generates tremendous market economic vitality (*Marketization* = 0.660) and increased foreign trade activities (*Trade* =

0.659). These are the most important factors in the foreign trade of health services. The active market economy accelerates competition among enterprises and helps them realize economies of scale. Besides, travel agencies have also become a central factor affecting the trade of health tourism service products. This is because the business scope of travel agencies (*Agency* = 0.667) has expanded and many travel agencies and online travel enterprises have launched health tourism products at home and abroad. Travel agencies play an intermediary role in connecting enterprises and health tourism consumers since they possess informative content of health tourism products, which attracts local residents and foreign tourists alike to enjoy a lower-priced, localized health tourism service in China.

Additionally, the proportion of total health expenditure (*Ratio* = 0.667) is also closely related to the foreign trade of health tourism. As mentioned above, in the tripartite expenditure of the total health expenditure, social spending (including most social medical security accounts and a small number of commercial health insurance accounts) and the cost of personal spending controlled by the consumer, can be regarded as income that affects health consumer demand, but can only be used for health consumption. In this situation, the expansion of the health income pool can enable consumers to choose better and more diversified health tourism service products. In recent years, as the health cost per capita increases, the number of health technicians per thousand people is also increasing rapidly, accordingly (*Technician* = 0.667), which implies that professional medical and health services can be sufficiently provided. Besides, domestic medical technologies continue to improve, the costs and prices of health services are further reduced, which not only decreases the total health costs, but also encourages more residents to spend locally. Furthermore, the increase in the number of domestic consumers can help domestic manufacturers develop health industries and establish comparative advantages (Rolf, 1996).

4. In-depth discussions

Based on the theoretical model of the intra-industry trade and the empirical model analysis, it can be seen that under the premise of a country's trade opening, consumers of health tourism (especially domestic consumers) are the key to the development of health tourism. Considering these findings, we focus on the needs of consumer groups and the diversity of health tourism products to examine the key issues concerning the sustainable development of health tourism in China.

4.1. Chinese health tourism consumers' demand

4.1.1. Flows of medical tourists

First, it is important to understand the characteristics of patient flows. In 2018, Shanghai (17.40%), Beijing (15.15%), Jiangsu (8.52%), Zhejiang (6.43%), and Guangdong (6.12%) were the top five provinces with the largest inflows of patients admitted by the tertiary hospitals, accounting for 60.55% of the total in China (National Health Commission of the People's Republic of China, 2020). On the contrary, Anhui, Hebei, Jiangsu, Zhejiang, and Henan were the top five provinces with the largest outflows of patients who chose to seek medical treatment in the tertiary hospitals outside their provinces. Notably, Zhejiang and Jiangsu share Shanghai's medical burden due to their proximity to the city. Overall, we notice that patients have become more mobile in recent years. Chinese domestic medical tourism consumers mainly centralize themselves within their regions and select high-level hospitals relatively close to their residences for medical treatment (National Health Commission of the People's Republic of China, 2020).

Second, it is important to explore the motivations for medical tourism. In 2018, "chemotherapy for cancer" accounted for 9.88% of the total medical tourist visits to the tertiary hospitals outside their provinces of residence; in addition, other popular reasons for medical tourism included the treatment of malignant tumors, cardiovascular diseases, and cerebrovascular diseases. The top five most popular

surgeries/operations sought by out-of-province medical tourists were injection or infusion of tumor chemotherapy drugs, low uterine cesarean section, bone marrow puncture biopsy, single catheter coronary angiography, and drug-induced coronary stenting. Notably, it is worth noting that two of the most important indicators of trans-regional medical tourism were medical treatment costs and medical quality. It has been evidenced that intra-regional medical tourism in China significantly reduces mortality rates and shortens the average length of hospital stay; however, this immediately increases the total cost of therapy (National Health Commission of the People's Republic of China, 2020).

Among the patients admitted to China's tertiary hospitals, 92.51%, and 76.49% chose to be hospitalized in the tertiary hospitals in their provinces and their cities, respectively, indicating that a majority of patients with serious diseases tend to stay in their home provinces and cities (National Health Commission of the People's Republic of China, 2020). Notably, these are the long-term guiding trends of China's medical reform policy. However, malignant tumors and cardiovascular and cerebrovascular diseases in Chinese patients can motivate overseas medical tourism, and the market share holds great potential for further development. Coincidentally, in 2018, the potential travel capacities of tourist sources in China's provinces (regions and cities) were the greatest (in descending order) in Shanghai, Beijing, Jiangsu, Guangdong, and Zhejiang. This order is completely consistent with the over-concentrations of medical resources in the five provinces (National Health Commission of the People's Republic of China, 2020). Residents living in these rich regions with highly developed medical resources are likely to seek medical services abroad if they do not receive the high-quality medical services they want at home.

4.1.2. Preferences of the elderly in health tourism

By the end of 2018, the number of people aged 60 and above in China for the first time surpassed the number of people aged 0–15, reaching 249 million and accounting for 17.9% of the total population. According to the prediction by the China Office on Aging, by 2050, China's elderly (aged 60 and above) population will increase to about 487 million (China Research Center on Aging, 2019). Poor health among the elderly has become a very prominent social problem in China at present and is likely to remain as such into the future. This trend suggests that the elderly will take an increasing share in the health tourism market.

In China, more than 75% of elderly individuals suffer from at least one chronic disease (China News, 2019). Notably, elderly individuals in China consider the main problems with the medical system to be high fees (44.7%) and long queues (32.5%). In recent years, China has gradually expanded the establishment of medical care centers and hospitals. Fortunately, most elderly individuals in China have easy access to medical treatment, care, and other medical services. Specifically, most of them have access to health services within 2 km. More than 90% respond that their care needs are met, and 99.1%—in both urban and rural areas—are covered by basic health insurance (Dang and Li, 2019). In addition, from a perspective of leisure activities, “young” elderly individuals are the main participants of various leisure activities. Because elderly individuals are very concerned about the price of medical care, they may consider heavily using basic medical insurance to reduce their overall medical expenses and may choose to see a doctor closer to their homes, especially if they live near an affordable and convenient medical institution. Also, notable is that young elderly men are the most likely to become potential health tourism consumers. Meanwhile, both elderly individuals between 60 and 69 years and elderly individuals with chronic diseases are the most willing to engage in TCM health tourism (Xie et al., 2019). Furthermore, most elderly individuals in China tend to take short, general domestic trips (3–5 days) and have the habit of saving money. Therefore, when developing health tourism products, it is not advisable to design expensive items. Indeed, health tourism product developers would do well to focus on experiential products when considering the preferences of elderly consumers.

4.2. Impact of health policies on consumer motivation

4.2.1. Medical insurance payment method

In developed countries such as the United States, where commercial insurance is the mainstay, patients who do not have health insurance but require medical care may seek cheaper care abroad (Lunt et al., 2014). However, this is not the case in China, where the basic medical insurance system is widely implemented and the coverage rate is extremely high. For example, in 2019, 1.35 billion people participated in the national basic medical insurance (including basic medical insurance for employees and basic medical insurance for urban and rural residents), keeping the participation rate above 95%. The burden on individuals in 2019 was 40.3%, which was 3.6% lower than that of the previous year (National Healthcare Security Administration, 2020). Generally, the gradual reduction in the burden on individuals is a long-term trend. In China, commercial medical insurance is only a supplement to basic medical insurance. Some people buy commercial medical insurance only when they feel that the amount of basic medical insurance is not enough to meet their medical treatment needs. However, maintaining or improving health through international health tourism requires individuals to cover their expenses and is not supported by China's basic medical insurance.

4.2.2. Waiting time to see a doctor

Although China implemented the family doctor and community first visit system, this has not been completely realized in practice. Therefore, at present, most Chinese outpatient clinics in hospitals do not implement the full appointment system, except for a small number of specialists and special outpatient clinics which require appointments. In other words, if a patient decides to see a doctor on the same day, they usually see the doctor that day without a long wait. In particular, China's recent successful promotion of online medical treatments and mobile phone payments have enabled patients to make appointments online with experts in large hospitals without having to queue at the scene. This is one of the main reasons that patients are able to remain in China for consultations and treatments; that is, this system efficiently operates such that patients do not need to go through their primary hospitals and can instead go directly to any major hospitals in China for outpatient services.

4.2.3. Looking for better resources

Citizens of low- and middle-income countries have long traveled abroad regionally and globally to access health services that are not available in their own countries (Connell, 2013). In China, choosing public hospitals seems to be a win-win choice for access to medical resources and economic burden reduction. However, the total amount of high-quality medical resources in China is relatively insufficient and unevenly distributed. Although it is possible to obtain medical resources, they are not necessarily high-quality. At present, there is a growing contradiction between the increasing health needs of Chinese citizens and China's ability to provide sufficient medical services. Chinese health tourists are more willing to go abroad to look for expensive medical services than stay at home to be treated with better equipment and quality services (Yu and Ko, 2012). In addition, due to delays in the approval of new drugs in China, some consumers may hope to get new drugs or more effective drugs abroad that are not available in China. Additionally, even if the same service can also be provided in China, foreign medical institutions may be able to respond more quickly than the Chinese system (e.g., may be able to make earlier appointments for painless gastroscopies and major surgeries).

On the other hand, with the expansion of the medical tourism market, an interesting trend has become prominent that an increasing number of consumers are traveling abroad not for medical treatment, but focus on improving their health. For example, such tourists travel to attend physical examinations related to disease prevention or cosmetic surgery—such phenomena are part of health tourism rather than medical tourism. A report by the Japan Policy Investment Bank predicts that

by 2020, it is forecast that more than 310,000 Chinese tourists will visit Japan for physical examinations alone every year, and the potential market size will reach 550.7 billion Yen (about equivalent to 30.28 billion Yuan) (China News, 2015). In particular, Chinese health tourists tend to visit Japan for precision examinations, South Korea for cosmetic surgery, Thailand for test-tube babies, and Switzerland to inject sheep child element (an anti-wrinkle treatment). These countries are popular among Chinese health tourists because they offer good quality cost-effective services, which are made possible by the economies of scale realized by the health tourism market's expansion.

4.3. Nascent health tourism market in China

4.3.1. Traditional Chinese medicine health tourism

China's health tourism stretches across both international and domestic markets. Notably, China's imports and exports of health tourism products and services are relatively typical. From a global perspective, China has no absolute advantage in critical care technology. Accordingly, to encourage domestic health tourism in China, China would do well to develop TCM health tourism. Chinese people attach great importance to TCM and generally use it in daily life, including the application of Chinese herbs in cooking, soaking feet, and bathing. The Chinese government also attaches great importance to and supports the development of TCM. In particular, Tu Youyou won the Nobel Prize for her invention of artemisinin, and the clinically effective use of TCM to treat COVID-19 has enhanced recognition of its influence. In addition, the low cost of TCM treatment effectively fills the serious gap in China's basic medical care system. Therefore, TCM tourism is perhaps the most advantageous avenue for the development of China's health tourism. Given the profound cultural significance, the unique theoretical system, and specialized contents of TCM, TCM health tourism could offer a variety of experiential, popular, diagnostic, and treatment-based tourism activities, including characteristic TCM therapies and approaches to fitness, as well as medicinal materials (Zhao, 2017).

4.3.2. Diversified health-tourism products

The varieties of health-tourism products are available largely in response to the needs of tourists. If only health tourism products are provided, long-term sustainable development of tourism would not be possible. Accordingly, the introduction of TCM is not the only way to develop health tourism in China. To build a specific and stable customer group, China has also established 13 health tourism demonstration bases to explore the development experience (For more details, see Table 2) (CNR, 2017). According to the existing demonstration bases of health tourism, the development of health tourism in China can be roughly divided into three types: (1) high-end medical tourism, mainly based on medical treatments in large cities with rich medical resources and good basic public facilities; (2) TCM tourism products, mainly in areas where both tourism and TCM resources are advantageous; and (3) rehabilitation and recuperation tourism in areas rich in natural resources, such as the seaside, forests, and hot springs. Bases for health tourism demonstrations are inclined to integrate all resources related to health and can thus yield economies of scale.

4.3.3. Hainan Boao Lecheng International Medical Tourism Pilot Zone

Apart from the unique advantages of TCM, China has not developed economies of scale in its development of international medical tourism. To align the medical services provided by hospitals with the real medical needs of Chinese people and to retain patients who originally went abroad for medical treatment, China established the "Hainan Boao Lecheng International Medical Tourism Pilot Zone", giving priority to the development of a high-end medical market and the introduction of many preferential policies not available anywhere in China. At present, there are nine medical institutions in operation, forming a preliminary industrial cluster in the fields of tumor prevention and treatment, reproductive preparation and pregnancy, plastic surgery, anti-aging,

Table 2
China's first batch of health tourism demonstration bases.

No.	Name	Place	Climate	Market position
1	Tianjin Health Industrial Park	Tianjin	Temperate continental monsoon climate	Health management/ High-end endowment
2	Beidaihe	Qinhuangdao, Hebei	Monsoon climate of medium latitudes	Recuperation
3	New Hongqiao International Medical Center	Shanghai	Subtropical monsoon climate	Medical Services
4	Jiangyan District	Taizhou, Jiangsu	Subtropical monsoon climate	High-end medical services/ combination of medical treatment and endowment
5	Zhoushan Archipelago New Area	Zhoushan, Zhejiang	Monsoon oceanic climate of the south margin of the north subtropics	Special need for health services recuperation
6	Jiuhua Mountain	Chizhou, Anhui	A transitional climate from a warm temperate zone to a subtropical zone	Health preservation
7	Pingtang Comprehensive Experimental Area	Fuzhou, Fujian	Subtropical maritime monsoon climate	Traditional Chinese medicine services
8	Laoshanwan International Ecological Health City	Qingdao, Shandong	Monsoon climate of medium latitudes	High-end medical services/ recuperation
9	Nansha New District, China (Guangdong) Pilot Free Trade Zone	Guangzhou, Guangdong	Subtropical monsoon climate	High-end medical services/ endowment/ health preservation
10	Gulin City	Guilin, Guangxi	Subtropical monsoon climate	Traditional Chinese medicine services/ recuperation
11	Sanya	Sanya, Hainan	Tropical oceanic monsoon climate	Traditional Chinese medicine services/ Recuperation
12	Boao Lecheng, International Medical Tourism Pilot Zone	Qionghai, Hainan	Tropical monsoon and humid climate	High-end medical services
13	Taohua River District	Zunyi, Guizhou	Humid subtropical monsoon climate	Health management/ health preservation/ endowment

stem cell research, health management, rehabilitation, and recuperation. However, the current operating situation is not ideal, the costs and benefits are completely unequal, and in most cases doctors and patients have to leave the cities where they live to fly to Boao for treatment.

On the other hand, undoubtedly, Boao is an important location for medical tourism because it offers drug therapies; stem cell therapy; and very safe, high-quality, and fast treatments. However, the reality is that without an appointment, doctors and patients are nowhere to be seen in

Boao. To achieve economies of scale, Boao must become home to a certain number of doctors and attract a corresponding number of patients. Accordingly, the sustainable development of Hainan's health tourism industry depends on how to attract these two groups to stay in Boao. In addition, to avoid the over-concentration of resources when patients are in a short time rushed to Hainan for special medical treatments, China has also established international medical tourism pilot zones in three other regions (namely, Changzhou in Jiangsu province, Shangrao in Jiangxi province, and Qingdao in Shandong province), causing Hainan to lose its absolute monopoly advantage in terms of the preferential health policy.

5. Conclusions

From the perspective of health globalization, health tourism balances high-quality medical resources, broadens people's access to health, gives patients a fairer choice, and speeds up competition in the health tourism trade between countries. In this sense, this study is novel and of great practical importance. Using the intra-industry trade theory and the empirical model, our study uncovered the most critical factors affecting health tourism trade in China, which, under the conditions of open trade, are total health expenditure per capita and the number of domestic health consumers. Generally, we found that health tourists would seek a diversity of products on a global scale to maximize their health benefits. Domestic demand would enable domestic enterprises to gain comparative advantages in the production of health tourism products, and domestic trade could drive international trade and attract more foreign tourists to earn foreign exchange income.

China has a huge market for health tourism, and this is the most valuable resource for the sustainable development of health tourism in China. By analyzing medical flow and preferences of elderly consumers, the study found that, in step with the national policy, most Chinese health tourists have more reasons to stay at home to enjoy health tourism services—the costs of trans-border travels are high and the distances to medical services are often far. Generally, many consumers living in residential areas tend to be within a short distance of medical resources. From the perspective of trade, it is more beneficial for China to ease its trade deficit in services through health tourism trade.

Based on the analysis of consumer demand, this study evaluated the sustainable development of China's health tourism trade. From the perspective of medical tourism, most Chinese people will choose the regional proximal medical centers where they live to receive medical treatment, and older people tend to seek medical treatment near their homes or even avail of in-home service. We argue that TCM tourism is a promising field for the development of the health tourism trade in China. We also note that China is currently trying to provide diversified health-tourism products to attract international health tourists.

China's health tourism market is mostly fueled by private capital; however, its ultimate purpose is to stimulate the domestic economy. According to the latest data, 82.6% of medical services in China are provided by public hospitals, while the rest (17.4%) of medical services are provided by private hospitals. It is obvious that private hospitals have a weak position in the allocation of medical resources, and Chinese policies related to health tourism emphasize the role of social capital. Even if there is some capital for Chinese public hospitals, they only adopt the mode of cooperation between the governments and social capital, which will not seize the resources of public hospitals too much and will not affect the welfare of Chinese people's access to health resources in the short term. In China, health tourism is most heavily distributed in economically underdeveloped areas but with a good ecological environment. In these rural areas, the development of health tourism can drive local economic growth. In addition, most consumers are looking for high-quality medical resources rather than high-end medical services, such as those provided by the Boao Super Hospital. Therefore, high-end medical treatment should be introduced more aggressively to high-income people at home and abroad, who pay more attention to the

quality of their treatments.

Overall, health tourism in China remains underdeveloped. It is generally characterized by short-term geographic migration, and medical motivations for travel are significantly greater than other health motivations. Besides, one key limitation of this study is that it is unable to fully investigate the motivation and flow trend of Chinese and overseas health tourism consumers. This could be further explored to better identify the future direction of the market's development. In addition, scholars would do well to conduct a comparative study on the development of health tourism in different Asian countries to enhance the reliability of the research, and the transportation cost brought by health tourism should also be taken into account. Finally, the development trajectory of the health tourism trade should be strategically schemed through inter-governmental cooperation, and the preferential policies to attract health tourism consumers play an important role in narrowing the trade deficit.

Credit author statement

Y. S. conceptualized the study design, coordinated resources and acquired funding to support the study. L. J. analyzed data and interpreted results. Y. S. and L. J. wrote the original manuscript. L. J., Y. S., and H. W. reviewed and edited the manuscript. H. W. and Y. S. did research investigation.

Declaration of competing interest

The authors declare no conflict of interest.

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