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RESEARCH ARTICLE

Doing well by doing right: heterogeneous effects of tourism firms' social responsibility on service productivity and profitability

Dongdong Wu [a], Hui Li [a] and Ya-Fei Liu [b]

[a]College of Tourism and Service Management, Nankai University, Tianjin, People's Republic of China; [b]School of Tourism, Hainan University, Haikou, People's Republic of China

ABSTRACT

This paper seeks to explore the heterogeneous effects of corporate social responsibility (CSR) practices on the service productivity and profitability of tourism firms, applying the perspectives of stakeholder theory and the resource-based view. We employ data envelopment analysis to gauge service productivity and to conduct an analysis of inefficiencies and benchmarks for underperforming firms. Additionally, we employ a two-way fixed-effects regression model using unbalanced panel data to discern the heterogeneous effects of CSR practices on firm performance. Our findings indicate that internal CSR practices (involving managers and employees) are positively correlated with both service productivity and profitability. Conversely, external CSR practices (involving suppliers, customers, environmental and societal factors) exhibit a negative impact on profitability but do not significantly affect service productivity. Further analysis reveals that service productivity and profitability are less likely to be the primary drivers of CSR practices, mitigating concerns regarding a potential bidirectional relationship.

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Corporate social responsibility; service productivity; financial performance; stakeholder theory; resource-based view; data envelopment analysis

1. Introduction

Corporate social responsibility (CSR) entails integrating social and environmental considerations into business operations, as well as engaging with multiple stakeholders through voluntary initiatives (Wang et al., 2016). With the growing recognition of the importance of sustainable business practices, CSR has become a significant focal point for both scholars and industry professionals, particularly within the tourism sector (Wu et al., 2023b). Numerous studies have delved into the influence of CSR initiatives on financial performance (Babajee et al., 2022; Rhou et al., 2016). Nevertheless, findings regarding the relationship between CSR and firms' financial performance remain inconclusive (Feng & Tseng, 2019). Furthermore, there exists a notable absence of a comprehensive performance metric that accounts for tourism firms' attributes, encompassing both fixed and human capital, from an operational standpoint (Joppe & Li, 2016).

Service productivity, as a concept rooted in operations, pertains to the conversion of a firm's resources into outcomes, offering insights into the efficiency of generating value from existing services (Rust & Huang, 2012). As an operational metric, service productivity can provide tourism firms with more profound insights than conventional indicators such as profitability, by delivering benchmarks and targets for improvement. According to the resource-based view, the presence of rare, valuable, inimitable, and non-substitutable resources is pivotal for firms seeking to cultivate competitiveness (Branco & Rodrigues, 2006). CSR practices, as intangible resources, may enhance a firm's

CONTACT Hui Li lihuihit@gmail.com

service productivity by bolstering employees' commitment to the organization and thereby supporting higher labour productivity (Jang et al., 2022). However, these practices may also deplete finite strategic resources and necessitate costly operational adjustments, potentially impeding improvements in service productivity. Consequently, the precise impact of CSR practices on service productivity within the tourism industry remains an open question.

The CSR practices within the tourism sector encompass a diverse array of stakeholders, including both internal stakeholders (such as managers and employees) and external stakeholders (including consumers, suppliers, non-governmental organizations, government entities, local communities, and ecosystems) (Font & Lynes, 2018). Stakeholder influence is largely shaped by the interdependent, multi-faceted nature of the tourism industry (Farmaki, 2019). Given the tourism industry's wide spectrum of stakeholders, these stakeholders significantly influence operational decisions and strategic implementations (Wu et al., 2023b). Therefore, firms should effectively manage the interests of their stakeholders to gain a competitive advantage. The connection between CSR, firm strategy, and financial performance has been explored in the context of stakeholder management (Theodoulidis et al., 2017). However, there remains an insufficient examination of potential disparities between internal and external stakeholders (Yoon & Chung, 2018), as well as a lack of comprehensive investigation into the various dimensions of stakeholders within the tourism domain (Wu et al., 2023b). The extent to which managers of tourism firms should prioritize internal versus external stakeholders (Tomasella et al., 2023), and the repercussions of assuming responsibility for specific stakeholder groups on firm performance, remain uncharted territories.

CSR practices have the potential to impact a firm's resources and its relationships with stakeholders, thereby influencing both service productivity and profitability (Sun & Stuebs, 2013). This paper places its focus on resource management and service enhancement within the tourism industry, with the aim of examining the heterogeneous effects of CSR practices adopted by firms on their internal and external stakeholders. Our investigation delves into the associations between CSR practices, categorized as either internal or external, and firm performance, categorized as operational or financial. Furthermore, we conduct an in-depth analysis to explore the effects of the specific dimensions of CSR practices on these two facets of firm performance. The primary contributions of this paper include bridging the gap between existing literature on CSR practices and service productivity within the tourism industry, using profitability as a comparative basis. Additionally, we explore the link between CSR practices and both dimensions of firm performance, employing the perspectives of stakeholder theory and the resource-based view. Lastly, the proposed inefficiency and benchmark analysis approach offers practical guidance to industry practitioners for optimizing management and enhancing service productivity across various business types.

The findings of this paper reveal that internal CSR practices exhibit a positive correlation with the service productivity and profitability of tourism firms. Conversely, external CSR practices show a negative association with profitability but do not significantly impact service productivity. Furthermore, our results indicate that demonstrating responsibility towards external stakeholders (such as suppliers and customers) and the environment can lead to a significant enhancement in service productivity. In contrast, acting responsibly towards internal managers and employees has a notably positive effect on profitability. However, responsibility towards the social dimension does not yield significant effects on either service productivity or profitability. Moreover, our proposed benchmark analysis, utilizing a weighted Russell directional distance model, provides a more comprehensive understanding of a firm's CSR practices and their contributions to value creation, emphasizing resource management and service enhancement. Notably, our findings highlight variations in service productivity across different business types. Further analysis also suggests that service productivity and profitability are less likely to be the primary drivers of CSR practices, alleviating concerns regarding potential bidirectional relationships.

2. Literature review and hypothesis development

2.1 CSR in the tourism industry

A systematic and rigorous review of the literature underscores the challenge posed by inconsistent findings to the widespread applicability of the link between CSR and firm performance (Farrington et al., 2017). Consequently, there arises a growing necessity for research tailored to specific contexts, such as focusing on particular industries. The tourism sector is notable for its substantial investments in fixed assets, protracted recovery periods, a heavy reliance on human capital, and the fiercely competitive nature of its markets, which all contribute to heightened operational risks (Li & Wu, 2024). Within the tourism industry, firms engage with a multitude of stakeholders through their social network connections and place significant emphasis on the management of stakeholder relationships, fairness, and justice (Wu et al., 2023b). Consequently, tourism firms are expected to embrace economic, social, and environmental responsibilities as part of their mission to attain sustainable development.

Some research has dissected CSR practices into distinct dimensions, including positive and negative aspects (Kang et al., 2010), social responsibility and irresponsibility (Jang et al., 2022), and non-operations- versus operations-related elements (Lee et al., 2013). Previous investigations have indicated that both non-operations and operations-related CSR activities do not yield significant effects on firm performance (Lee et al., 2013). Furthermore, actions aimed at strengthening or addressing CSR concerns can enhance or diminish shareholder value by respectively boosting future value expectations or reducing systematic risk (Kim & Kim, 2014). CSR practices have been observed to have a positive impact on both the volume and sentiment of online employee reviews, with irresponsibility actions moderating this relationship (Jang et al., 2022).

However, the majority of studies typically consider overall CSR scores, often overlooking potential variations stemming from diverse sources of stakeholder concerns. Although prior research has suggested that internal (external) CSR practices enhance (diminish) a firm's financial performance while having no impact (or even a positive effect) on marketing performance (Yoon & Chung, 2018), the context and variables employed in these studies may not be directly applicable to the CSR practices of tourism firms operating within the Chinese context. Hence, our paper delves into the diverse effects, encompassing both internal and external dimensions, as well as more detailed facets, of CSR practices on various performance measures within this specific context.

2.2 Benchmarking of service productivity

This paper offers a retrospective examination of the analytical frameworks and theories related to service productivity, as discussed by Maroto and Rubalcaba (2008). Numerous models have been devised to gauge the service productivity of organizations (Scerri & Agarwal, 2018). These models include the input-process-output model, service process matrix, service cubicle, and service enterprise productivity in action model. Within the realm of service productivity within the tourism sector, prior research has explored the distinctive attributes of service productivity and underscored the pivotal role played by human resources, notably managers and employees (Joppe & Li, 2016). Furthermore, it is worth noting that the measurement of service productivity often relies on financial metrics, primarily due to the ready availability of operational data from firms (Grönroos & Ojasalo, 2004).

Prior research has indeed affirmed that CSR practices can enhance a firm's competitiveness, encompassing factors such as productivity (Sun & Stuebs, 2013). Nevertheless, a clear and direct relationship between CSR practices and service productivity in the tourism industry remains elusive. In terms of measurement, one valuable tool for assessing the productivity of service organizations is Data Envelopment Analysis (DEA) (Charnes et al., 1978). DEA stands as a non-parametric technique that leverages multiple input and output indicators (Li & Wu, 2024; Wu et al., 2023a) to

evaluate and compare service productivity across various decision-making units (DMUs). By employing DEA, managers gain a powerful instrument for more accurate measurement and enhanced management of service productivity (Aspara et al., 2018). Notably, DEA has also found utility as a tool for gauging key variables in CSR-related investigations (Yoo et al., 2022).

Through the measurement of service performance among tourism firms operating within the same markets, DEA serves as a valuable tool for offering benchmarks to inefficient firms, subsequently identifying areas for potential enhancements (Sainaghi et al., 2017). Additionally, DEA empowers tourism firms to optimize their resource allocation and enhance their performance in operational aspects by: (1) Identifying best practices and generating rankings for all DMUs; (2) Detecting distinct sources of inefficiency specific to each DMU; (3) Establishing attainable improvement targets for inefficient DMUs; (4) Identifying peer organizations for each DMU; (5) Providing actionable guidance for sustained performance improvement. Managers of service organizations can leverage this benchmarking process to uncover and implement best practices, ultimately facilitating continuous improvement and maximizing productivity within their respective organizations (Rust & Huang, 2012).

2.3 Hypothesis development

Considering the costs associated with CSR practices and the finite resources available to tourism firms, it's reasonable to expect that internal and external CSR practices may yield different impacts on service productivity and profitability. Internal CSR practices exert a direct influence on the management of internal organizational members, including executives, managers, and employees. In contrast, external CSR practices encompass the well-being of a broader range of external stakeholders, such as investors, suppliers, consumers, communities, and the environment (Yoon & Chung, 2018). Figure 1 presents the overall proposed hypothesis model.

2.3.1 Relationship between CSR and service productivity

CSR practices are recognized as an intangible source of competitive advantage for firms (Hawn & Ioannou, 2016). Internal CSR practices play a pivotal role in strengthening the incentive structure and fostering a sense of responsibility within the firm's culture while also improving relationships with employees (Branco & Rodrigues, 2006). As firms take on greater responsibility in providing improved working conditions, employee training, and organizational support, internal CSR practices have been shown to enhance employees' commitment, job satisfaction, performance, and work productivity (Frank & Obloj, 2014; Youn et al., 2018). The significance of labour productivity cannot be overstated when measuring a firm's overall productivity, especially in the context of the tourism industry where human capital plays a critical role in delivering exceptional experiences (Joppe &

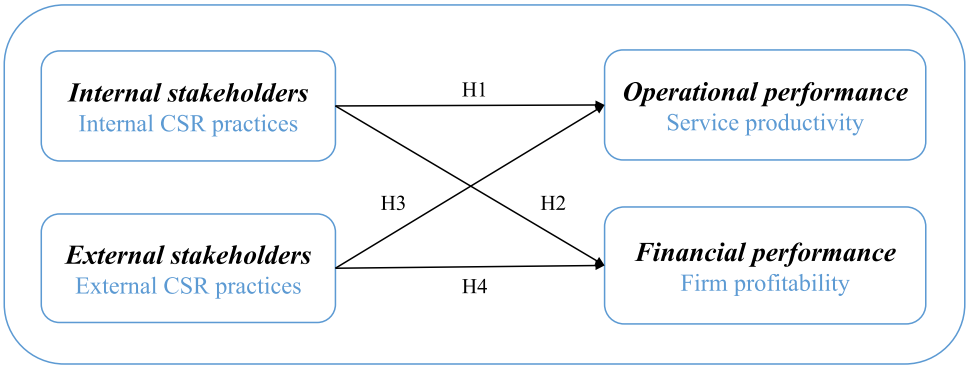

Figure 1. The proposed hypothesis model.

Li, 2016). Consequently, it is reasonable to hypothesize that internal CSR practices have the potential to enhance a firm's service productivity by fostering higher labour productivity, leading to more efficient and effective resource utilization. Thus, we hypothesize that:

H1. Internal CSR practices positively relate to tourism firms' service productivity.

CSR practices can also contribute to augmenting a firm's reservoir of intangible resources and facilitate the establishment of critical connections with external stakeholders (Theodoulidis et al., 2017). Intangible resources, such as brand equity and heightened customer satisfaction resulting from external CSR practices, can play a pivotal role in shaping a favourable corporate image. For instance, CSR initiatives have been shown to have a positive impact on a firm's reputation and customer satisfaction among specific stakeholders (Su et al., 2017). However, it's important to acknowledge that the implementation of CSR practices incurs costs, which can sometimes be viewed as a 'misuse' of strategic resources for tourism firms. Engaging in activities such as environmental conservation, philanthropic contributions, attracting investor attention, enhancing customer loyalty, and other socially responsible endeavours requires a substantial investment of time, effort, and capital. Consequently, external CSR practices may potentially diminish a firm's operational efficiency and service productivity because effectively serving a diverse array of external stakeholders can be challenging and resource-intensive. Thus, we hypothesize that:

H2. External CSR practices negatively relate to tourism firms' service productivity.

2.3.2 Relationship between CSR and financial performance

A stable and proficient human capital pool can significantly enhance both the intangible reputation and tangible revenue of a firm, especially within the labour-intensive tourism industry (Jang et al., 2022). CSR practices play a pivotal role in facilitating firms in cultivating relationships with diverse stakeholders, thereby bolstering their overall performance (Jones et al., 2018). Internal CSR practices are instrumental in fortifying employees' commitment, sense of identity, engagement in organizational citizenship behaviour, environmental responsibility, and overall work performance (Fu et al., 2014). Initiatives aimed at enhancing employee relations can invigorate the workforce, reduce physical and mental fatigue, promote employee engagement, enhance psychological capital, and contribute positively to work performance (Frank & Obloj, 2014; Mao et al., 2021). The heightened work performance stemming from internal CSR practices is likely to correlate positively with profitability. Furthermore, insights from the organizational behaviour literature lend support to the idea that internal CSR practices lead to greater diversity in corporate governance and signal effective team management (Yoon & Chung, 2018). These factors can capture the attention of consumers and subsequently boost the sales of products or services. Thus, we hypothesize that:

H3. Internal CSR practices positively relate to tourism firms' profitability.

There exists a widespread expectation that tourism firms should embrace ethical responsibilities and contribute to the well-being of the community beyond mere profit-driven pursuits (Font & Lynes, 2018). When firms engage in external CSR practices, such as garnering investor attention, fostering consumer loyalty, supporting environmental protection, participating in community development, and making charitable donations, they often incur additional direct costs, which can potentially diminish their overall profitability (Yoon & Chung, 2018). It's crucial to recognize that CSR practices represent a form of cost expenditure, and their translation into improved financial performance is contingent on the establishment of robust relationships between tourism firms and their stakeholders (Franco et al., 2020). Furthermore, there exists information asymmetry between those managing the firm's corporate strategy and external stakeholders (Barnett, 2007), making CSR practices susceptible to mismanagement and misuse by managers. Additionally, influenced by local traditional culture, external CSR practices may primarily reside within the realm of ethical

considerations rather than being integrated into the firm's strategic decision-making (Hu et al., 2020). Thus, we hypothesize that:

H4. External CSR practices negatively relate to tourism firms' profitability.

3. Methodology

3.1 Data and samples

Tourism firms publicly traded on China's stock market (i.e. Shanghai and Shenzhen Stock Exchanges) constitute the observations, over the period 2010–2019. Firm-specific financial data are taken from the CSMAR database. The CSR data are collected from Hexun.com, the largest financial and economic portal in China. It considers different stakeholders and comprises five dimensions of CSR practices: responsibilities to managers, employees, suppliers and customers, the environment, and society. Social responsibility of tourism firms is evaluated by assigning different weights to the specific dimensions since 2010 by the database provider (Li et al., 2021). The data on social responsibility and the annual reports released by tourism firms are integrated for our investigation.

The following principles are followed to clean the data. First, only service-oriented companies involved in travel, attractions, restaurants, and hotels are selected. Second, for firms listed after 2010, we select only firms with at least three continuous firm-year observations in the study period. Third, the observations of specially treated firms with poor financial performance and delisted firms are excluded. Fourth, we match tourism firms retrieved from the CSMAR database with the CSR data in Hexun.com and remove observations with missing values from the two sources of data. Fifth, a winsorizing measure (with 1% quantile as a criterion) is adopted to reduce the bias induced by severe outliers.

After taking those steps, 57 firms with 504 firm-year observations are available during the study period (see Appendix A). Because balancing an unbalanced panel may result in substantial information loss, the empirical analysis below uses unbalanced longitudinal panel data. The sample firms cover the business types of accommodation and catering, scenic spot and sightseeing, travel agencies and exhibitions, film and live entertainment, culture and tourism related real estate, and airline service.

3.2 Estimation of service productivity

Though traditional DEA models are widely used for estimating efficiency or productivity, it is argued that non-radial efficiency measures provide a stronger discriminating capacity for performance measurement (Wu et al., 2023a). Because a complex production process cannot be captured by linear functions, the non-radial assumption is likely appropriate. In this paper, a non-radial measure based on a weighted Russell directional distance model is adopted to estimate service productivity (Barros et al., 2012; Fujii et al., 2014).

Considering the characteristic of high fixed costs and labour intensity in the tourism industry (Li & Wu, 2024; Singal, 2015), three input indicators are used: net fixed assets (*capital*), operating costs (*cost*) and number of employees (*labour*). Operating income (*income*) and total indebtedness (*liability*) are considered as desirable and undesirable output indicators, respectively. Monetary values (i.e. capital, cost, income and liability) are in millions of CNY.

Suppose each $DMU_j (j = 1, 2, \ldots, J)$ (i.e. tourism firm) uses inputs $x = (x_1, x_2, \ldots, x_N) \in R_+^N$ to produce both desirable outputs, $y = (y_1, y_2, \ldots, y_M) \in R_+^M$, and undesirable outputs, $b = (b_1, b_2, \ldots, b_L) \in R_+^L$. The directional distance function can be defined by the following:

$$\overrightarrow{D}(x, y, b; g) = sup\{\beta : (x + \beta g, y + \beta g, b + \beta g) \in T\} \tag{1}$$

where the vector $g = (g_x, g_y, g_b)$ represents the various directions of each variable. The assumptions of variable returns to scale and disposability of variables are referred to the study of Barros et al.

(2012). Following Fujii et al. (2014), the service productivity of firm k is calculated as follows:

$$\begin{aligned}
&\overrightarrow{D}(x, y, b; g) = \max\left(\frac{1}{N}\sum_{n=1}^{N}\beta_n^k + \frac{1}{M}\sum_{m=1}^{M}\beta_m^k + \frac{1}{L}\sum_{l=1}^{L}\beta_l^k\right)\\
&s.t.\ \sum_{j=1}^{J} z_k y_{mj} \geq y_{mk} + \beta_m^k g_y,\ m = 1, 2, \ldots, M\\
&\sum_{j=1}^{J} z_k b_{lj} = b_{lk} - \beta_l^k g_b,\ l = 1, 2, \ldots, L\\
&\sum_{j=1}^{J} z_k x_{nj} \leq x_{nk} + \beta_n^k g_x,\ n = 1, 2, \ldots, N\\
&\sum_{j=1}^{J} z_k = 1,\ z_k \geq 0,\ j = 1, 2, \ldots, J
\end{aligned} \tag{2}$$

where β_m^k, β_l^k and β_n^k are the inefficiency measures for desirable outputs y_m, undesirable outputs b_l and inputs x_n, respectively. z_k are the intensity weights used to construct the convex combinations. According to the range directional model (Portela et al., 2004), we can define the directional vector considering the range of possible improvement by the following:

$$\begin{cases} g_x = x_{nk} - \min\{x_{nj}\},\ n = 1, 2, \ldots, N \\ g_y = \max\{y_{mj}\} - y_{mk},\ m = 1, 2, \ldots, M \\ g_b = b_{lk} - \min\{b_{lj}\},\ l = 1, 2, \ldots, L \end{cases} \tag{3}$$

Due to the nature of the inefficiency measure, the proposed model is able to determine each variable's contribution to inefficiency. The value of $\overrightarrow{D}(x, y, b; g)$ is bounded in the interval [0, 1], and therefore the efficiency of the proposed model can be calculated as $1 - \overrightarrow{D}(x, y, b; g)$.

3.3 Variables and panel regression model

This paper investigates two dependent (i.e. service productivity and profitability) and two independent (i.e. internal and external CSR) variables. Service productivity (*Efficiency*) is measured by the firm's efficiency value from the DEA model. Financial performance is proxied by the firm's return on assets (*ROA*). According to stakeholder theory, CSR practices can be divided into internal and external to investigate the possible differences between the two types (Yoon & Chung, 2018). The internal CSR (*InternalCSR*) rating reflects the firm's responsibilities to its managers and employees, while the external CSR (*ExternalCSR*) rating involves its responsibilities to suppliers and customers, the environment, and society (Yin et al., 2023). The detailed descriptions can be seen in Appendix B. We use the Z-score method to standardize the original data.

We controlled for the firm- and industry-specific variables by including the variables *Size*, *Growth*, *Leverage*, *Liquidity* and *Concentration*. Firm *Size* is measured as the natural logarithm of total assets. *Growth* is proxied by the growth rate in operating income. *Leverage* is a measure of the solvency and capital structure. *Liquidity* is calculated by the 'quick' ratio, which is the ratio of quick assets to current liabilities. *Concentration* is a composite index that measures market concentration, measured by the Herfindahl-Hirschman Index.

To investigate heterogeneity in the effects of CSR practices (i.e. internal and external CSR) on tourism firms' performance, a two-way fixed-effects model by industry and year is adopted. A firm fixed-effects model is not applied because the loss of degrees of freedom would be too significant. Considering the possible endogeneity problem caused by reverse causality, this paper explores the lagged effects of CSR practices at year t on firm performance at year $t+1$ (Jang et al., 2022).

Therefore, the final regression procedure contains 57 firms with 447 firm-year observations. The two-way fixed-effects model is as follows:

$$Efficiency_{it+1} = \beta_0 + \beta_1 \times InternalCSR_{it} + \beta_2 \times ExternalCSR_{it} + \beta_3 \times Size_{it} + \beta_4 \times Growth_{it} + \beta_5 \times Leverage_{it} + \beta_6 \times Liquidity_{it} + \beta_7 \times Concentration_{it} + \delta_i + \mu_t + \varepsilon_{it} \quad (4)$$

$$ROA_{it+1} = \beta_0 + \beta_1 \times InternalCSR_{it} + \beta_2 \times ExternalCSR_{it} + \beta_3 \times Size_{it} + \beta_4 \times Growth_{it} + \beta_5 \times Leverage_{it} + \beta_6 \times Liquidity_{it} + \beta_7 \times Concentration_{it} + \delta_i + \mu_t + \varepsilon_{it} \quad (5)$$

where δ_i is industry-fixed-effects, μ_t is time-fixed-effects, and ε_{it} is an error term. The Hausman test supports the use of the fixed-effects model. Though the two-way fixed-effects model has controlled for various unobserved factors and addressed possible industry and year heterogeneities, we additionally use random-effects model to validate its robustness. The panel regression models are estimated with robust standard error.

4. Empirical results and analysis

4.1 Descriptive statistics

Table 1 shows the descriptive statistics for the DEA and regression variables. Comparing the statistical values of input and output variables of the DEA, we can conclude that there are huge differences among tourism firms. Therefore, it is necessary and practical to allocate resources for the inefficient firms through benchmarking analysis. The mean values of service productivity and profitability are 0.755 and 0.061, respectively. The internal CSR has a mean of 16.099 and a standard deviation of 7.554, with a minimum score of −9.050 and a maximum score of 33.930. The external CSR has a mean of 10.495 and a standard deviation of 10.633, with a minimum value of −15.000 and a maximum value of 51.100.

Table 2 shows the results of the Pearson correlation analysis. Internal and external CSR have positively significant correlations with service productivity and *ROA*. Service productivity has a positively significant correlation with *ROA* ($r = 0.221$), internal and external CSR ($r = 0.377$ and 0.192), *Size* ($r = 0.304$), *Growth* ($r = 0.109$), and *Liquidity* ($r = 0.201$), but a negatively significant correlation with *Leverage* ($r = -0.092$). Furthermore, *Concentration* has positively significant correlation with *Size* ($r =$

Table 1. Descriptive statistics for the DEA and regression variables.

Variable	Obs.	Mean	Std. Dev.	Min.	Median	Max.
DEA variables						
Labour	504	8113.61	17593.21	38.00	2263.00	103876.00
Capital	504	9386.17	30189.14	2.51	583.69	175675.00
Cost	504	8504.54	22360.57	1.47	698.04	136016.00
Income	504	10778.17	26369.58	11.93	1228.61	154322.00
Liability	504	16781.94	42647.71	10.33	1063.90	284626.63
Dependent variables						
Service productivity	504	0.755	0.213	0.415	0.699	1.000
Profitability	504	0.061	0.162	−1.318	0.079	0.516
Independent variables						
Internal CSR[a]	504	0	1	−2.723	0.119	2.347
External CSR[a]	504	0	1	−3.971	−0.200	3.348
Internal CSR[b]	504	16.009	7.554	−9.050	16.750	33.930
External CSR[b]	504	10.495	10.633	−15.000	9.180	51.100
Control variables						
Size	504	8.408	1.713	4.472	8.002	12.847
Growth	504	0.535	3.647	−1.093	−0.051	68.818
Leverage	504	0.432	0.214	0.019	0.425	1.099
Liquidity	504	1.763	2.871	0.075	1.035	47.625
Concentration	504	0.274	0.062	0.205	0.250	0.399

Note: Superscript a denotes the data after Z-score standardization, while superscript b denotes the original data.

Table 2. Pearson correlation analysis.

Variable	Service productivity	Profitability	Internal CSR	External CSR	Size	Growth	Leverage	Liquidity	Concentration
Service productivity	1.000								
Profitability	0.221***	1.000							
Internal CSR	0.377***	0.609***	1.000						
External CSR	0.192***	0.374***	0.632***	1.000					
Size	0.304***	0.215***	0.445***	0.415***	1.000				
Growth	0.109**	0.151***	0.046	0.033	0.028	1.000			
Leverage	−0.092**	−0.030	−0.072	0.165***	0.585***	0.095**	1.000		
Liquidity	0.201***	−0.002	0.108*	−0.049	−0.195***	−0.029	−0.484***	1.000	
Concentration	−0.003	−0.013	−0.015	0.014	0.147***	−0.034	0.019	−0.026	1.000

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

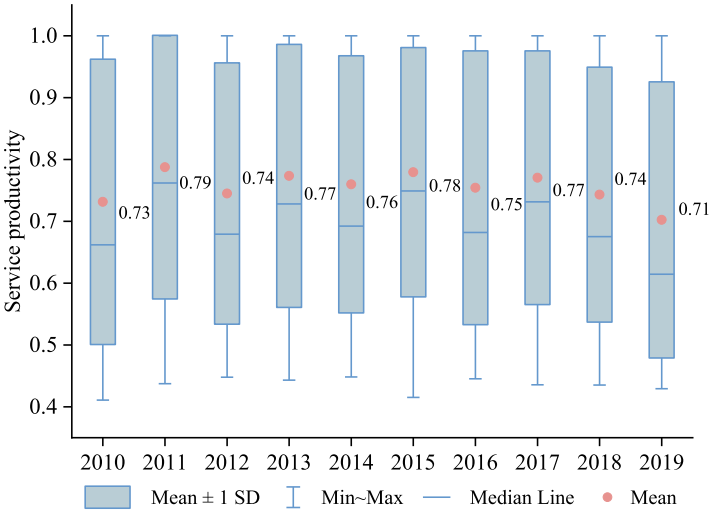

Figure 2. Box plot of service productivity over the study period.

0.147). Most of the correlation coefficients are not higher than 0.5. The results eliminate any concerns about a severe multicollinearity problem to some extent. Further, the variance inflation factor test, with values lower than the tolerance range of 10, demonstrates that the empirical models do not have a multicollinearity problem.

4.2 Results on service productivity

Figure 2 shows the distribution of service productivity of tourism firms over time. The average service productivity was 0.755, indicating that the resource allocation of firms was inefficient. Furthermore, the yearly average values fluctuate, as presented in Figure 2, and the distribution of service productivity is seriously right-skewed, indicating the potential for service productivity improvement.

Table 3 presents the quintile and average values of service productivity by different business types. The quintile is: the lowest (I), lower-middle (II), median (III), upper-middle (IV), and the highest (V). The average service productivity of airline service firms is highest (0.889), followed by film and live entertainment (0.833), and culture- and tourism-related real estate (0.804), while scenic spot and sightseeing (0.627), accommodation and catering (0.777), and travel agencies and exhibitions (0.755) have relatively low average service productivity. Firms dealing with scenic spots and sightseeing have the lowest mean service productivity, and the service productivity of those firms is as low as 0.411, with a median of 0.569.

Table 3. Service productivity by business type and quintile group.

Quintile group	Airline service	Scenic spot and sightseeing	Accommodation and catering	Travel agencies and exhibitions	Culture- and tourism-related real estate	Film and live entertainment
Lowest (I)	0.468	0.411	0.435	0.473	0.443	0.440
Lower-middle (II)	0.816	0.500	0.587	0.636	0.578	0.586
Median (III)	1.000	0.569	0.736	0.713	1.000	1.000
Upper-middle (IV)	1.000	0.691	1.000	1.000	1.000	1.000
Highest (V)	1.000	1.000	1.000	1.000	1.000	1.000
Average	0.889	0.627	0.777	0.755	0.804	0.833
Firm-year observations	50	141	119	55	78	61

Appendix C presents the inefficiency and benchmark analysis. Tourism firms with a higher inefficiency value (i.e. lower efficiency value) over the study period are selected as examples to carry out in-depth analysis. The source of inefficiency in service productivity mainly comes from input; that is, excessive resource input leads to low production efficiency. The benchmark and weight coefficient for each inefficient firm are provided to help them discover best practices. As shown in Table 4, slack movement and projection for each input and output indicator could help firms to manage and allocate their finite resources better and to improve their service productivity. For example, 000524.SZ should reduce its *labour*, *capital*, and *cost* inputs, as well as its undesirable output, i.e. *liability*, with no changes of desirable output, i.e. *income*; then it can be efficient. 300133.SZ and 000613.SZ can be regarded as benchmark best practices for 000524.SZ to improve its current operations.

4.3 Effects of internal and external CSR practices on performance

A two-way fixed-effects model was used for the panel regression. Table 4 presents the estimation results of the effect of internal and external CSR practices on tourism firms' performance. Models 1 and 2 are estimated based on this two-way fixed-effects (FE) model, while models 3 and 4 are estimated based on a random-effects (RE) model. H1 and H2 predict that internal (external) CSR practices positively (negatively) relate to tourism firms' service productivity, respectively. As shown in Table 4, Model 1 shows that internal CSR practices have a significant positive effect on service productivity ($\beta_1 = 0.030$, $P < 0.01$), which supports H1, but external CSR practices have no significant effects ($\beta_2 = -0.001$), which fails to support H2. The result is partially accord with previous study (Sun & Stuebs, 2013), which found that chemical industry's CSR practices has positive effect on firm productivity, measured by data envelopment analysis. In the tourism industry, service productivity and profitability are significant drivers of firm value, and productivity measured by asset turnover is deemed as a better predictor of long-term financial value than profitability (Poretti & Heo, 2022). The result verifies the significant role of tourism firms' CSR practices (internal rather than external one) on firm operational performance, i.e. service productivity.

H3 and H4 predict that internal (external) CSR practices positively (negatively) relate to tourism firms' profitability, respectively. Model 2 indicates that internal CSR practices significantly improve

Table 4. Estimates of internal and external CSR practices on performance.

Variable	Model 1 (FE) DV = *Efficiency*	Model 2 (FE) DV = *ROA*	Model 3 (RE) DV = *Efficiency*	Model 4 (RE) DV = *ROA*
Internal CSR	0.030***	0.075***	0.030**	0.082***
	(0.011)	(0.012)	(0.012)	(0.014)
External CSR	−0.001	−0.027**	−0.002	−0.030**
	(0.008)	(0.011)	(0.008)	(0.012)
Size	−0.003	−0.003	0.009	−0.007
	(0.023)	(0.009)	(0.017)	(0.008)
Growth	0.005**	0.001	0.005**	0.001
	(0.002)	(0.001)	(0.002)	(0.001)
Leverage	−0.154	0.027	−0.137	0.091
	(0.095)	(0.066)	(0.086)	(0.065)
Liquidity	0.003	−0.000	0.003	0.001
	(0.003)	(0.001)	(0.002)	(0.001)
Concentration	0.084	−0.397	−0.082	−0.293***
	(0.281)	(0.476)	(0.138)	(0.111)
Constant	0.936***	0.239	0.738***	0.151**
	(0.256)	(0.157)	(0.115)	(0.063)
Two-way fixed-effects	Yes	Yes	No	No
Number of firms	57	57	57	57
Observations	447	447	447	447
R-squared	0.289	0.256	0.148	0.184

Note: Robust standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

ROA ($\beta_1 = 0.075$, $P < 0.01$), in support of H3, but external CSR practices show negative effect on *ROA* ($\beta_2 = -0.021$, $P < 0.05$), which support H4. This finding is in line with previous study (Yoon & Chung, 2018), which found internal (external) CSR practices increase (decrease) restaurant firms' profitability. Airline firms' CSR practices shows a downward trend in profitability in the initial stage and then gradually increases in the long-term (Kuo et al., 2021). Consumer and community-related CSR practices negatively related to firm financial performance (Theodoulidis et al., 2017), which support the finding that external CSR practices show negative effect on *ROA*. The possible explanation could be that CSR investments in external stakeholders consume large cash outlays, without immediate and direct outcomes.

Models 3 and 4 (as a test of robustness) verify the main results of the above analysis. Furthermore, the results indicate that *Growth* has a significantly positive effect on service productivity ($\beta_4 = 0.005$, $P < 0.05$), which demonstrates that the growth rate of operating income could positively contribute to the improvement of service productivity. *Concentration* has a significantly negative effect on *ROA* ($\beta_7 = -0.293$, $P < 0.01$), which shows that market concentration and fierce competition could negatively relate to the improvement of *ROA*. To sum up, the results of the present main analysis show that: internal CSR practices positively relate to service productivity and profitability; external CSR practices negatively relate to profitability but have no significant effects on service productivity.

4.4 Effects of the specific dimensions of CSR practices on performance

Moreover, practitioners of tourism firms may be more curious about which detailed dimension of CSR practices can benefit the firm, and which rule they can follow to allocate their finite resources to best effect across the specific dimensions of CSR practices. Table 5 presents the estimation results for the specific dimensions of CSR practices on tourism firms' performance. It indicates that the segmentation of internal and external CSR practices reveals differences between the two. Models 5 and 7 show that meeting responsibilities to suppliers and customers, and the environment, can significantly improve service productivity, though those two dimensions relate to external CSR practices. It confirms the viewpoint that service productivity coincides with the service-dominant logic of adopting customers' perspective on productivity (Aspara et al., 2018). Models 6 and 8 indicate that meeting responsibilities to managers and employees has a significantly positive effect on *ROA*, although the role of manager responsibility seems more important given that the main purpose of any business is profit.

Most importantly, responsibility to society shows no significant effect on tourism firms' performance, which give tourism firms a dilemma over whether to focus on improving firm returns or on meeting social expectations. Though few studies have investigated the impact of firms being socially responsible on their financial and operational performance, the prominent influence of tourism

Table 5. Estimates for the specific dimensions of CSR practices on performance.

Variable	Model 5 (FE) DV = *Efficiency*	Model 6 (FE) DV = *ROA*	Model 7 (RE) DV = *Efficiency*	Model 8 (RE) DV = *ROA*
Manager	0.020*	0.054***	0.019*	0.058***
	(0.010)	(0.010)	(0.011)	(0.012)
Employee	0.018*	0.018**	0.018*	0.018**
	(0.009)	(0.008)	(0.010)	(0.009)
Supplier and customer	0.021***	0.005	0.022***	0.005
	(0.006)	(0.005)	(0.007)	(0.005)
Environmental	0.020***	0.003	0.021***	0.004
	(0.007)	(0.005)	(0.007)	(0.004)
Social	−0.007	0.001	−0.008	0.005
	(0.008)	(0.011)	(0.009)	(0.012)
Controls	Yes	Yes	Yes	Yes
Two-way fixed-effects	Yes	Yes	No	No
Number of firms	57	57	57	57
Observations	447	447	447	447

Note: Robust standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

activities on society are unquestionable (Moneva et al., 2020). Previous study shows that hotel and restaurant firms' CSR practice to local community has positive effects on financial performance (Inoue & Lee, 2011), which is contrary to the findings of this paper. However, this result is in line with previous study (Moneva et al., 2020), which found a neutral impact of firms being socially responsible on profitability. Those contradictions could be explained by the adoption of sample selections, methodological approach, and industry-specific interactions.

Related studies report inconsistent results concerning the effects of CSR practices on firm performance. Some studies suggest that CSR practices are an important driver of firm value realization, while others indicate that CSR will lead to the inappropriate allocation of firm resources and is not a cost-effective investment (Wang et al., 2016). In this paper, though external CSR practices have no significant effects on service productivity, investing in the specific dimensions (i.e. supplier and customer, and the environment) can also benefit firm operation. The possible explanation is that improving the satisfaction of supplier and customer and practicing environmental governance and qualification are beneficial for optimizing firm resources and improving productivity (Li et al., 2021), while income tax payment and charitable giving are not cost-effective investment in the short-run. Besides, responsibility to society shows no significant effect on firm financial and operational performance at least in the short-run, because CSR practices are usually deemed as long-term oriented.

4.5 Robustness check and further analysis

The research design reduces endogeneity concerns. First, the CSR rating system considers both the CSR reports and annual statements of each firm, rather than CSR reports only. Furthermore, the dataset from Hexun.com includes all listed tourism firms in China's stock market, which can help reduce selection bias. Second, we have controlled for as many firm- and industry-specific variables as possible. The unbalanced panel data model with fixed-effects is adopted to capture any unobserved heterogeneity and effects. Third, there is a time lag for the impact of CSR rating on service productivity and financial performance, and thus the empirical model of this paper treats the dependent variable with a one-stage lag. Fourth, the winsorizing method is used to mitigate the effect of outliers. Finally, a panel Tobit model was adopted as an alternative measurement model to check the robustness of empirical results, and the findings are consistent.

CSR practices that related to managers, employees, suppliers and customers, the environment, and society are sensitive to the availability of slack resources. Slack resources theory believes that firms with higher financial or operational performance can generate more favourable slack resources (Waddock & Graves, 1997), which benefits for the increasement of managers' flexibility and firms' strategic options (Shahzad et al., 2016) and also the investment of CSR practices. Therefore, a possible bidirectional relationship could appear between CSR practices and firm performance (Choi & Lee, 2018; Garay & Font, 2012). For example, economic conditions are crucial factors that affecting restaurant firms' investments to environmental and community projects (Lee et al., 2013). Table 6 shows the estimates of service productivity and profitability on CSR practices (i.e. overall, internal, and external CSR practices). The result indicates that service productivity and profitability are less likely to be the key driver of CSR practices in general, which is in line with the study of Moneva et al. (2020).

5. Conclusion and implications

5.1 Conclusions

The primary findings can be summarized as follows: Internal CSR practices exhibit a positive association with the service productivity and profitability of tourism firms. On the other hand, external CSR practices display a negative correlation with profitability while showing no significant impact on service productivity. Descriptive statistics reveal that tourism firms tend to perform more favourably in terms of internal CSR practices when compared to their performance in external CSR practices.

Table 6. Estimates of service productivity and profitability on CSR practices.

Variable	Model 9 (FE) DV = CSR	Model 10 (FE) DV = Internal CSR	Model 11 (FE) DV = External CSR	Model 12 (RE) DV = CSR	Model 13 (RE) DV = Internal CSR	Model 14 (RE) DV = External CSR
Service productivity	0.522	0.782**	0.312	0.251	0.540*	0.116
	(0.380)	(0.355)	(0.385)	(0.327)	(0.303)	(0.349)
Profitability	0.836	1.336	0.158	1.159*	1.503*	0.419
	(0.691)	(0.816)	(0.516)	(0.659)	(0.770)	(0.491)
Size	0.343***	0.326***	0.279***	0.281***	0.255***	0.226***
	(0.052)	(0.054)	(0.059)	(0.046)	(0.047)	(0.046)
Growth	−0.003	−0.000	−0.003	−0.002	0.001	−0.003
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Leverage	−0.718*	−1.147***	−0.149	−0.729*	−1.054***	−0.153
	(0.387)	(0.405)	(0.372)	(0.373)	(0.377)	(0.367)
Liquidity	0.010	0.026**	0.001	0.012	0.028**	0.004
	(0.010)	(0.011)	(0.010)	(0.010)	(0.011)	(0.009)
Concentration	−3.452**	−2.406	−3.421*	−1.647**	−1.427***	−1.482*
	(1.701)	(1.684)	(1.767)	(0.694)	(0.489)	(0.824)
Constant	−2.318***	−2.552***	−1.767**	−1.873***	−1.857***	−1.534***
	(0.622)	(0.771)	(0.717)	(0.333)	(0.378)	(0.309)
Two-way fixed-effects	Yes	Yes	Yes	No	No	No
Number of firms	57	57	57	57	57	57
Observations	447	447	447	447	447	447
R-squared	0.325	0.443	0.184	0.292	0.389	0.168

Note: Robust standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

This discrepancy can, in part, be attributed to the nature of the tourism industry, which heavily relies on human capital and emphasizes high-touch service. Internal CSR practices contribute to the enhancement of service productivity and profitability by improving employee productivity and service quality. Furthermore, given the substantial investments in fixed assets and extended capital recovery cycles within the tourism industry, the adoption of external CSR practices may potentially harm the profitability of tourism firms due to increased costs and resource depletion.

Fulfilling responsibilities to external stakeholders, including suppliers, customers, and environmental concerns, can significantly enhance service productivity. Moreover, meeting the obligations towards internal stakeholders, particularly employees, has a notably positive impact on profitability. However, fulfilling the firm's societal responsibilities does not exhibit a significant relationship with overall firm performance. Meeting the needs of customers and suppliers serves to reduce operational costs and liabilities, concurrently boosting operational revenue, thereby contributing to improvements in service productivity. Investments in environmentally-friendly equipment can facilitate more efficient production and operations, ultimately leading to enhanced service productivity.

5.2 Theoretical implications

First, this paper presents a comprehensive examination of the diverse effects of internal and external CSR practices, along with a detailed exploration of CSR practices directed at different stakeholders within the tourism industry. The findings underscore that actions aimed at internal stakeholders can be instrumental in enhancing both service productivity and profitability, which extends the understanding stakeholder prioritization (Tomasella et al., 2023). This paper is in line with the existing literature in the realm of human resources, which supports the idea that CSR practices can boost employee productivity while also yielding cost savings in training (Frank & Obloj, 2014; Youn et al., 2018). In contrast to previous research findings (Theodoulidis et al., 2017), our paper reveals that external CSR practices may not be as effective in enhancing service productivity and could potentially even have a detrimental impact on profitability. CSR practices, such as charitable donations, often involve substantial costs, and any potential benefits for the firm may not be immediately or

directly observable. Indeed, earlier studies in the field of CSR within the tourism industry have suggested that CSR practices related to external stakeholders, especially those concerning the social dimension, may not yield the desired results (Kang et al., 2010).

Second, this paper makes a valuable contribution to the field of service productivity management (Joppe & Li, 2016) by implementing an advanced benchmarking analysis approach tailored for tourism firms. The framework considers both efficiency and effectiveness as essential factors for effectively managing service productivity (Rust & Huang, 2012). In this paper, we introduce the concept of service productivity, defining it as the efficiency, or the process of 'doing things right,' involved in the provision of current service offerings. This involves the conversion of service input resources into stakeholder-value outputs (Rust & Huang, 2012). Beyond shedding light on the relationship between CSR practices and service productivity, the proposed benchmarking analysis approach can serve as a practical tool for practitioners (Sun & Stuebs, 2013), which is important for CSR practices of tourism firm. It enables them to diagnose potential impediments to the enhancement of service productivity.

Third, this paper explores the linkage between CSR practices and the performance of tourism firms, guided by the perspectives of stakeholder theory and the resource-based view. According to stakeholder theory, CSR practices can aid firms in cultivating relationships with a diverse array of stakeholders, thereby enhancing their overall performance (Jones et al., 2018). It underscores the importance of firms managing and prioritizing the interests of key stakeholders as a means to establish a competitive advantage (Tomasella et al., 2023). In parallel, the resource-based view posits that possessing rare, valuable, inimitable, and non-substitutable resources is essential for firms to fortify their competitive position (Branco & Rodrigues, 2006). Consequently, the relationship between CSR practices and service productivity highlights how considerations pertaining to internal and external stakeholders can influence the efficiency of resource allocation. This, in turn, can have a significant impact on firm performance and competitiveness.

5.3 Practical implications

First, internal CSR practices could be used as a lever to improve service productivity and profitability, and thus balancing the investments in internal or external or detailed dimensions of CSR activities should be of great concern to executives and managers. The type of CSR investments may depend on the primary aims of particular CSR practices as well as the operational and financial conditions of firms (Yoon & Chung, 2018). Investments in internal CSR practices, which relate to tourism firms' responsibilities to managers and employees, increase profitability. Investments in responsibilities related to suppliers and customers, and the environment, can support service productivity improvement, although external CSR practices related to the social dimension and its related stakeholders has no impact on tourism firms' operational and financial performance.

Second, the proposed inefficiency and benchmark analysis approach using the DEA technique can guide practitioners to optimizing management and service productivity for different business types. Firms whose business focuses on scenic spots and sightseeing (airline service) have the lowest (highest) average service productivity. This finding indicates that managing service productivity should consider the differences between business types. Furthermore, the source of inefficiency in service productivity mainly comes from inputs, in the form of excessive resource input leading to low production efficiency. Thus, targeting the benchmark firms, executives and managers can optimize their labour, capital, and cost inputs for inefficient firms by reducing slack. For example, if the investment on a specific dimension of CSR practices could help optimize resource input for the service operation, this type of investment strategy might be far-sighted.

Third, this paper suggests that executives and managers should reexamine the efficiency-effectiveness relationship under the service-oriented logic for tourism firms, because the effective resource-consuming practices (i.e. CSR practices) can optimize management and operational and financial performance. That is 'doing the right things' (tourism firms' social responsibility) can

promote the outcome of 'doing things right' (service productivity and profitability). Though CSR practices are cost-oriented investments, they can also serve as a firm strategy to attract the attention of stakeholders and develop intangible resources, such as firms' reputation among investors, customer satisfaction and loyalty. In addition, service productivity should be regarded not only as a measure of firm performance but also as a strategic decision variable (Rust & Huang, 2012).

5.4 Limitations and future research

This study suffers from the following limitations. First, this paper did not include other unobserved control factors that may affect firm performance. Traditional cultural values, characteristic firm governance mode, and other context-related variables could be introduced to investigate the association between CSR practices and firm performance. Second, this study explored the relationship between CSR practices and firm performance in the Chinese context, and thus could not provide cross-cultural comparisons. This study also has the limitation of using only listed firms, which may not represent the entire industry. Small and private firms could supplement the samples in future studies. Finally, this paper did not investigate the effects of CSR practices of different business types due to the restriction of sample size. Further research could analyze the role of business types on the relationship between CSR practices and firm performance.

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ORCID

Dongdong Wu http://orcid.org/0000-0002-9784-401X
Hui Li http://orcid.org/0000-0002-5822-2795

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Appendices

Appendix A. Listed tourism firms in China

Firm code	Business type	Firm-year observations	Firm code	Business type	Firm-year observations
000007.SZ	CT	2010–2019	300133.SZ	FL	2010–2019
000033.SZ	AC	2010–2013	300144.SZ	SS	2010–2019
000069.SZ	CT	2010–2019	300178.SZ	TE	2011–2019
000428.SZ	AC	2010–2019	300251.SZ	FL	2011–2019
000430.SZ	SS	2010–2019	600029.SH	AS	2010–2019
000524.SZ	TE	2010–2019	600054.SH	SS	2010–2019
000610.SZ	SS	2010–2019	600115.SH	AS	2010–2019
000613.SZ	AC	2010–2019	600138.SH	TE	2010–2019
000620.SZ	CT	2011–2019	600221.SH	AS	2010–2019
000721.SZ	AC	2010–2019	600258.SH	AC	2010–2019
000796.SZ	TE	2010–2019	600358.SH	AC	2010–2019
000802.SZ	FL	2010–2019	600555.SH	AC	2010–2019
000863.SZ	CT	2012–2019	600576.SH	FL	2010–2019
000888.SZ	SS	2010–2019	600593.SH	SS	2010–2019
000978.SZ	SS	2010–2019	600640.SH	AC	2010–2019
000979.SZ	CT	2010–2016	600706.SH	SS	2012–2019
002033.SZ	SS	2010–2019	600749.SH	SS	2010–2019
002059.SZ	SS	2010–2019	600754.SH	AC	2010–2019
002071.SZ	FL	2010–2018	601007.SH	AC	2010–2019
002146.SZ	CT	2010–2019	601021.SH	AS	2015–2019
002153.SZ	AC	2010–2019	601111.SH	AS	2010–2019
002159.SZ	SS	2010–2019	601888.SH	TE	2010–2019
002186.SZ	AC	2010–2019	603099.SH	SS	2014–2019
002306.SZ	AC	2010–2014	603103.SH	FL	2017–2019
002310.SZ	CT	2010–2019	603136.SH	SS	2017–2019
002485.SZ	CT	2010–2019	603199.SH	SS	2015–2019
002627.SZ	SS	2011–2019	603869.SH	CT	2016–2019
002707.SZ	TE	2014–2019	603885.SH	AS	2015–2019
300027.SZ	FL	2010–2019			

Note: AC means accommodation and catering, SS means scenic spot and sightseeing, TE means travel agencies and exhibitions, FL means film and live entertainment, CT means culture and tourism related real estate, and AS means airline service.

Appendix B. Hexun.com's CSR rating structure

First-level indicators	Secondary-level indicators	Tertiary-level indicators
Manager responsibility (30%)	A1. Profit (10%)	Return on equity (2%)
		Return on total assets (2%)
		The profit margin of main business (2%)
		Earnings per share (1%)
		Undistributed profit per share (2%)
		Cost profit margin (1%)
	A2. Debt payment (3%)	Quick ratio (0.5%)
		Liquidity ratio (0.5%)
		Cash ratio (0.5%)
		Ratio of shareholders' equity (0.5%)
		Asset liability ratio (1%)
	A3. Return (8%)	Dividend financing ratio (2%)
		Dividend yield (3%)
		The ratio of dividends to distributable profits (3%)
	A4. Information disclosure (5%)	Number of penalties imposed by the exchange on the company and relevant responsible persons (5%)
	A5. Innovation (4%)	Product development expenditure (1%)
		Technological innovation concept (1%)
		Number of technological innovation projects (2%)

(*Continued*)

Continued.

First-level indicators	Secondary-level indicators	Tertiary-level indicators
Employee responsibility (15%)	B1. Performance (5%)	Per capita income of employees (4%)
		Staff training (1%)
	B2. Safety (5%)	Security check (2%)
		Safety training (3%)
	B3. Staff care (5%)	Consolation consciousness (1%)
		Consolation staff (2%)
		Consolation money (2%)
Supplier and customer responsibility (15%)	C1. Product quality (7%)	Quality management awareness (3%)
		Quality management system certificate (4%)
	C2. After-sales service (3%)	Customer satisfaction survey (3%)
	C3. Honest and reciprocal (5%)	Fair competition of suppliers (3%)
		Anti-commercial-bribery training (2%)
Environmental responsibility (10%)	D. Environmental governance (10%)	Environmental protection awareness (2%)
		Environmental management system certification (2%)
		Environmental protection investment amount (2%)
		Number of types of pollution discharge (2%)
		Number of types of energy conservation (2%)
Social responsibility (30%)	E. Contribution value (30%)	Ratio of income tax to total profit (15%)
		Amount of public welfare donations (15%)

Note: In parentheses, the numbers are the weight of the corresponding items for the service industry; the table is compiled according to the description on Hexun's website.

Appendix C. Inefficiency and benchmark analysis

Firm code	Year	Inefficiency	Input inefficiency	Output inefficiency	Benchmark (Lambda)	Labour slack	Capital slack	Cost slack	Income slack	Liability slack
000524.SZ	2010	0.527	0.321	0.206	300133.SZ (0.944) 000613.SZ (0.056)	−1137.63	−439.73	−0.75	0.00	−109.54
002071.SZ	2011	0.536	0.367	0.169	300133.SZ (0.815) 300251.SZ (0.185)	−1444.83	−183.85	−160.54	0.00	−322.26
000428.SZ	2012	0.503	0.289	0.214	600754.SH (0.553) 002153.SZ (0.447)	−3563.03	−2686.97	−407.89	0.00	−4201.17
002159.SZ	2013	0.527	0.315	0.213	000613.SZ (0.644) 300133.SZ (0.356)	−1469.65	−634.62	−16.36	0.00	−694.82
002059.SZ	2014	0.505	0.317	0.188	002071.SZ (0.883) 002707.SZ (0.117)	−1662.34	−568.39	−74.18	0.00	−1468.49
000979.SZ	2015	0.531	0.298	0.232	300251.SZ (0.799) 600576.SH (0.201)	−1816.14	−361.45	−18.62	0.00	−13159.62
600706.SZ	2016	0.516	0.313	0.203	600576.SH (0.985) 601888.SH (0.015)	−3439.30	−782.87	−57.47	0.00	−724.35
600749.SH	2017	0.564	0.341	0.223	000007.SZ (0.966) 300144.SZ (0.034)	−596.20	−566.49	−40.55	0.00	−786.15

(*Continued*)

Continued.

Firm code	Year	Inefficiency	Input inefficiency	Output inefficiency	Benchmark (Lambda)	Labour slack	Capital slack	Cost slack	Income slack	Liability slack
000430.SZ	2018	0.530	0.315	0.215	600576.SH (0.635) 000613.SZ (0.365)	−959.80	−559.19	−30.01	0.00	−782.85
000978.SZ	2019	0.571	0.343	0.228	000613.SZ (0.988) 601888.SH (0.012)	−2245.14	−1162.19	−81.11	0.00	−1161.50

Note: Lambda means the weight coefficient of benchmark.