

Introduction

With the rapid development of the global tourism industry and the improvement of people's living standards, the environmental quality of tourist destinations has become a focal point of concern [1]. Particularly in China, a country rich in natural resources and profound cultural heritage, forest tourism has emerged as a distinctive form of travel [2]. In recent years, China's National Forest Parks, as representative carriers of forest tourism, have played a crucial role in promoting sustainable development through active initiatives to enhance the environmental conditions within the scenic areas. This paper aims to conduct an in-depth investigation into the experiences of China's National Forest Parks, exploring the relationship between scenic environmental improvement and the development of forest tourism. Forest tourism, as a sustainable form of travel, not only meets the demands of individuals for natural environments but also contributes positively to local economic and social development [3]. Therefore, gaining a thorough understanding and analysis of the catalytic role of scenic environmental improvement in driving forest tourism holds significant implications for guiding the future development direction of forest tourism and enhancing the sustainability of tourist destinations. Against the backdrop of global environmental conservation and the pursuit of sustainability in the tourism industry, the research outcomes of this paper are anticipated to furnish valuable theoretical and practical support for advancing the sustainable development of forest tourism and promoting the harmonious coexistence of tourism and the natural environment.

Literature Review

In the examination of the impact of environmental improvement on tourism development, the academic community presents three primary viewpoints that have significantly informed this dissertation. The summation of these three perspectives is elucidated below.

Firstly, some studies posit that environmental improvement can foster the growth of the tourism industry [4-7]. This perspective underscores that by enhancing the aesthetic quality of the scenic environment and improving service facilities, it becomes possible to attract a greater number of tourists, elevate visitor satisfaction, and thus establish a robust foundation for the sustainable development of the tourism sector. Scholars have observed that a favorable enhancement in the environment not only provides a more enjoyable experience for tourists but also stimulates interest in the chosen tourism destination [8]. By augmenting the aesthetic value of the area and improving the quality of natural landscapes, visitors are more inclined to select the destination as their preferred travel choice [9]. Furthermore, researchers emphasize that positive

word-of-mouth generated by improved services and enhanced visitor experiences can attract additional potential tourists, creating a virtuous cycle [10]. Therefore, through continuous environmental improvement, the tourism industry can achieve sustainable growth, fostering prosperity in regional tourism. This theoretical perspective provides a robust foundation for this study and offers valuable guidance for future strategic development in tourist destinations.

Secondly, some researchers propose an alternative viewpoint, suggesting that environmental improvement may have negative consequences for tourism development, necessitating restrictive measures to preserve sustainable environmental enhancement [11-13]. The essence of this perspective lies in accentuating the crucial balance and sustainability required between environmental conservation and tourism industry growth. In practice, certain regions have implemented a series of restrictive measures to safeguard the long-term health of natural environments [14, 15]. These measures include controlling the number of visitors to prevent ecological damage caused by excessive footfall, reducing development activities to maintain environmental health, preventing the depletion of natural resources, and disrupting ecological balance [16]. This viewpoint calls for heightened societal awareness regarding environmental conservation, emphasizing that the development of the tourism industry should occur within the parameters of not compromising the integrity of the natural environment [17]. By limiting visitor numbers and curtailing development activities, effective protection of the scenic environment can be achieved, ensuring its sustainability and ecological balance [18]. The pursuit of this equilibrium aims to realize the sustainable development of the tourism industry, allowing it to harmoniously coexist with the environment over the long term [19]. This perspective contributes essential background information for this study, shedding light on the potential negative impacts of environmental improvements on tourism development and prompting a nuanced examination of the relationship between tourism development and environmental conservation. The key challenge in practical policy formulation and management lies in striking a balance between the demands of the tourism industry and the health of the environment.

Thirdly, another group of scholars underscores the uncertainty surrounding the impact of environmental improvements on the economic development of tourism [20-23]. While environmental improvement may stimulate growth in tourism in certain aspects, its overall impact on the economy may be intricate and variable [24]. This viewpoint challenges the simplified understanding of the relationship between environmental improvement and the tourism industry, emphasizing the necessity for more in-depth research to comprehensively understand the comprehensive effects of environmental improvement on tourism. Researchers supporting this viewpoint contend that

the approval duration on forest parks cannot be ignored. Forest parks established earlier not only possess superior natural and cultural endowments compared to parks established later but also receive more policy and financial support. Therefore, the establishment of forest parks may affect various environmental improvements and their tourism development. Additionally, the size of the forest park area may also influence its tourism development; larger parks have more development potential but are constrained by financial limitations, potentially weakening the environmental improvements and services they can provide. In the second column, establishment time and park area variables are included. Due to limitations in publicly available information, data for these variables was only found for national forest parks, resulting in varying degrees of missing data for other parks. Including these variables in the estimation would lead to sample selection bias, focusing mainly on national forest parks, and a reduction in sample size, excluding nearly 50% of the samples. Furthermore, the significance and coefficients of the key independent variables did not fundamentally change; only the biodiversity indicator variable shifted from insignificant to significant, with an increased coefficient. Therefore, to balance forest park structure and sample richness, the baseline model results in Tables 1 and 2, the first column, are considered the reference for subsequent heterogeneity analysis, robustness tests, etc.

Furthermore, considering the potential lag in the impact of environmental improvements within parks on forest tourism and to alleviate possible reverse causation biases, columns 3 and 4 in Tables 1 and 2 lag the four types of environmental improvement variables by one period. The regression results indicate that the impact of soil quality in the previous period on the current forest park tourism income and tourist numbers remains insignificant. In contrast, the impact of air quality and water quality indicators in the previous period on the current forest park tourism income and tourist numbers is significantly positive at the 1% significance level, with positive coefficients. This to some extent reflects that, after entering the forest park, forest tourists do not highly depend on modern soil quality indicators but prefer improvements in air quality and water quality indicators. The impact of the previous period's biodiversity indicator variable on the current forest tourism income and tourist numbers is significantly positive at the 1% level. These results indicate a certain lag in the impact of environmental improvements within the park on tourism income and tourist numbers. However, the coefficients and significance levels of the four key environmental improvement variables have not fundamentally changed, suggesting a relatively reliable baseline estimate and minimal risk of reverse causation bias.

The fixed effects results of the baseline model indicate that, overall, the soil quality indicator has no significant impact on tourism income or the number of visitors to forest parks. In contrast, the air quality

and water quality indicators exhibit significant effects on both tourism income and visitor numbers in forest parks. Additionally, the biodiversity indicator shows a significant positive impact only on the number of visitors. Why, then, is the soil quality indicator not significantly influencing forest tourism? The impact of forest tourism is a complex process influenced by various factors, and soil quality represents just one element in this multifaceted equation. Its impact may be relatively minor, making it difficult to stand out significantly in the overall effects. Other environmental factors could play more crucial roles in shaping the tourist experience and attractiveness of the tourism site, diminishing the significance of soil quality. Visitor behavior and management measures are also critical factors influencing forest tourism. For instance, visitors may concentrate their activities within a certain range, making them less directly affected by the soil quality.

Moreover, effective management measures could mitigate the potential negative impact of soil quality on visitor activities. Forest soils may possess some adaptability to certain types of visitor activities, thereby alleviating the adverse effects of soil quality on tourism. Certain soil types might better withstand the pressures exerted by visitor activities, making the impact of soil quality less pronounced in the overall picture. In summary, for forest tourism, air quality emerges as the most pivotal factor influencing tourism income and visitor numbers, followed by water quality and biodiversity indicators. The soil quality indicator, however, does not exhibit a significant impact on tourism income and visitor numbers in forest parks.

Heterogeneity Analysis

From the perspectives of the natural, cultural, and historical dimensions of the facilities provided by forest parks and the tourism resources and services offered, national forest parks demonstrate a significant superiority over provincial-level parks, while provincial parks are notably superior to city/county-level parks. Hence, different levels of forest parks exhibit evident heterogeneity. Theoretically, such heterogeneity may result in varying impacts of environmental improvement on tourism revenue and visitor numbers across different levels of forest parks. Moreover, due to the vast geographical diversity in China, regional disparities between different forest parks may also be pronounced. Furthermore, within the same level of forest parks, variations across different regions may be substantial. Given the significance and representativeness of national forest parks, this section focuses only on the differences among national forest parks in different regions. Based on the results of the baseline model mentioned earlier, this section explores the heterogeneity effects of environmental improvement on forest tourism across different levels of parks and regions.

The regression results in Table 3 report the impact of the quantity of environmental improvement on forest

county-level forest parks are only statistically reported in a few provinces, with most provinces lacking statistical data for these parks. Additionally, county-level forest parks are relatively undeveloped compared to provincial-level parks in terms of area, landscape quality, cultural and historical resources, forest resources, and environmental improvement. These county-level forest park samples only constitute 3.75% of the entire sample. The regression results, reported in Table 6, align closely with the baseline scenario.

Furthermore, to mitigate the impact of outliers in the environmental improvement variables on regression results, we excluded the top and bottom 0.5% of samples for each environmental improvement variable. The regression results, also presented in Table 6, indicate that the research findings remain largely unchanged.

Finally, considering concerns about potential endogeneity issues arising from reverse causality in control variables, all control variables were lagged by one period. The regression results, reported in Table 6, show no substantial differences from the baseline scenario. The robustness test results affirm the reliability of the research findings.

Conclusion

Forest tourism has emerged as a vital sector in China's forestry, embodying a sunrise industry, green enterprise, wealth generator, and a beloved contributor to public health and happiness. As the primary entities driving forest tourism, the effective promotion of stable and rapid development in forest tourism parks is an urgent and essential concern.

Utilizing data from forest parks spanning 2016 to 2022, coupled with macro-level data from their respective cities, we constructed a unified integrated panel dataset. The study employed forest park tourism revenue and the number of tourists received as key indicators to assess forest tourism development, investigating the impact of four types of environmental improvements on forest tourism. The main conclusions of this study are as follows: Soil quality indicators exhibit no significant influence on forest tourism revenue and attendance; air quality and water quality indicators demonstrate a significant positive impact on both tourism revenue and attendance; biodiversity indicators significantly positively affect the number of tourists but have no impact on tourism revenue. The influence of different environmental improvements on forest tourism revenue and attendance manifests distinct heterogeneity across parks of different grades and regions, emphasizing the need for differentiated strategies.

The policy implications derived from our research are as follows:

Prioritize improvements in air and water quality: The results underscore the significant positive impact of air and water quality on forest tourism revenue and

attendance. Therefore, government and management authorities can intensify efforts to enhance and protect the air and water quality surrounding forest parks. Measures may include reducing sources of pollution, strengthening environmental monitoring, and advancing ecological protection and restoration projects.

Focus on biodiversity conservation: Given the significant positive impact of biodiversity indicators on the number of tourists, policies encouraging and supporting ecological conservation projects can be implemented to facilitate the recovery and maintenance of biodiversity within forest parks.

Consider heterogeneity factors: The results highlight the influence of disparities among parks of different grades and regions on the relationship between environmental improvement and forest tourism. Policymakers should factor in these heterogeneity elements when formulating policies, adopting differentiated strategies to more effectively drive the development of forest tourism.

Strengthen attention on national forest parks: Considering the significant differences in the impact of different environmental improvements on tourism revenue and attendance at national forest parks, targeted attention from the government can be intensified. Through policy support and investment guidance, further development of the tourism industry in national-level forest parks can be encouraged.

These policy implications provide valuable guidance for decision-makers, facilitating the optimization of forest tourism development strategies, enhancing the attractiveness and competitiveness of forest parks, and promoting the sustainable development of the tourism industry.

Comprehensive Reflection on Results and Future Directions

The findings from this research shed light on the intricate interplay between environmental improvements and forest tourism. Going beyond the immediate policy implications, they prompt a more profound reflection on the sustainable development of forest tourism and future research trajectories.

Implications of the Results

The observed disparities in the impacts of environmental improvements emphasize the need for policies tailored to the specific characteristics of different forest parks. While air and water quality improvements emerge as paramount, the positive influence of biodiversity on tourist numbers signals an opportunity for ecological conservation initiatives.

Potential Future Research Directions

Temporal Dynamics: Investigate how the influence of environmental improvements on forest tourism

