

Does Public Sentiment on Corruption and Anti-corruption Restrain the Growth of Five-Star Hotel Industry in China?

Tingting Zhou, Jing Yu, and Jiaqi Song

Abstract—Using the provincial panel data of five-star hotels in China, relying on Baidu big data to reflect the public concern about corruption and anti-corruption, this paper explores the development status of five-star hotels in China in the field of corruption and anti-corruption public sentiment. That is, using the regional netizens' web searching behavior about corruption and anti-corruption in the Baidu website as the measurement of public concern about corruption and anti-corruption, this paper investigates the impacts of the public attention to corruption and anti-corruption on the growth of five-star hotel industry in China. The study finds that the public pay more attention to corruption than anti-corruption. The corruption and anti-corruption sentiment through personal computer terminal in Baidu index website is greater than that of mobile terminal. There is a significantly negative relationship between the corruption and anti-corruption Baidu index and the growth of the five-star hotel industry. The public's attention to corruption and anti-corruption has a greater impact on the quarterly catering revenue of five-star hotels than room revenue. The study shows that in the incorruptible social environment created by anti-corruption, the development of five-star hotels has been suppressed to some extent under the intense attention and supervision of the public on corruption. This paper verifies the shrinking business of Chinese five-star hotels in incorruptible social environment from the perspective of public ideology and public sentiment. Practice shows that anti-corruption breaks the false prosperity of "corruption economy" model.

Index Terms—Anti-corruption, Baidu index, corruption, five-star hotel.

I. INTRODUCTION

In the process of the development and improvement of the socialist market economy, corruption and anti-corruption have always been a hot issue in academic circles. The problem of corruption in China is still very serious at this stage. According to official data from the Central Discipline Commission, in 2013, China investigated and treated 24,000 corruption that violates the eight provisions of the Central Committee. This number increased to 53,000 in 2014. Since the 18th National Congress, the force of anti-corruption in China have continued to increase. According to the official data of the Supreme People's Procuratorate, RPC, in 2013, China investigated and dealt 37,551 cases of various types of duty crimes. It increased to 41,487 in 2014. Corruption Perception Index (CPI) issued by Transparency International

shows that China's CPI score was 3.6 points in 2012 and 4.0 points in 2014, indicating that China's anti-corruption work has made certain achievement, and social incorruptness has seen an increase. However, under the continuous high-pressure anti-corruption situation in China, corruption is still occurring. Corruption has become a major obstacle to the construction of China's political system.

China is in the stage of economic and social transformation, the causes of corruption and its role in economic growth have received widespread attention. The relationship between corruption, anti-corruption and economic growth presents disparate research conclusions due to institutional setting (Vaal and Ebben, 2011) [1], economic environment, marketization level, and democracy (Assiotis and Sylwester, 2014) [2]. Most studies analyze the relationship among corruption, anti-corruption and overall economic operation based on macroeconomic perspectives, but neglected exploring the influence mechanism of corruption and anti-corruption on the growth of specific industries. China is in the stage of economic and social transformation. The socialist market economy needs to be improved, and the characteristics of the inter-industry development are quite different. Industry differences play different contextual roles in the relationship between corruption, anti-corruption and economic growth. The exploration of the mode of "corrupt economy" in a specific industry has a greater guiding significance for promoting the efficient development of the industry.

Five-star hotels play an important role in the entire hotel industry as well as in the Chinese tourism economy. According to the statistical bulletin of the national star-rated hotel, in the fourth quarter of 2015, among the national star-rated hotels, the number of five-star hotels accounted for only 7%, but the operating revenue accounted for 35%. Five-star hotels provide room, catering, entertainment and other services as their main business. Compared with real economy, the service of five-star hotels is more likely to be linked with corruption. In view of this, based on the big data of Baidu Index, focusing on social public ideology, this paper analyses the effect of Baidu Corruption and Anti-Corruption Search Index on the growth of five-star hotel industry from the perspective of regional netizens' attention to corruption and anti-corruption. The study finds that at the level of public sentiment, the public's attention to corruption and anti-corruption has played a significant negative role on the growth of the five-star hotel industry, which verifies the shrinking trend of the growth of the five-star hotel industry in a clean and honest society. The Baidu Index provides a real-time observation platform for us to study corruption and anti-corruption. It has formed effective public pressure on government officials and regulators.

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II. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Whether corruption in emerging economies matters has drawn great public attention in recent years (Jong *et al.*, 2010; Ashforth *et al.*, 2008; Rodriguez *et al.*, 2006; Uhlenbruck *et al.*, 2006) [3]-[6]. According to the agent theory and the viewpoint of institutional economics, anti-corruption is an effective measure to restrain the corruption of government officials. Based on the characteristics of corruption, the anti-corruption system design should be improved to reduce the degree of information asymmetry and help to curb corruption. Under the principal-agent framework, corruption is agents seeking private interests and accepting them privately without reporting to the government, in which government officials act as agents and are inconsistent with the goals of the principal (citizens or the government). Corruption relies on public power for personal gain of agents (Becker and Stigler, 1974; Abbink and Serra, 2012) [7], [8]. Solé-Ollé and Sorribas-Navarro (2018) argue that corruption scandals have a remarkable and continuous effect on trust in local politicians and on perceptions of corruption [9]. Gans-Morse, Borges and Makarin (2018) find that, if corruption is a systemic problem, it is impossible for it to be treated in the long term with individual-level solutions [10]. Hodge *et al.* (2011) point out that the adverse effect of corruption on growth, and the possible channels may be its negative effects on investment, human capital, political instability, governance levels [11]. Faruq, Webb and Yi (2013) argue that poor bureaucratic quality and corruption have negative roles in firm productivity, especially corruption [12]. Collins, Uhlenbruck and Rodriguez (2009) investigate the relationship between executives' social ties and firm's illegal behaviors, and find that executives who have social ties with government officials are more likely to rationalize using corruption as an effective method to gain firm competitiveness [13].

The anti-corruption system provides punishment for officials' corruption. It promotes interest integration between principals and agents to a certain extent and reduces the expected benefits of corruption, and thus reduces officials' corruption. The viewpoints of Institutional Economics believe that the absence of institutions and imbalance of power are important reasons for corruption. Stronger product market competition is also thought to be associated with more severe corruption (Alexeev and Song, 2013; Venard, 2009) [14], [15]. China is in the period of social and economic transformation. In the process of promoting national economic development, corruption has been bred because the introduction of the system lagging behind the economic society arises new problems, coupled with inadequate supervision. The opinions of Institutional Economics advocate to check and balance the power of government officials through strengthening the anti-corruption system and improving the supervision mechanism to curb official corruption.

Since 2012, China has maintained a high pressure against corruption. The state has issued several anti-corruption policies and regulations to restrain and regulate official corruption at the legal system level. These measures break the illusion of the prosperity of the "corrupt economy". Under the current situation of high-pressure anti-corruption, the growth of five-star hotel industry declines. In addition to the

reduction of the government's expenditure on normal official activities¹, the consumption of government officials with public funds and accepting gifts and other virtually corrupt behaviors is also decreasing at the same time².

Anti-corruption policies can regulate officials' administrative behaviors to a certain extent, and establish the relationship between the government and enterprises based on law, and cut off the path for some enterprises to achieve rapid development relying on political connections. Liu, Luo and Tian (2016) point out that after the arrest of corrupt bureaucrats, a significant reduction in the likelihood of M&As for non SOEs which are engaged in corruption [16]. Under the trend of high-pressure anti-corruption, the exercise of government administrative power became more open and transparent, and the control space of government officials shrank. Zhang *et al.* (2019) find that anti-corruption can effectively reduce the public's distrust of the government [17]. Xu and Yano (2016) believe that the greater the anti-corruption efforts in China, the less rent-seeking space for government officials, and the tendency for administrative behavior to be regulated, leading to the greater support for listed companies in R&D [18]. Government departments tend to optimize resource allocation and approval procedures reasonably. The distorted allocation of resources and unfair audit caused by rent-seeking behaviors are reduced, which breaks the operating mode of five-star hotels that try to obtain resources through rent-seeking behaviors and interfere with administrative examination and approval.

Environment has important roles in economic behaviors. Nam (2018) points out that national cultures being regarded as having unequal power distribution and uncertainty avoidance have a declining anti-corruption effect of e-government [19]. The public attention to corruption is an effective social supervision force, which is conducive to forming an incorruptible social environment and restraining the occurrence of corruption. The public attention to anti-corruption reflects the influence of anti-corruption policy to a certain extent and is the power of public opinion to promote the implementation of anti-corruption policy. The implementation process of anti-corruption policy is the gradual formation of a clean social environment. The public's strong concern and supervision on corruption also promote the honesty and self-discipline of officials and reduce the space for rent-seeking. This paper argues that the public attention to corruption and anti-corruption will restrain the

¹ This involves the demarcation of the government's normal duty consumption and corrupt consumption in five-star hotels. Duty consumption is the expenditure required by staff at all levels of the public sector to perform their duties, like the expenditure of official vehicles, reception, travel, conference, office and other expenses. The boundary between normal duty consumption and corrupt consumption is whether the consumption of public officials is based on various kinds of public expenditure arising from the performance of public functions. Public expenditure incurred by public servants based on official duties is a normal duty consumption. Besides, consumption of public funds is corrupt consumption.

² After the implementation of the anti-corruption high-pressure policy, corrupt consumption of government officials in five-star hotels has become more hidden, and the form of economic consumption has also been "upgraded", including: "With the help of forums, seminars and other means, meeting in different places in the name of Party and government organs", holding the banner of industry dialogue and conducting expensive "government issues, enterprise bills", "forum and conference", "conference set forum", "customized conference hall", "eating in villas and employing five-star hotel chefs", "buying high-grade gifts in five-star hotels, but offering meals and room and meetings fee or site rent invoice, etc.

income growth of five-star hotels to some extent.

III. DATA AND RESEARCH DESIGN

From the perspective of public ideology, based on Baidu big data, using the five-star hotel industry growth provincial panel data over the period of 2011 to 2014 as our sample, this paper empirically discusses the effect mechanism of corruption and anti-corruption attention on the growth of five-star hotel industry:

$$REVE = \alpha + \beta_1 BAIDU + \beta_2 FIX + \beta_3 CONSUM + \beta_4 URB + \beta_5 CPI + \beta_6 TOUR + \beta_7 FOUND + \beta_8 VISITOR + \beta_9 SERV + \beta_{10} GROUP + \beta_{11} MARRI + \sum YEAR + \varepsilon \quad (1)$$

REVE is the income variable of five-star hotels, which is the proportion of total revenue of five-star hotels in GDP. The data comes from the copy of *The Yearbook of China Tourism Statistics*. We employ Baidu index to measure public concern about corruption and anti-corruption. The Baidu index is based on massive data. On the one hand, it carries out the searching popularity of keyword. On the other hand, it deeply explores public opinion information, market demand, user characteristics and other aspects of data characteristics. The Baidu index is updated daily, concluding Baidu searching index, Baidu information index and Baidu media index, etc.

In this paper, Python was used to capture daily data of Baidu searching index from the official website of Baidu index. Baidu searching index is based on the search volume of Baidu users in the data base, using keywords as the statistical object, scientifically analyzing and calculating the weighted sum of searching frequency of keywords in Baidu web search. The Baidu searching index is consist of data from all over the country and each regions. And according to the

different search sources, the search index is divided into personal computer (short for PC) searching index and mobile searching index. Baidu searching index reflects the search scale of a certain keyword based on the data search behavior of Baidu netizens, and then reflects the focus of the public attention, helping researchers to grasp the change of social public opinion in real time.

Using both the PC Internet and mobile terminal Internet in Baidu index, this paper employs the PC average trend, mobile average trend and overall average trend of corruption and anti-corruption to measure people's attention to corruption and anti-corruption in China and various regions. *CORPC*, *CORM* and *CORT* are measurement for regional Baidu netizens' concern about corruption through the personal computer terminal, mobile terminal and overall terminal, respectively. *ACORPC*, *ACORM* and *ACORT* represent the personal computer annual trend, mobile average annual trend and overall average annual trend variable of the Baidu index of anti-corruption in each region. This paper employs BAIDU to represent the public attention on corruption and anti-corruption, which consist of six variables, that is, *CORPC*, *CORM*, *CORT*, *ACORPC*, *ACORM*, *ACORT*. The specific calculation method of the above variables is $LN(1+X)$, where X represents the annual average of daily data of Baidu index, that is corruption PC trend, corruption mobile trend, overall corruption trend, anti-corruption PC trend, anti-corruption mobile trend, and overall anti-corruption trend. Taking *CORT* as an example, at first, we use the daily data of the overall trend of corruption Baidu index in each area to calculate the average annual X of each year's netizens for corruption search frequency, and then calculate the value of *CORT* by using $LN(1+X)$. The calculation of other indicators is similar.

TABLE I: VARIABLE DEFINITION

Variable	Name	Measurement
Total revenue of five-star hotels in the region	<i>REVE</i>	Regional five-star hotel total revenue as a percentage of regional GDP
Public attention on corruption and anti-corruption	<i>BAIDU</i>	taken from Baidu index official website, consisting of six variables (<i>CORPC</i> , <i>CORM</i> , <i>CORT</i> , <i>ACORPC</i> , <i>ACORM</i> , <i>ACORT</i>), the measurement method is detailed in the text
Original value of fixed assets of the whole society per capita	<i>FIX</i>	Total social fixed asset investment / total population
Consumption level	<i>CONSUM</i>	The ratio of per capita consumption expenditure of urban and rural residents to the proportion of income
Urbanization level	<i>URB</i>	The ratio of permanent urban residents to the total population
Price level	<i>CPI</i>	Consumer price index
The condition of tourism resource	<i>TOUR</i>	The nature logarithm of tourism resources score
Infrastructure level	<i>FOUND</i>	The nature logarithm of total infrastructure score
Inbound tourism index	<i>VISITOR</i>	The index, synthesized by principal component analysis
Number of public servants	<i>SERV</i>	The nature logarithm of number of government officers per year
Number of performing arts groups	<i>GROUP</i>	The nature logarithm of number of performing arts groups
Marriage rates	<i>MARRI</i>	The ratio of the number of marriages per year to the total number of people
Annual dummy variable	<i>YEAR</i>	Annual dummy variable

The growth of five-star hotel industry is also affected by the local social, economic and other factors. In this paper, the control variables include the original value of fixed assets (*FIX*), consumption level (*CONSUM*), urbanization level

(*URBAN*), the price level (*CPI*), the condition of tourism resource (*TOUR*), infrastructure level (*FOUND*), inbound index number (*VISITOR*), the number of government officer (*SERV*), the number of performing arts groups' institutions

(*GROUP*), marriage rates (*MARRI*). The authors manually collected the annual number of world natural heritage, cultural heritage, natural and cultural dual heritage, and the number of national historical and cultural cities in each province, and calculated the tourism resource conditions of each province (*TOUR*). Infrastructure level (*FOUND*) was calculated based on the density of railway network, graded highway and inland waterway in each province. The index of inbound tourism (*VISITOR*) was synthesized by principal component analysis by using the foreign exchange income of Chinese tourism, the number of inbound foreign tourists, and the number of Hong Kong, Macao and Taiwan tourists. *YEAR* is the annual dummy variable. The original data of tourism resource conditions (*TOUR*) comes from the manually collection of *world heritage list*. The original data used to calculate inbound tourism index (*VISITOR*) comes from *China Tourism Statistics Yearbook*. Data related to other variables are obtained from *China Statistical Yearbook*. Variable definitions are shown in Table I.

IV. SOME COMMON MISTAKES

A. Descriptive Statistics

Table II provides descriptive statistics of variables. At the regional level, the average ratio of gross revenue of five-star hotels to GDP in 2000-2014 is 0.115%. The average PC trend and mobile average trend of the corruption Baidu index are

4.009 and 1.977, respectively. The average PC trend and the average mobile trend of the anti-corruption Baidu index are 3.835 and 2.133, respectively. It shows that the concern about corruption and anti-corruption based on PC Internet is greater than that based on mobile Internet. The overall average trend of the corruption Baidu index (4.365) is greater than that of the anti-corruption Baidu index (4.249), indicating that people pay more attention to corruption than anti-corruption. The standard deviation of *CORM* is 2.018 and the standard deviation of anti-corruption Baidu Index Mobile Average Trend (*ACORM*) is 2.203, which shows that there is a big difference in the public attention based on mobile Internet. In terms of PC average trend and mobile average trend, the minimum value of the PC average trend of corruption and anti-corruption Baidu index is greater than the mobile average trend, but the maximum value is opposite. It shows that during the period of 2011-2014, the rise of mobile Internet was relatively late, but it gained popularity rapidly. People's attention based on mobile Internet is gradually becoming an important data source to investigate public sentiment. The average consumption level, price level and urbanization level are 0.710, 1.033 and 0.543, respectively. The average level of the original value of fixed assets per capita was 3.125. The average value of tourism resources and infrastructure are 3.767 and 10.329 respectively. The average inbound index, government officers, performing arts groups, and marriage rate are 0.656, 3.737, 5.181 and 1.7%, respectively.

TABLE II: DESCRIPTIVE STATISTICS

Variable	Mean	Median	Std. Dev.	Min	Max
<i>REVE</i>	0.115	0.116	0.019	0.000	0.141
<i>CORPC</i>	4.009	4.145	0.535	1.710	4.690
<i>CORM</i>	1.977	0.970	2.018	0.000	4.910
<i>CORT</i>	4.365	4.395	0.565	2.220	5.400
<i>ACORPC</i>	3.835	4.010	0.681	1.210	4.910
<i>ACORM</i>	2.133	1.020	2.203	0.000	5.830
<i>ACORT</i>	4.249	4.185	0.914	1.210	6.140
<i>FIX</i>	3.125	2.860	1.149	1.220	7.020
<i>CONSUM</i>	0.710	0.710	0.050	0.590	0.870
<i>URBAN</i>	0.543	0.520	0.137	0.230	0.900
<i>CPI</i>	1.033	1.030	0.014	1.020	1.060
<i>TOUR</i>	3.767	3.990	0.751	2.200	4.780
<i>FOUND</i>	10.329	10.390	0.747	8.200	12.290
<i>VISITOR</i>	0.656	-0.140	3.053	-1.220	16.380
<i>SERV</i>	3.737	3.850	0.669	2.130	4.720
<i>GROUP</i>	5.181	5.250	0.896	2.770	7.170
<i>MARRI</i>	0.017	0.016	0.004	0.007	0.026

Fig. 1 and Fig. 2 show the dynamic track of the national corruption, anti-corruption Baidu index (quarterly average trend) and the quarterly total revenue (*REVES*) of the five star hotels across the country. *CORPCS* (*ACORPCS*), *CORMS* (*ACORMS*) and *CORTS* (*ACORTS*) denote PC, mobile and overall quarterly average trend variables of national corruption (anti-corruption) index. The average quarterly trend of corruption and corruption is similar to that of annual measurement. Overall, the average PC trend, the moving average trend and the overall average trend of corruption and anti-corruption Baidu index showed a trend of rising volatility. The growth of the five star hotel industry (*REVES*) showed a downward trend, indicating that the public's attention to corruption and anti-corruption was negatively correlated with the growth of the five star hotel industry. From 2011 to 2014, the average quarterly total

revenue of five-star hotels declined by - 1.88%. In contrast, the anti-corruption index rose more than the corruption index, but the overall mean level of corruption index was slightly higher than the anti-corruption index. Corruption and anti-corruption have always been the focus of public concern. Since the eighteen National Congress of the Communist Party of China, a large number of corrupt officials have been sacked under the continuous anti-corruption policy of high pressure, causing great concern to the public about corruption and anti-corruption. Fig. 1 and Fig. 2 show the dynamic trends of the national corruption and anti-corruption Baidu index (quarterly average trend) and the national five-star hotel quarterly gross revenue (*REVES*). *CORPCS*, *CORMS* and *CORTS* represent the PC, mobile and overall quarterly average trend variables of the national corruption Baidu index, respectively. *ACORPCS*, *ACORMS* and *ACORTS* are

the PC, mobile and overall quarterly average trend variables of the anti-corruption Baidu index, respectively. The Baidu quarterly average trend of corruption and anti-corruption variables (*CORPCS*, *CORMS*, *CORTS*, *ACORPCS*, *ACORMS*, *ACORTS*) are measured in the same way as the Annual variables (*CORPC*, *CORM*, *CORT*, *ACORPC*, *ACORM*, *ACORT*). For example, *CORTS*, the daily data of the overall trend of corruption baidu index in various regions, were firstly used to calculate the average annual X of each year's netizens for corruption searching frequency, and then $LN(1+X)$ was used to calculate the value of *CORTS*. The rest are calculated similarly.

Generally speaking, the PC average trend, mobile average trend and overall average trend of corruption and anti-corruption Baidu Index show a fluctuating upward trend,

while the five-star hotel industry growth (*REVES*) shows a downward trend. It shows that there is a negative correlation between public attention to corruption and anti-corruption and the growth of five-star hotel industry. From 2011 to 2014, the average quarterly revenue of five-star hotels decreased by -1.88%. In contrast, the anti-corruption Baidu index increased more than the corruption Baidu index, but the overall average level of the corruption Baidu index is slightly higher than the anti-corruption Baidu index. Corruption and anti-corruption have always been the focus of public concern. Since the eighteenth National Congress of the Communist Party of China, under the continuous high-pressure anti-corruption policy of the state, many corrupt officials fell of the horse, which has aroused great public concern about corruption and anti-corruption issues.

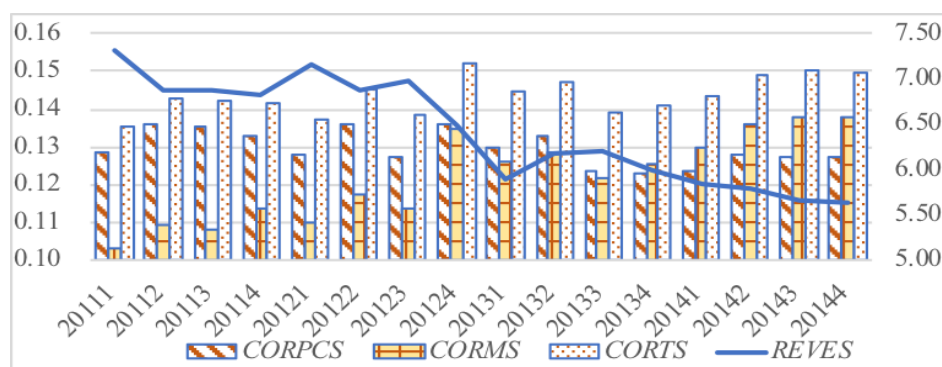


Fig. 1. National Corruption Baidu Index (Quarterly Average Trend) and Quarterly Total Revenue of Five-star Hotels in China.

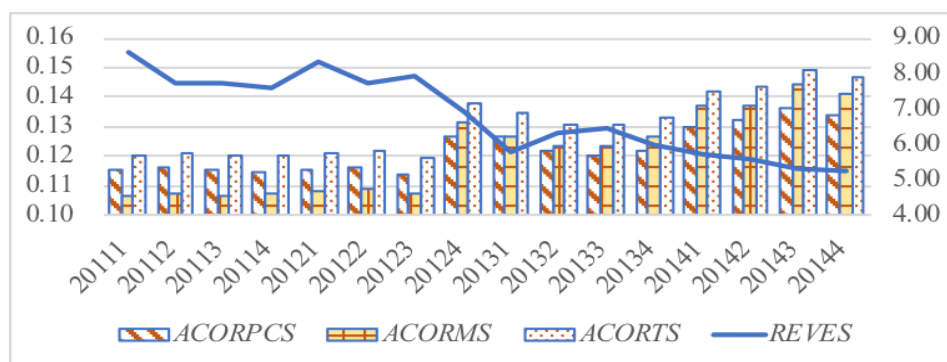


Fig. 2. National Anti-corruption Baidu Index (Quarterly Average Trend) and Quarterly Total Revenue of Five-star Hotels in China.

The results of the correlation analysis between the national corruption and anti-corruption Baidu Index (quarterly average trend) and the quarterly total revenue of five-star hotels during the period of 2011-2014 are shown in Table III. The mobile average trend of corruption Baidu index (*CORMS*), overall average trend (*CORTS*), anti-corruption Baidu index PC average trend (*ACORPCS*), mobile average trend (*ACORMS*), and overall average trend (*ACORTS*) are negatively correlated with the five-star hotel industry growth (*REVES*). The significant level is above 5%. Relevant analysis result shows that there is a significant negative correlation between corruption and anti-corruption Baidu Index and the growth of five-star hotel industry.

B. Public Attention to Corruption and Anti-corruption and the Growth of Five-star Hotel Industry

Table IV presents the regression results of the relationship between regional corruption, anti-corruption Baidu index (annual data) and regional five-star hotel industry growth (annual data). *BAIDU* represents six variables of the average

annual trend of regional corruption and anti-corruption Baidu index, i.e. *CORPC*, *CORM*, *CORT*, *ACORPC*, *ACORM*, *ACORT*. The overall annual trend of corruption Baidu Index (*CORT*) is significantly and negatively associated with the total revenue of five-star hotels at 1% level, but this negative correlation is more reflected in the mobile annual trend of corruption Baidu Index (*CORM*). The relationship between the PC annual trend of corruption Baidu Index (*CORPC*) and the revenue of five-star hotels is not significant. The three variables of the anti-corruption Baidu index (*ACORPC*, *ACORM* and *ACORT*) have a significantly negative relationship with the total revenue of five-star hotels. Overall, Table IV reports a significant negative relationship between public sentiment of corruption and anti-corruption (*BAIDU*) and the growth of five-star hotel industry (*REVES*).

The public attention to corruption can be regarded as a kind of social supervision force, which is conducive to forming a clean social environment and restraining the occurrence of corruption. The public attention to anti-corruption reflects the influence of anti-corruption

policy to a certain extent and contribute to promote the implementation of anti-corruption policy. The public supervision (Baidu index of corruption) and the influence of anti-corruption policies (Baidu index of corruption) all have a significant negative impact on the growth of the five-star hotel industry. The regression results show that in the clean social environment created by anti-corruption and under the strong public concern and supervision about corruption, the income of five-star hotels has been negatively affected to a

certain extent. Baidu index provides a real-time observation point for us to study corruption issues and pay attention to anti-corruption policies, and forms a certain public opinion pressure on government officials and regulators. The in-depth development of anti-corruption work, while relying on the relevant government departments to perform their duties, also need to pay attention to the appeal of the public, timely attention and actively respond to the changes in online public opinion.

TABLE III: CORRELATION ANALYSIS OF NATIONAL CORRUPTION AND ANTI-CORRUPTION BAIDU INDEX (QUARTERLY AVERAGE TREND) AND QUARTERLY TOTAL REVENUE OF FIVE-STAR HOTELS IN CHINA

	REVES	CORPCS	CORMS	CORTS	ACORPCS	ACORMS	ACORTS
REVES	1.000 (0.000)	0.459* (0.074)	-0.770*** (0.001)	-0.539** (0.031)	-0.841*** (0.000)	-0.809*** (0.000)	-0.825*** (0.000)
CORPCS	0.428* (0.098)	1.000 (0.000)	-0.317 (0.232)	0.280 (0.293)	-0.241 (0.369)	-0.412 (0.113)	-0.261 (0.329)
CORMS	-0.804*** (0.000)	-0.269 (0.314)	1.000 (0.000)	0.803*** (0.000)	0.891*** (0.000)	0.966*** (0.000)	0.912*** (0.000)
CORTS	-0.566** (0.022)	0.297 (0.264)	0.831*** (0.000)	1.000 (0.000)	0.776*** (0.000)	0.711*** (0.002)	0.782*** (0.000)
ACORPCS	-0.815*** (0.000)	-0.339 (0.199)	0.924*** (0.000)	0.757*** (0.001)	1.000 (0.000)	0.908*** (0.000)	0.988*** (0.000)
ACORMS	-0.844*** (0.000)	-0.429* (0.097)	0.956*** (0.000)	0.722*** (0.002)	0.978*** (0.000)	1.000 (0.000)	0.943*** (0.000)
ACORTS	-0.833*** (0.000)	-0.395 (0.130)	0.943*** (0.000)	0.738*** (0.001)	0.993*** (0.000)	0.996*** (0.000)	1.000 (0.000)

The upper triangle is Spearman correlation coefficient and the lower triangle is Pearson correlation coefficient. P value is in parentheses.

TABLE IV: PUBLIC CONCERNS ABOUT CORRUPTION AND ANTI-CORRUPTION AND TOTAL REVENUE OF FIVE-STAR HOTELS

	(1) CORPC	(2) CORM	(3) CORT	(4) ACORPC	(5) ACORM	(6) ACORT
C	9.932 (0.748)	7.177 (1.569)	5.544 (1.532)	3.568 (0.981)	5.978* (1.674)	3.910* (1.721)
BAIDU	0.395 (1.102)	-0.098*** (-3.166)	-0.587*** (-2.930)	-0.332*** (-2.809)	-0.085*** (-3.323)	-0.158*** (-3.288)
FIX	-0.196*** (-2.799)	-0.070 (-1.519)	-0.100* (-1.711)	-0.047 (-0.814)	-0.064* (-1.687)	-0.044 (-0.875)
CONSUM	-0.106 (-0.083)	2.301*** (7.169)	3.082*** (4.805)	2.866*** (4.376)	2.336*** (8.277)	2.762*** (7.164)
URBAN	5.567*** (4.859)	0.130 (0.100)	3.100 (1.422)	0.332 (0.164)	0.392 (0.384)	1.074 (0.989)
CPI	-8.152 (-0.645)	4.247 (1.078)	4.362 (1.428)	5.657* (1.838)	5.088 (1.620)	5.011* (1.823)
TOUR	0.107 (0.771)	-0.381*** (-4.711)	-0.429*** (-3.540)	-0.597*** (-4.579)	-0.407*** (-6.369)	-0.520*** (-13.952)
FOUND	0.316*** (3.755)	-0.002 (-0.122)	0.008 (0.240)	0.006 (0.159)	-0.002 (-0.233)	0.003 (0.194)
VISITOR	0.055** (2.243)	-0.082*** (-3.024)	-0.081*** (-2.976)	-0.063** (-2.306)	-0.080*** (-3.533)	-0.062** (-2.565)
SERV	0.151 (0.636)	-0.050 (-0.130)	0.445 (1.104)	0.812* (1.779)	0.025 (0.089)	0.614** (2.250)
GROUP	0.351*** (3.573)	0.056*** (3.419)	0.051 (1.113)	0.084* (1.865)	0.053*** (3.201)	0.060*** (2.884)
MARRI	17.645 (0.907)	-7.077** (-2.116)	4.032 (0.379)	3.381 (0.306)	-8.696*** (-2.992)	1.649 (0.310)
YEAR	YES	YES	YES	YES	YES	YES
Adj. R ²	0.793	0.994	0.996	0.995	0.995	0.995
F	33.745***	487.416***	687.084***	545.356***	527.090***	499.588***
N	121	121	121	121	121	121

***, **, and * denote significance at the 1, 5 and 10% levels, respectively.

C. Robustness Checks

To ensure the robustness of our results, we divided the total revenue of five-star hotels into room income and catering income, and further studies the relationship between public concern of corruption and anti-corruption and income

of five-star hotels. Five-star hotel room income (*SUITE*) is the ratio of regional five-star hotel room income to GDP. The catering income of star hotels (*CATER*) is the percentage of catering income of five-star hotels in regional GDP.

The regression result of the relationship between the annual trend of corruption and anti-corruption in Baidu and

the room income of five-star hotels in the region is shown in Table V. The annual overall trend of corruption and anti-corruption Baidu Index is negatively related to the room income (*SUITE*) at the level of 1%. However, the negative correlation between the overall annual trend of corruption

and the room revenue of five-star hotel is more reflected in the mobile average annual trend of Baidu corruption index (*CORM*), but not obvious in the PC average annual trend of Baidu corruption index (*CORPC*).

TABLE V: CORRUPTION, ANTI-CORRUPTION CONCERN AND FIVE-STAR HOTEL ROOM INCOME (*SUITE*)

	(1) <i>CORPC</i>	(2) <i>CORM</i>	(3) <i>CORT</i>	(4) <i>ACORPC</i>	(5) <i>ACORM</i>	(6) <i>ACORT</i>
<i>C</i>	10.779 (0.822)	5.961 (1.483)	5.006 (1.524)	2.818 (0.855)	5.111 (1.599)	2.836 (1.159)
<i>BAIDU</i>	0.323 (0.913)	-0.099*** (-2.631)	-0.593*** (-3.125)	-0.259** (-2.198)	-0.089*** (-2.810)	-0.129*** (-3.127)
<i>FIX</i>	-0.244*** (-3.524)	-0.060** (-2.320)	-0.078* (-1.716)	-0.039 (-0.809)	-0.059*** (-2.702)	-0.040 (-1.397)
<i>CONSUM</i>	-0.103 (-0.081)	2.765*** (7.255)	3.425*** (5.531)	3.238*** (4.966)	2.837*** (9.692)	3.239*** (8.225)
<i>URBAN</i>	5.688*** (5.026)	1.545 (1.177)	3.501* (1.864)	1.560 (0.840)	1.628 (1.461)	2.076** (2.015)
<i>CPI</i>	-8.648 (-0.693)	4.865 (1.540)	5.077* (1.848)	6.101** (2.165)	5.478** (2.207)	5.825*** (2.658)
<i>TOUR</i>	0.164 (1.191)	-0.385*** (-3.730)	-0.415*** (-3.256)	-0.539*** (-3.759)	-0.403*** (-5.066)	-0.502*** (-7.070)
<i>FOUND</i>	0.293*** (3.525)	-0.006 (-0.346)	0.006 (0.208)	0.006 (0.167)	-0.006 (-0.448)	0.003 (0.131)
<i>VISITOR</i>	0.055** (2.243)	-0.076*** (-2.971)	-0.071*** (-2.873)	-0.055** (-2.155)	-0.075*** (-3.427)	-0.057** (-2.547)
<i>SERV</i>	0.023 (0.096)	-0.402 (-1.234)	0.036 (0.090)	0.302 (0.624)	-0.345 (-1.346)	0.170 (0.591)
<i>GROUP</i>	0.296*** (3.051)	0.043*** (3.029)	0.027 (0.643)	0.053 (1.306)	0.038*** (2.763)	0.039** (2.243)
<i>MARRI</i>	19.250 (1.002)	0.129 (0.019)	11.114 (1.062)	11.272 (1.022)	-0.771 (-0.138)	10.191** (1.996)
<i>YEAR</i>	<i>YES</i>	<i>YES</i>	<i>YES</i>	<i>YES</i>	<i>YES</i>	<i>YES</i>
<i>Adj. R²</i>	0.774	0.994	0.995	0.994	0.994	0.994
<i>F</i>	30.300***	471.055***	592.110***	484.166***	469.514***	454.438***
<i>N</i>	121	121	121	121	121	121

***, **, and * denote significance at the 1, 5 and 10% levels, respectively.

TABLE VI: CORRUPTION, ANTI-CORRUPTION CONCERN AND CATERING INCOME OF FIVE-STAR HOTELS (*CATER*)

	(1) <i>CORPC</i>	(2) <i>CORM</i>	(3) <i>CORT</i>	(4) <i>ACORPC</i>	(5) <i>ACORM</i>	(6) <i>ACORT</i>
<i>C</i>	13.092 (0.940)	13.360*** (3.169)	13.246*** (3.332)	12.709*** (3.212)	12.101*** (3.368)	15.252** (2.163)
<i>BAIDU</i>	0.541 (1.440)	-0.138*** (-2.737)	-0.086*** (-3.064)	-0.055 (-0.388)	-0.114** (-2.541)	-6.243*** (-2.945)
<i>FIX</i>	-0.113 (-1.531)	-0.023 (-0.473)	-0.004 (-0.070)	0.009 (0.154)	-0.012 (-0.286)	-0.084** (-2.240)
<i>CONSUM</i>	-0.161 (-0.120)	2.120*** (9.128)	2.198*** (3.161)	2.180*** (3.110)	2.250*** (8.743)	1.746** (2.226)
<i>URBAN</i>	4.873*** (4.055)	-5.830*** (-3.058)	-6.430*** (-2.665)	-6.992*** (-3.268)	-5.692*** (-3.209)	5.178*** (10.749)
<i>CPI</i>	-12.751 (-0.963)	1.109 (0.366)	0.606 (0.185)	1.370 (0.405)	1.547 (0.604)	-16.623** (-2.518)
<i>TOUR</i>	-0.018 (-0.121)	-0.726*** (-4.510)	-0.818*** (-5.140)	-0.862*** (-6.159)	-0.783*** (-6.296)	-0.126 (-1.495)
<i>FOUND</i>	0.324*** (3.671)	-0.015 (-0.796)	-0.010 (-0.197)	-0.007 (-0.168)	-0.018 (-1.364)	0.392*** (5.506)
<i>VISITOR</i>	0.059** (2.274)	-0.104** (-2.554)	-0.085*** (-2.872)	-0.074** (-2.384)	-0.099*** (-3.075)	0.036*** (2.590)
<i>SERV</i>	0.225 (0.899)	0.104 (0.201)	0.493 (0.985)	0.510 (1.057)	0.349 (0.899)	0.453*** (2.814)
<i>GROUP</i>	0.446*** (4.324)	0.131*** (3.296)	0.112** (2.303)	0.116** (2.262)	0.126*** (3.479)	0.503*** (8.513)
<i>MARRI</i>	18.942 (0.928)	-14.221*** (-11.377)	-10.052 (-0.812)	-11.008 (-0.925)	-15.726*** (-8.933)	13.097 (1.126)
<i>YEAR</i>	<i>YES</i>	<i>YES</i>	<i>YES</i>	<i>YES</i>	<i>YES</i>	<i>YES</i>
<i>Adj. R²</i>	0.792	0.997	0.995	0.994	0.997	0.948
<i>F</i>	33.659***	1027.432***	526.985***	453.459***	942.332***	156.853***
<i>N</i>	121	121	121	121	121	121

***, **, and * denote significance at the 1, 5 and 10% levels, respectively.

We made a regression analysis on the relationship between public concern about corruption and anti-corruption (Baidu index annual data) and catering revenue (annual data) of five-star hotels in the regional level. The result is shown in

Table VI. The overall average annual trend of corruption Baidu index (*CORT*) is significantly and negatively associated with the five-star hotel restaurant income in 1% level, but this negative relationship is more reflected in the

mobile average trend of corruption Baidu index (*CORM*). The average annual trend of PC of corrupt Baidu index (*CORPC*) and five-star hotel restaurant income relationship is not significant. In anti-corruption Baidu Index, there is a significant negative relationship between *ACORPC*, *ACORM*, *ACORT* and catering revenue of five-star hotels. Generally speaking, public sentiment about corruption and anti-corruption has significant negative roles in catering income of five-star hotels in China.

V. CONCLUSION

Standing on the frequent corruption problems during China's economic and social transformation and the continuous high-pressure anti-corruption trend since the 18th national congress of the communist party of China, using the panel data of five-star hotels in provincial areas from 2011 to 2014, based on the public sentiment about corruption and anti-corruption, this paper analyzes the development of five-star hotels in corruption and anti-corruption network public opinion from the perspective of social ideology. The study finds that the public netizen is more concerned about corruption than anti-corruption. The PC-based Internet corruption and anti-corruption focus is greater than the mobile Internet-based public attention. Corruption and anti-corruption Baidu Index have a significant negative association with the growth of five-star hotel industry, but the negative impact of corruption Baidu Index on five-star hotel revenue is more reflected in the attention of mobile Internet users. The public attention to corruption and anti-corruption has the greatest impact on the quarterly catering income of five-star hotels, while the impact on the quarterly room income is relatively small. The conclusions of this paper verify the shrinking business of Chinese five-star hotels in a clean and honest social environment from the perspective of public ideology and online public opinion.

In terms of the relationship between corruption and economic development, "the viewpoint of effective corruption" and "the viewpoint of harmful corruption" have opposite opinions. Unlike previous studies, this paper does not explore the relationship among corruption, anti-corruption and total economic growth, but chooses a five-star hotel industry with special representation to explore the impact of public sentiment about corruption and anti-corruption on the development of the five-star hotel industry. This paper holds that the public attention to corruption forms a kind of social supervision force, which is conducive to the construction of a clean social environment. The public attention to anti-corruption reflects the impact of anti-corruption policy and promotes the implementation of anti-corruption policy to a certain extent. As an important social supervisory force, public appeal has public opinion binding force on corruption of government officials. Effective anti-corruption work in China relies on government departments to abide by their responsibilities, but at the same time, it also needs to pay attention to the demands of the public, pay timely attention to and actively respond to the potential changes in network public opinion.

This paper shows that in the clean social environment created by anti-corruption, under the strong concern and supervision of the public on corruption, the income of

five-star hotels has been negatively affected to some extent. This paper only explores the impacts of public attention on corruption and anti-corruption on five-star hotels in China, and emphasizes the role of Internet public sentiment, but does not explore how to achieve sustainable growth of five-star hotels in China. However, the results show that China's five-star hotels can no longer rely on the corruption spending of government officials to achieve their own growth. China's five-star hotel should adjust its development strategy in time, pay attention to the diversified needs of customers, pay attention to the innovation of service mode, actively explore new income growth points, abandon the traditional five-star hotel development mode that relies on government consumption, so as to make China's five-star hotel truly prosperous.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

AUTHOR CONTRIBUTIONS

Jing Yu and Jiaqi Song analyzed the data; Tingting Zhou and Jing Yu wrote the paper; Tingting Zhou conducted the research; all authors had approved the final version.

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