Analysis of influencing factors of tax-free consumption in Hainan Islands based on structural equation model

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Abstract. As an important part of the international tourism consumption center of Hainan Free Trade Port, the tax exemption policy of outlying islands has played an important role in driving tourism consumption in Hainan, driving local economic growth and promoting the return of high-end consumption. In this paper, we construct regression models and structural equation models to explore the factors that affect duty-free consumption in Hainan's outlying islands. Firstly, the regression model is used to conduct regression test on the influencing factors, and three important factors are screened out, such as whether the inventory of the duty-free points on the islands is sufficient, whether the facilities of the duty-free points on the islands are perfect, and the professionalism of the duty-free shop staff. Secondly, the structural equation model is used to analyze and modify the influencing factors in a deeper way, and finally it is determined that the four aspects of the perceived value of goods, policy, convenience and service have an important impact on the duty-free consumption of Hainan islands. The results of this study provide an important reference for the formulation and implementation of the tax exemption policy in Hainan's outlying islands, and also provide theoretical support for further exploring the tax-free consumption behavior in outlying islands.

Keywords: Consumer behavior, Outlying Island tax exemption, Perceived function, Structural equation model.

1. Introduction

Duty-free goods originated in Ireland in 1947, and Brendan O'Regan of Shannon Airport operated duty-free tobacco and alcohol. With the development of The Times, the types of duty-free goods have gradually increased. As an important part of the international tourism island, Hainan province began to implement the exemption policy for outlying islands in 2011. Before that, only Jeju Island of South Korea, Okinawa Island of Japan, Matsu and Kinmen of Taiwan had implemented the exemption policy for outlying islands. The tax-free policy of Hainan outlying islands has undergone nine major adjustments. The shopping quota has been increased from the original 5,000 yuan to 100,000 yuan, and the tax-free categories have been increased from 18 to 45 categories. The policy has achieved full coverage of the three outlying islands in Hainan by plane, train and ship, and gradually included the passengers of business jets and domestic cruises to outlying islands into the policy benefit group; Business entities are allowed to open online sales Windows, affix commodity source code, and increase the way of delivery to 5 kinds..... Each policy upgrade has had a positive effect.

Tax exemption on outlying islands has played an important role in promoting tourism consumption in Hainan, driving local economic growth and promoting the return of high-end consumption. Every adjustment of the tax exemption policy of outlying islands is to serve tourists, stimulate consumption and improve the level of tourism consumption. So what are the factors that affect the tax exemption for tourists? How do these factors affect tourists' spending behavior? It is necessary to design a questionnaire and conduct a field survey, so as to provide a reference for Hainan province to promote

the policy formulation of duty-free consumption in outlying islands and the direction of improving the consumption environment.

The earliest research on consumption behavior was mainly conducted from the perspective of perceived value. Sheth (1991), Zeithaml (1988) [1] and other scholars believed that perceived value (products, services, convenience, policies, emotions, etc.) would positively affect consumption behavior. Specific to each factor of perceived value, scholars have given their own views. Jing, G (2013) [2]; Zhao (2022) [3] et al. believed that the type, price, quality and adequacy of supply of goods would affect consumption. Li et al. (2021) [4] believed that service attitude, customer information security, after-sales service and marketing strategy affect online consumption. Wang (2008) [5] et al. believed that transportation, purchase channels and the convenience of picking up goods affect consumption. Hu (2020) [6]Wang (2021) [7] et al. believed that the amount of tax exemption and the types of goods affected consumption. Zhuo (2020) [8]believed that the characteristics of goods and the identification and value of buyers would affect consumption. Yang (2013) [9] believed that considering purchasing duty-free products and recommending others to buy them would affect consumption. Zhou (2021) [10]and other demographic characteristics such as the place of origin, gender, age, educational background, occupation, monthly income and length of stay will affect consumption.

In terms of studying the impact of the tax exemption policy for outlying islands in Hainan on tourism consumption, Yan et al. (2013) [11] believed that the tax exemption policy for outlying islands had a significant role in driving the domestic tourism revenue of Hainan Province. Zuo et al. (2021) [12] established a joint purchase model of travel and duty-free goods. In terms of improving the development quality of tax exemption on outlying islands, Ishaohua believes that the guarantee of relevant service quality and appropriate marketing activities should achieve synergistic effect with the tax exemption policy on outlying island [13] s. Zhang et al. (2017) [14]evaluated the impact of policy and business strategy adjustment of duty-free shops and found that increasing the duty-free limit had a significant effect on releasing tourists' shopping demand, while only relaxing the commodity category and quantity limit had a limited impact. Zhang et al. (2018) [15] constructed the gravity model of the determinants of the number of inbound tourists in Hainan from the bilateral perspective of destination and tourist source, and found that the departure tax rebate should include tourism commodities with Hainan characteristics into the tax rebate list, and increase the construction of departure tax rebate stores in the whole province to expand the coverage of the departure tax rebate policy. Chen and Zhang (2021) [16] found through field investigation that there were not all kinds of duty-free shopping brands in Hainan, the spatial layout of stores in the city was unreasonable, and the delivery of goods was not convenient. Although the potential of tourism consumption in Hainan has been constantly released in recent years, the unreasonable structure of tourism consumption affects the improvement of tourism consumption in Hainan (Bi, 2021). [17] The development of tourism consumption in Hainan is also affected by the development of tourism consumption in Hainan.

Through the research results of scholars, it is found that the research on the influencing factors of tourism consumption behavior at home and abroad has been mature, and the influencing factors have reached a consensus in the academic circles. Just as Professor Bao Yaning, former vice president of the Party School of Hainan Provincial Committee of the Communist Party of China, said, "All ideas should start from the study of tourists." From the perspective of tourists at the micro level, this paper seeks the reasons for tax-free consumption in Hainan islands, and makes suggestions for the development of tax-free outlying islands in Hainan Province.

2. Empirical research design

The self-designed questionnaire consists of two parts: demographic characteristic questions and variable measurement questions. The questionnaire is designed according to the reference maturity scale, which is deleted based on the local characteristics of Hainan and the research results of scholars. The final scale has passed the reliability and validity test. The specific scale is shown in Table 1:

Table 1. Scale design

Variable of study	Scale questions	Basis of reference
Value of products	Full range of goods Commodity prices are reasonable The quality of the goods is guaranteed There are frequent stock-outs	Jing, G (2013); Zhao Lei (2022)
Value of services	The waiter has a good service attitude Duty free stores keep your personal information strictly confidential Good after-sales service Strong marketing means	Li Weiqing (2021)
Value of convenience	Convenient transportation There are many online and offline purchase channels Convenient way of delivery	Wang Bo (2008)
Value of policy	Large amount of tax exemption Full range of goods	Hu (2020); Wang Qian (2021)
Value of feeling	Goods have a unique taste Goods reflect personality Goods can reflect personal value	Zhuo;Jianguo (2020)
Intention to purchase	Consider buying duty-free goods Recommend others to buy	Yang (2013)
Characteristics of population	Place of origin, gender, age, educational background, occupation, monthly income, length of stay	Zhou Lixia (2021)

3. logistic model analysis

In order to verify the influencing factors of tax-free consumption in Hainan islands, this paper constructs the following model for regression test:

$$ln\frac{p_i}{(1-p_i)} = b_0 + \sum_{k=1}^{k} b_k X_{ik} \tag{1}$$

Of which, $p_i = p(y_{i=1} \mid X_{i1}, X_{i2}, X_{i3}, \cdots\cdots, X_{ik})$ Is the probability of occurrence of the research object, n is the number of samples, and k is the observed value.

In this regression study, SPSS 25.0 is used to screen the independent variables. SPSS 25.0 has a total of 7 methods for screening independent variables in the regression model section, and the results presented by different algorithms may have some slight differences. In the process of economic problem analysis, different methods are applied to carry out regression demonstration for different variable selection, and the most suitable model is selected based on the preliminary regression results for the next discussion and analysis. Before the regression analysis, in order to make the regression results better explain the nature of economic phenomena, the "dummy variable" is set for the independent variables involved, and the first type is set as the reference category. The introduction and setting of dummy variables can better examine the influence of qualitative factors on dependent variables in the regression model. After eliminating the independent variables with weak correlation, the regression analysis was carried out. In this paper, the regression results of different methods will be compared and analyzed to select the most appropriate model.

The regression analysis results of SPSS 25.0 are usually output in the case table in the form of observation values greater than ±3. Therefore, the observed values with a standard deviation greater than ±3 are identified as outliers in this paper. Therefore, it is necessary to control the observed data within a reasonable range in the setting to avoid the occurrence of outliers, so as to ensure the accuracy of the model. The final regression results are shown in Table 2. The column B is the coefficient value of the independent variable, the column S.E. is the standard deviation, and the Wald is the statistic value, which is used to test the significance of the regression coefficient and the corresponding process.

The larger the Wald value corresponding to the factor is, the greater the influence of the independent variable on the dependent variable is. According to the regression analysis results, it is found that the independent variables that finally pass the test are the following three: whether the inventory of the duty-free points on outlying islands is sufficient, whether the facilities of the duty-free points on outlying islands are perfect, and the professionalism of the waiters in the duty-free shops.

Table 2. Estimated values of regression parameters

B	Standard error of	wald	df	Significance of significance	Exp (B)	The 95% confidence interval for Exp	
						Lower limit	Upper limit
		9.925	4	0.042			
0.058	0.945	0.004	1	0.951	1.06	0.166	6.758
0.032	0.896	0.001	1	0.971	1.033	0.178	5.98
0.515	0.91	0.32	1	0.571	1.674	0.281	9.968
1.136	0.915	1.539	1	0.215	3.113	0.518	18.727
		29.154	4	0			
0.729	0.926	0.619	1	0.431	2.073	0.337	12.729
1.087	0.882	1.519	1	0.218	2.967	0.526	16.726
2.002	0.887	5.09	1	0.024	7.401	1.301	42.119
2.938	0.935	9.872	1	0.002	18.882	3.02	118.043
		20.114	4	0			
1.201	0.597	4.043	1	0.044	3.322	1.031	10.707
1.833	0.6	9.321	1	0.002	6.251	1.927	20.275
3.036	0.818	13.759	1	0	20.812	4.185	103.487
3.606	1.97	3.351	1	0.047	36.812	1.775	1751.109
-4.211	1.266	11.06	1	0.001	0.015		

Based on the analysis results of SPSS, the final regression equation is obtained as follows:

$$Y = -4.211 + 2.002X_{11_3} + 2.938X_{11_4} + 1.201X_{13_1} + 1.833X_{13_2} + 3.036X_{16_3} + 3.606X_{16_4}$$
$$p = 1/(1+e^{-Y}) \quad (2)$$

The coefficients of the independent variables are all positive, indicating that the commodity can show self-personality, the commodity price is reasonable, and whether to recommend others to buy it are positively correlated with the attitude towards tax exemption in outlying islands, which is also in line with the general perception. The independent variables are divided into five categories: "very inconsistent," "inconsistent," "general," "consistent" and "very consistent," and only four dummy variables are needed.

$X_{11_1}=1$ Is FOR "basically not in CONFORMITY", $X_{11_2}=1$ Show "general", $X_{11_3}=1$ Basically in line with $X_{11_4}=1$ It is in full compliance with, $X_{11_1}=0, X_{11_2}=0, X_{11_3}=0, X_{11_4}=0$ Totally out of conformity. After introducing the dummy variable, the model is as follows:

$$\ln\frac{P}{1-P} = -4.211 + 2.002X_{11_3} + 2.938X_{11_4} + 1.201X_{13_1} + 1.833X_{13_2} + 3.036X_{16_3} + 3.606X_{16_4} \quad (3)$$

The omitted categories in the model are used as the reference category, and "completely inconsistent" will be used as the reference category in this process.

When $X_{11_3}=1$:

$$\ln(\frac{P_i}{1-P_i})_{X_{11_3}=0} = -4.211 + 2.002X_{11_3} + 2.938X_{11_4} + 1.201X_{13_1} + 1.8333X_{13_2} + 3.036X_{16_3} + 3.606X_{16_4} \quad (4)$$

When $X_{11_3} = 0$:

$$\ln(\frac{P_i}{1-P_i})_{X_{11_3}=0} = -4.211 + 2.002X_{11_3} + 2.938X_{11_4} + 1.201X_{13_1} + 1.8333X_{13_2} + 3.036X_{16_3} + 3.606X_{16_4} \quad (5)$$

The following is obtained:

$$\ln(\frac{P_i}{1-P_i})_{X_{11_3}=1} - \ln(\frac{P_i}{1-P_i})_{X_{11_3}=0} = \beta_{11_3} = 2.002 \quad (6)$$

Take the natural exponent on both sides of this equation.

Through the regression results, it is found that Q13 and Q16 (duty-free amount and service attitude) are important factors affecting the duty-free consumption in Hainan islands. That is, with the development of economy and the improvement of people's living standards, people's consumption focus has gradually shifted from material needs to spiritual perceived value.

The results of the questionnaire survey show that there are a large number of people who think that the commodity prices are generally reasonable or reasonable, that is, the tax preferential treatment of duty-free commodities has certain advantages over the shopping mall counters, and only 17.6% of the total people think that the price is unreasonable. Therefore, the duty-free development of outlying islands can attract more tourists to spend by increasing the preferential treatment of duty-free commodities within a reasonable range. It can be seen from the survey results that the loyalty of duty-free consumer groups in outlying islands is relatively high, with 51.7% of them willing to recommend others to buy duty-free goods, 9.3% of them unwilling to recommend duty-free goods, and the rest of them showing an ambiguous attitude. Therefore, from the perspective of humanity, through in-depth exploration of consumers' psychological motivation, we should give consumers humanistic care, fully show the positive value of duty-free goods in outlying islands, and improve the social reputation of duty-free goods. From the perspective of "service value", it can meet consumers' expectations in "service value", stimulate consumers' purchase intention and stimulate consumption behavior.

4. Structural equation model analysis

In the previous analysis, the regression model is used to analyze the factors that affect the demographic characteristics and living habits of the tax exemption in the outlying islands. As is known to all, there is a certain correlation among the variables and influence each other, and the influencing factors of duty-free consumption in outlying islands cannot be completely explained only through the previous regression model. In the structural equation model, the items in the questionnaire are used as the observed variables, the extracted characteristics are used as the exogenous latent variables, and the duty-free consumption factors of outlying islands are used as the internal latent variables for factor analysis.

According to the logical relationship and the perceived value theory, this paper analyzes the possible paths between the respective variables as shown in Table 3.

Table 3. There are paths in the model

Expectation of consumption	⇨	Outlying island duty free point mass
Expectation of consumption	⇨	Satisfaction with
Outlying island duty free point mass	⇨	Satisfaction with
Expectation of consumption	⇨	Tourists spend duty-free on outlying islands
Outlying island duty free point mass	⇨	Tourists spend duty-free on outlying islands
Satisfaction with	⇨	Tourists spend duty-free on outlying islands

AMOS was used to draw the initial model, as shown in the figure 1 (Qn stands for the serial number of scale questions) :

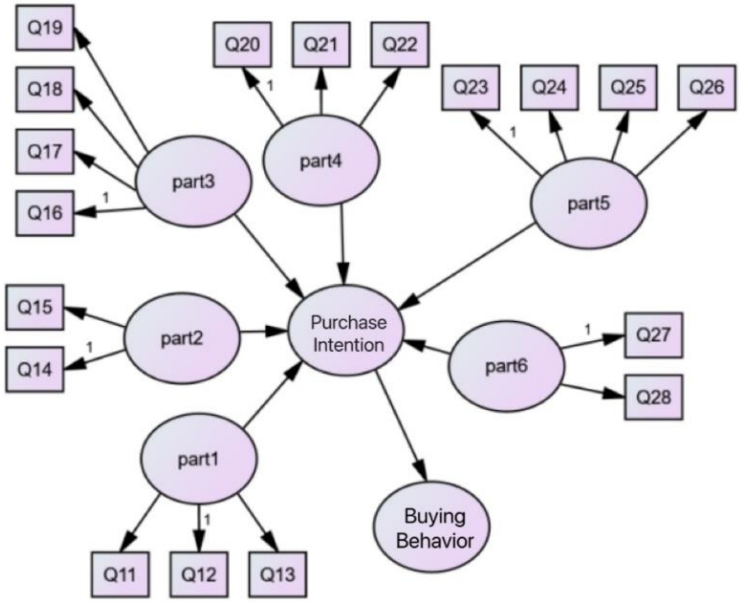


Figure 1. Preliminary structural equation model

When applying the structural equation model, it is necessary to estimate the parameters of the model first, and then use statistical indicators to test the model and evaluate the goodness of the data adaptation effect of the model analysis results.Factor analysis is shown in table 4.

Table 4. Factor analysis of the initial model

Factor of	Variables of interest	Non-standard load factor	Standard load factor	Z	S.E.	P
Value of feeling	11.Goods have a unique taste	1	0.961	—	—	—
	12.Merchandise can express my personality	0.87	0.972	51.259	0.017	0.000***
	13.Goods can reflect my personal value	0.876	0.96	46.086	0.019	
The policy factor	14.Large amount of tax exemption	1	0.911	—	—	—
	15.Full range of goods	0.951	0.959	36.631	0.026	0.000***
Level of service	16.Do you think the waiters in the duty-free shop have a good attitude	1	0.94	—	—	—
	17.Duty free stores keep your personal information strictly confidential	1.145	0.942	41.631	0.028	0.000***
	18.Good after-sales service	0.926	0.929	42.019	0.022	0.000***
	19.Means of marketing	0.923	0.938	39.239	0.024	0.000***
Degree of convenience	20.The transportation is very convenient	1	0.968	—	—	—
	21.There are many online and offline purchase channels	1.053	0.925	42.657	0.025	0.000***
	22.Convenient way of delivery	0.924	0.925	34.928	0.026	0.000***
Quality of goods	23.The duty free shop has a full range of goods	1	0.948	—	—	—
	24.Commodity prices are reasonable	1.28	0.989	52.237	0.025	0.000***
	25.The quality of the goods is guaranteed	1.308	0.991	53.092	0.025	0.000***
	26.There are frequent stock-outs	1.284	0.924	36.074	0.036	0.000***

Table 5. Initial model fit index values

x^2	df	P	Cmin/df	GFI	RMSEA	RMR	CR	NFI	NNFI
—	—	>0.05	<3	>0.9	<0.10	<0.05	>0.9	>0.9	>0.9
2881.373	133	0.000***	21.664	0.846	0.235	1.457	0.852	0.846	0.809

It can be found from Table 5 that the two latent variables, service level and policy factors, can be excluded.

Table 6. The fit test of the revised degree model

x^2	df	P	Cmin/df	GFI	RMSEA	RMR	CR	NFI	NNFI
—	—	>0.05	<3	>0.9	<0.10	<0.05	>0.9	>0.9	>0.9
0	-5	NaN	0	1	None	0.682	0.999	1	1.004

It can be found from Table 6 that each index shows a good fit of the model. This model is the final structural equation model of this paper. Limited to the number of samples, individual indicator values show that the model is not ideal. The final structural equation model is shown in Figure 2 (Qn represents the question number of the scale) :

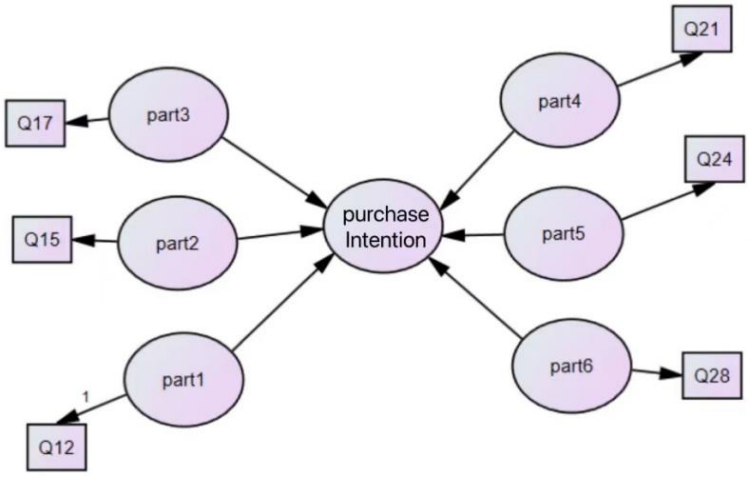


Figure 2. Final structural equation model

This paper uses structural equation modeling to test and modify the factors that affect the tax exemption of outlying islands, and finally determines the important influencing factors. The results show that the four aspects of the perceived value of goods, policy, convenience and service have an important impact on the duty-free consumption of Hainan islands. Emotional value is screened out in the empirical process, that is, in the duty-free consumption of Hainan islands, "emotional value" is not an important factor affecting tourists' consumption; Product value factors have the strongest coupling degree to the duty-free consumption in Hainan Islands, that is, price, quality and cost performance have an impact on the duty-free consumer behavior in Hainan Islands. The choice behaviors that reflect the taste and highlight the personality are not the key factors that affect the duty-free consumption in Hainan Islands. Policy, convenience, and service value are the key influencing factors of duty-free consumption in Hainan's outlying islands.

5. Conclusion

Through the analysis of regression model and structural equation model, this paper deeply explores the key factors that affect the tax-free consumption in Hainan island. In the regression model, the inventory adequacy of the outlying island duty free points, the facilities perfection of the outlying island duty free points, and the professionalism of the duty-free shop staff were identified as important factors that have a significant impact on consumption behavior. The results of the structural equation model further highlight that the four aspects of goods, policy, convenience and service have an

important impact on the consumption of off-island duty-free in the perceived value. Specifically, product value has the most significant impact on tax-free consumption in outlying islands, and policy, convenience, and service value are also important influencing factors. Through the in-depth analysis of this study, it can provide important references and suggestions for the optimization of the tax-free policy of Hainan islands, and provide theoretical support for improving the tax-free consumption experience of Hainan islands and promoting the healthy development of the tax-free industry of Hainan islands. At the same time, the method and results of this study also provide useful enlightenment and reference for further research on tax-free consumption behavior in outlying islands.

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