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Recreational Visit to Suburban Forests during the COVID-19 Pandemic: A Case Study of Taiwan

Yung-Chih Chen ^{1,2}, Frank C. Tsai ^{3,*}, Ming-Jer Tsai ^{2,4} and Wan-Yu Liu ^{1,5} 

- ¹ Department of Forestry, National Chung Hsing University, 145 Xingda Rd., South Dist., Taichung City 40227, Taiwan; yungchihchen@ntu.edu.tw (Y.-C.C.); wylu@nchu.edu.tw (W.-Y.L.)
 - ² The Experimental Forest, National Taiwan University, 12, Sec. 1, Qianshan Rd., Zhushan Township, Nantou County 55750, Taiwan; tmj@ntu.edu.tw
 - ³ Hospitality and Tourism Management, Slippery Rock University of Pennsylvania, 1 Morrow Way, Slippery Rock, PA 16057, USA
 - ⁴ School of Forestry and Resource Conservation, National Taiwan University, 1, Sec. 4, Roosevelt Rd., Taipei 10617, Taiwan
 - ⁵ Innovation and Development Center of Sustainable Agriculture, National Chung Hsing University, 145 Xingda Rd., South Dist., Taichung City 40227, Taiwan
- * Correspondence: frank.tsai@sru.edu

Abstract: COVID-19 global pandemic has caused massive disruption of travel behaviors along with other aspects of human life, such as social distancing, staying at home, and avoiding crowds. People substituted outdoor activities for indoor activities, and the forest environment has become a popular alternative. Taiwan has a high population density, but it had few COVID-19 confirmed cases in 2020 during the first wave of the COVID-19 pandemic. No forest areas have been closed due to the COVID-19 outbreak. In light of this generally increased demand for suburban forests for recreational uses, the current COVID-19 pandemic situation poses specific challenges regarding forest use, management, and policy. This study integrates visitation numbers of the popular forest recreation area and selects the unblocking index and social distancing index as the COVID-19 index to capture the impacts of forest recreation area on the COVID-19 outbreak in Taiwan. The results show both COVID-19 indices have high explanatory power for suburban forest visitation and both have a significant impact on the number of visitors. Although the number of visitors to suburban forests decreased during the COVID-19 pandemic alert, it bounced when the COVID-19 outbreak was under control. This study provides a brief overview of management implications for recreational visits during COVID-19. We posed an early warning to forest managers for greater revenue traveling post-COVID-19.

Keywords: visitation; outdoor recreation; coronavirus; revenue travel; Xitou



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1. Introduction

The COVID-19 pandemic was caused by SARS-CoV-2, a new coronavirus with similar characteristics to Severe Acute Respiratory Syndrome (SARS) [1]. The ongoing COVID-19 pandemic situation has posed a significant effect on the tourism industry globally [2–4]. Tourism destinations have embraced emergency health care measures and restrictions imposed on human movement around the world. It also creates social, economic, and political crises in the infected territories [5–7]. Uncertainty surrounding vaccine availability and uptake, along with the fact that this virus rapidly circulates throughout the world and mutates. People's perceptions of the risks posed by tourism activities, and change their willingness to pay for reducing the public health risk associated with tourism activities [8]. Most countries have implemented COVID-19 lockdowns, border closures, and other essential health measures to slow down the spread of COVID-19. Beaches and resorts were almost empty as COVID-19 crushed the tourism industry, peoples' movements were stopped, and traveling between territories was strictly controlled.

As COVID-19 erupted in Asia during the early phase, traveling decisions rely on pre-travel evaluations heavily. This continues to be a key determination and must incorporate the assessment of the level of risk to an individual traveler to either manage or reduce the risk of travel [9]. The travelers may decide to either delay or cancel their trips along with the spread of COVID-19 updates simultaneously [10].

In Taiwan, the first confirmed imported COVID-19 case was found on 21 January 2020, with a cumulative total of 799 confirmed cases and 7 deaths as of 31 December 2020, as announced by the Taiwan Central Epidemic Command Center (CECC) (Figure 1). Taiwan's government and residents have gained experience from the SARS epidemic in 2003, and have prepared for potential outbreaks or any state emergency since then. This experience gained helps the government implement a multifaceted strategy during the early stages of the COVID-19 outbreak in 2020.

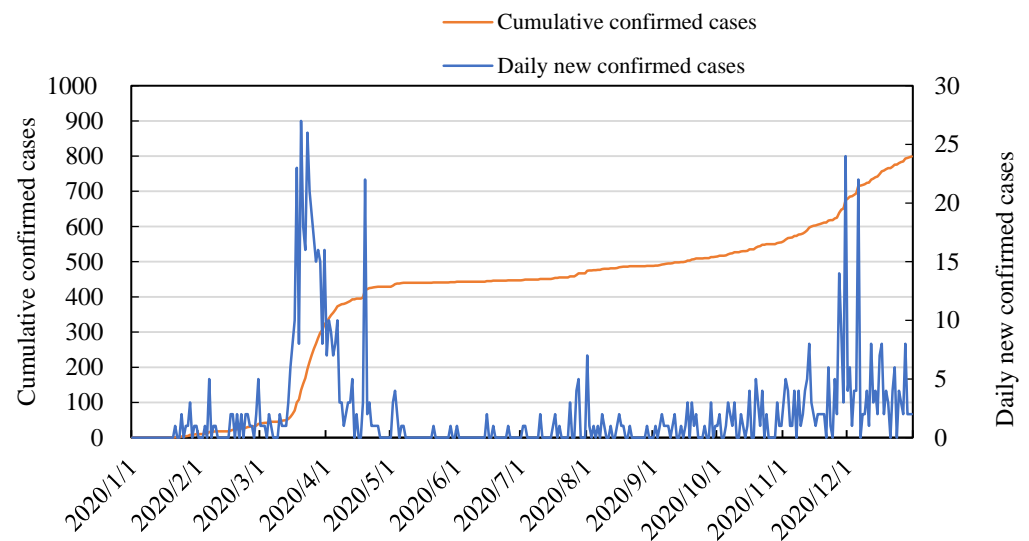


Figure 1. COVID-19 confirmed cases in Taiwan in 2020.

Revenge travel is a type of travel behavior that people do after getting fed up with the lockdown [11]. It is also an extension of the 1980s concept of revenge spending, coined when consumer spending exploded in China as it emerged from restrictions [12]. When the COVID-19 outbreak slowdown, people tend to have a strong desire to travel, and the tourism industry may usher in a rebound growth, in a “retaliatory” manner [13,14]. In the summer of 2020, Taiwan's government promoted tourism through the “Stimulus Vouchers” scheme and “Safe to Travel” subsidies, encouraging domestic travel and rejuvenating the economy. As a result, many tourist attractions in Taiwan were overcrowded and traffic congestion occurred, which seemed to be revenge travel. Travelers are more likely to come and see travel as a gift, traveling more to make up for canceled trips as restrictions ease [15]. As the COVID-19 pandemic continues, domestic travel is relatively safe with fewer restrictions [16]. With the easing of pandemic protocols, an explosion of domestic tourism has rebounded to the brunt of the COVID-19 pandemic. Many outdoor attractions have become popular tourist destinations for revenge travelers.

The factors' impact on visitation is many and complicated [17]. These factors include transportation accessibility, seasonality, weather, economic environment, travel duration, and epidemic [18–22]. Tourist arrivals also indicate the popularity of a tourist destination and reflect the effectiveness of facility and operational management [23]. Pichlerová et al. in [24] further indicated that forest accessibility is a paramount factor affecting the number of forest visits both before and during the COVID-19 pandemic from a study in Slovakia.

The most popular outdoor destinations are national parks in America. Visitation to national parks in 2019 exceeded 300 million recreation visits for the fifth consecutive year. In 2020, the National Park Service welcomed 237 million recreation visits, which was

90 million visits less or a 27.6% decrease compared to the number before the COVID-19 pandemic in 2019. The decrease was largely due to temporary park closures implemented in response to the coronavirus pandemic [25]. In Europe, Schägner et al. in [26] estimated that 449 national parks attract over two billion visitors with a total of EUR 14.5 billion in economic contribution annually. The COVID-19 pandemic led many European countries to impose lockdown measures to limit people's movement, where strict lockdown restrictions were imposed, and a reduction in visitor numbers was initially observed. Particularly, Taiwanese residents prefer to go to forest recreation areas. There are 22 forest recreation areas, and none of these parks were closed due to the COVID-19 outbreak in Taiwan. Without the lockdown restrictions imposed by the Taiwan government, the number of recreational visitors did not decrease significantly in 2020, and even some areas had higher recreational tourists than expected.

A comparison of forest visitor numbers and distribution before and during the COVID-19 lockdown in Bonn, Germany, showed that there was a significant increase in forest visitations, and visitor patterns drastically shifted from an even distribution throughout the day with small peaks before and after office hours to a culmination in the late afternoon [27]. From a global-scale analysis, the frequency of visits to urban parks was much higher during COVID-19 when compared to the pre-pandemic baseline [28]. This fully highlights the growing popularity of forest environments during the epidemic, which can provide urban residents with healthy and safe outdoor leisure places and green infrastructure. Thus, these parks provide residents with environmental, social, psychological, and health functions and ecological services [29,30]. Suburban forests have received renewed attention for their vital and irreplaceable functions, clearly beneficial to human public health as well as social well-being during the health crisis and the global virus pandemic [31,32].

The COVID-19 outbreak had a hugely adverse effect on the tourism industry in Taiwan. The sudden downturns in the tourism industry and the revenge travel behaviors impacted tourist destinations from different aspects. Forest visitation changed during the COVID-19 pandemic, but the nature of this change is different from country to country. Taiwan is an island country with a high population density. In addition, the value and importance of domestic forest recreation have become more prominent when the government applied border closures. However, no scientific research has been conducted in examining the impact of the COVID-19 outbreak on visitors to suburban forests. To fill this gap, this study planned to collect visitor data in evaluating how forest recreation area visitation numbers were affected during the COVID-19 outbreak by the Unblocking index and Social distancing index through variance test and regression analysis. It also explored appropriate indicators and models to assess how the number of tourists in forest recreation areas was affected by the outbreak of COVID-19. In addition to that, this study also addressed the role of suburban forests during the COVID-19 pandemic, and how to properly manage forest recreation areas to meet the needs of urban residents.

2. Literature Review

Numerous studies have shown that visitation numbers can be affected by many factors. A typical visitation number analysis may be categorized into visitation in either long-term trends or short-term changes. The long-term trend refers to ongoing changes in visitation numbers, while short-term changes consider unexpected events that impact visitation numbers, such as natural disasters (i.e., earthquakes, typhoons, or mudslides) and major epidemics [23]. Natural disasters often cause severe property damage and casualties; as time passes, the influence degree of natural disasters on the scenic spot will descend to zero, based on the regional and temporal characteristics of natural disasters, while the economic impact of the natural disaster on the scenic spot could be expressed by the decrease in annual visitors [17]. An empirical study showed that the relationship between the factors and tourism demand is time varying. Dining, attractions, and shopping have a driving effect on tourism demand, and simulative factors: transportation, tours, and lodging hinder the growth of tourism demand and are thus baffling factors [33]. Furthermore, the

month was the most important predictor of visitor numbers, followed by the exchange rate, temperature, precipitation, holidays, and media coverage in Swiss national parks [34]. Short-term perturbations, such as epidemic diseases, natural disasters, civil strife, and economic crises can negatively affect tourism development in either the short or long term [35]. The effects of such events on tourism are usually immediate and extreme, and its recovery could become a long-term pattern of growth [36]. The time required for full recovery from tourism affected by a crisis depends on the nature of the disturbance as well as the specifically affected tourism system [37].

In Taiwan, the visitation number of national parks were affected by income, the national population, the national senior population, inbound visitor, climate change, and the events held by the national parks [38]. However, Taiwanese prefer to go to the forest recreation areas in the suburban forest for outdoor recreation. There are 18 forest recreation areas in Taiwan under the Forestry Bureau, 2 are managed by the Veterans Affairs Council, and 2 are under the Ministry of Education. Among them, the most popular forest recreation areas are Xitou Nature Education Area, Alishan National Forest Recreation Area, Taipingshan National Forest Recreation Area, Wuling National Forest Recreation Area, and Aowanda National Forest Recreation Area. During the last decade, the Xitou Nature Education Area has maintained its popularity and gained stable growth in visitor numbers, and has attracted over two million visitors annually since 2017 (Figure 2).

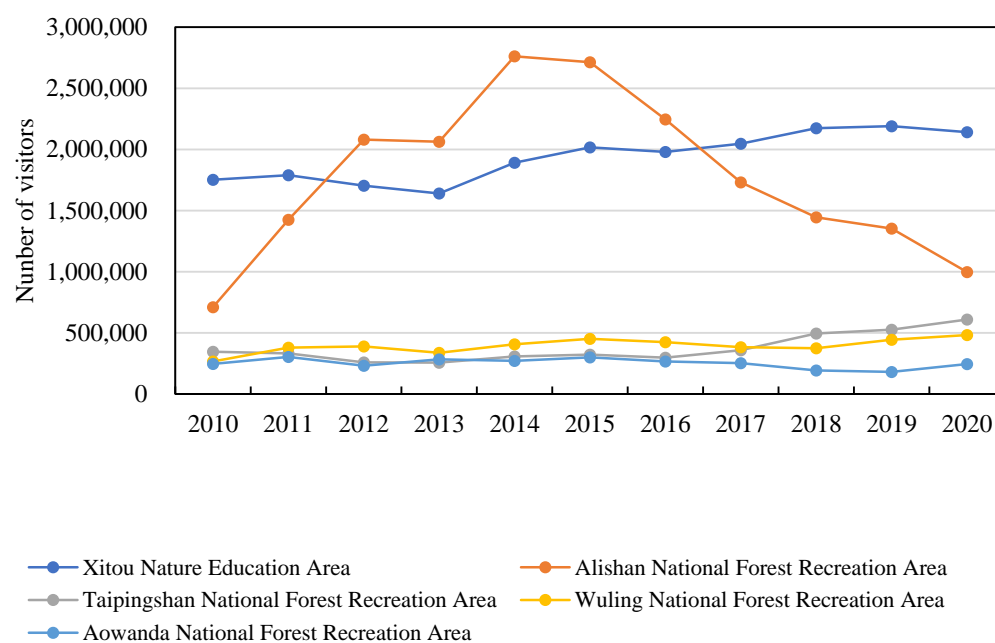


Figure 2. Visitation numbers of top five forest recreation areas in Taiwan (source: Taiwan Tourism Bureau Statistics and Xitou Nature Education Area).

The number of holidays each month and the average monthly rainfall was considered to be related to recreational visits to the Xitou Nature Education Area, which were positive and negative correlations, respectively [39]. Another Xitou Nature Education Area case study shows refreshment, local culture, and involvement positively influenced the word-of-mouth intention of visitors. Additionally, hedonism, local culture, and involvement significantly positively influenced the revisit intention of visitors [40]. There were several severe typhoons and major earthquakes that struck central Taiwan between 1996 and 2005. These natural disasters damaged visitation numbers dramatically in the area, and Xitou had an estimated decrease of 530 thousand visitation numbers over three years by Typhoon Herb; a 2.59 million losses in visitation numbers caused by the Chi-Chi earthquake over seven years; a 360 thousand decline in visitation numbers over three years by Typhoons Toraji and Nari; and an 80 thousand visitation number drop over one year by Typhoon

Mindulle [23]. The catastrophic events had a significant effect on the visitors to Alishan, Sun Moon Lake, and Xitou with an average impact of 55.75% from 1999 to 2000. The impact was greater in the 1999 earthquake as the epicenter was closer, with the recovery period of visitation numbers being about two to nine years [17].

The epidemic greatly affected people's life, work, and travel during the SARS outbreak, while impacting people's inclination to travel, their preference for leisure activities, and concern for public hygiene [41]. The SARS epidemic created a significant negative impact on tourism development in China. Tourism's lack of resistance but high resilience to short-term crises provides tourism and regional planning challenges [42]. People tried to avoid crowded areas, while the outdoor attractions provided alternatives for different activities [43]. Rural tourism in the Czech Republic increased by 20% in the first half of 2020, with the COVID-19 outbreak instead creating an opportunity for the development of rural tourism [44]. Pichlerová et al. in [24] revealed that the number of forest visits increased during the COVID-19 pandemic as compared to the pre-pandemic period.

Kuo et al. in [45] stated that tourist arrivals decreased significantly in SARS-affected countries, but no significant effect was observed in Avian Flu-affected countries in Asia. Likewise, McAleer et al. in [22] also concluded that SARS has a worsened negative impact compared to Avian Flu's impact on tourist arrivals. Tourist arrivals in Taiwan were severely impacted by the SARS outbreak, and the island's inbound arrivals have not yet fully recovered after Taiwan's withdrawal from the SARS travel advisory list by the WHO [46]. Inbound tourism from Japan was devastated by the crisis, particularly during the first 5 months after the SARS outbreak [47]. Moreover, it took many stages for travelers from Japan, Hong Kong, and the U.S. to regain confidence in Taiwan [48]. The World Tourism Organization expected a decrease of 74% in international tourist arrivals in 2020 compared to 2019. This would mean that international tourism would have returned to levels 30 years ago. While demand for international travel remains subdued, domestic tourism is strengthening the recovery in several large markets such as China and Russia [49,50].

Visitation to green spaces is a common COVID-19 coping strategy promoted by state and national public health officials and political leadership [28]. Forests have long been reservoirs for human health and well-being, and the COVID-19 pandemic reaffirmed that visitor experiences in the woods provide these essential services [27]. After reopening from the initial closure of national parks in the U.S. followed by the COVID-19 pandemic, visitation numbers to national parks almost immediately rebounded [51]. National parks in the U.S. are recording visitation levels that exceed pre-pandemic levels, and some reopening national parks saw such high demand that they immediately shut down due to traffic congestion [52].

In the early days of the COVID-19 outbreak, a study estimated the impact of COVID-19 from the SARS experience and pointed out that travel restriction is the most influencing factor for the number of tourist arrivals, and the number of COVID-19 confirmed cases had a significant negative impact on tourism demand, in which a 1% COVID-19 case increase results in a 0.075% decline in tourist arrivals. Thus, a decline of approximately 110 arrivals for every additional person infected by the coronavirus [53]. Moreover, according to [54], as an island country, Taiwan may need to plan for multiple additional interventions (e.g., screening and quarantine) to raise the probability of remaining pandemic free or slowing down the pandemic. In addition to the experience of SARS in 2003, Taiwan took speedy responses, proactive deployments, closing borders early, and tightening travel regulations; other factors included rigorous contact tracing, technology-enforced quarantine, and widespread mask-wearing [55].

Regardless of the type of negative shocks, it is commonly believed that the COVID-19 pandemic would decrease tourism demand, tourist arrivals, tourist departures, tourism receipts, and tourist expenditures. Landry et al. in [56] quantified the effects of the COVID-19 pandemic on outdoor recreation trip behavior and economic value in the U.S. The study suggested that the pandemic had negative effects on recreation visits and values, with an approximately 26% reduction in trips per participant to outdoor recreation sites

post-COVID-19, as compared to pre-COVID-19 trips. It also showed a decrease in annual consumer surplus per outdoor recreation participant of about 19% to 26%, which can be attributed to post-COVID-19 reductions in outdoor recreation site quality related to COVID-19 perceived risks and restrictions. Thus, even though people may be visiting public outdoor recreation sites during the ongoing COVID-19 pandemic, the quality of their experience appears to be somewhat diminished. The study further estimated the reduction in consumer surplus per outdoor recreation participant of about USD 424 annually. In another study in Vermont, USA, during the COVID-19 restriction period, Grima et al. in [32] assessed the importance of urban and peri-urban forests and other natural areas to people living in and around the city of Burlington and indicated that 69.0% of the respondents had increased their visitation rates to natural areas and urban forests, and 80.6% of respondents considered these areas to be important, and had access to them.

When discussing the impact of the COVID-19 pandemic on travel demand, questionnaires were often used to ask respondents hypothetical questions to explore the impact of the COVID-19 outbreak on people's travel behavior, as can be seen in the aforementioned studies. Using COVID-19-related factors, such as the number of confirmed cases and the number of deaths, as variables to explore the number of visitors to tourist destinations is often misleading and cannot fully reflect the current epidemic situation. The College of Public Health of National Taiwan University proposed an unblocking index to evaluate both the COVID-19 disease burden and the medical resource capacity captured by the number of recovery and case fatality rates of COVID-19. The index increased for a sustained outbreak with increased COVID-19 cases and unmet medical needs aroused by these cases. Therefore, this situation required strict social distancing policies [57]. Remuzzi and Remuzzi in [58] alerted that European countries should avoid close contact at the individual level and social meetings in each country. This is the only effective way to contain the spread of this virus. Taiwan National Center for High-performance Computing developed a social distancing index using data from Johns Hopkins University and Taiwan's Ministry of Health and Welfare. The index considered the number of new confirmed cases per day and the spread of the virus in the past 15 days, which can better reflect the current epidemic situation [59].

In the event of natural disasters and the fear of encountering danger or catching a disease generally changes tourists' travel behaviors and negatively impacts the tourism industry. The 2004 Indian Ocean tsunami was one of the deadliest disasters in modern history, tsunami waves rolled over coastlines in Thailand, India, and Sri Lanka, killing tens of thousands. The massive drop in international tourists resulted in only a 50% recovery in tourism six months after the tsunami [60]. The adverse effects of the outbreak of SARS on the tourism industry were found by [61,62]. Page et al. in [63] used a model assessing the impact of the swine flu pandemic (H1N1) on inbound tourism demand in the UK and confirmed the existence of significant negative impacts. That being said, the negative effects of the COVID-19 pandemic on tourists need to be verified.

3. Methods

3.1. Study Site

The Xitou Nature Education Area is located in a valley alongside Feng-Huang Mountains in Lugu Township, Nantou, Taiwan. The area of Xitou is 2349 ha., with altitudes ranging from 800 to 2000 m, an intense humidity ranging from 88 to 93%, and an annual average temperature is 16.6 °C (the monthly temperature ranges from 11 to 28 °C) [64]. Xitou Nature Education Area is a university experimental forest, controlled and managed by the College of Bio-Resources and Agriculture, National Taiwan University (NTU). It was turned into a forest recreation area in 1970 [40]; it offers great natural resources and environmentally friendly services for tourists such as ecological guided tours, environmental education, forest therapy programs, food and beverage, and accommodation services [65]. Its visitor arrivals have grown since first opened in 1970, and has attracted over two million visitors annually in recent years. With its well-organized, well-maintained landscape, good logistics system,

outdoor recreation facilities, and cool climate, Xitou Nature Education Area has gained a reputation as the most popular forest recreation area in Taiwan [66] (Figure 1).

3.2. Data Collection

This study integrates COVID-19 case information and Xitou Nature Education Area visitor data to analyze the effects of the COVID-19 pandemic on recreation visits. A set of secondary data, Xitou Nature Education Area visitation numbers, was obtained from the Experimental forest, College of Bio-Resources and Agriculture, NTU; data regarding COVID-19 cases were acquired from Taiwan Centers for Disease Control (Figure 1). The monthly visitation numbers of national recreation areas were obtained from the Taiwan Tourism Bureau. Daily data from January 2020 to December 2020 were used to assess the impact of the COVID-19 outbreak on Xitou Nature Education Area recreation visits. Only the months from March to December were used in analyzing the number of monthly visitors. Since 2020 is a leap year, and the Chinese New Year long holiday could be in January or February in different years, the data from January to February were excluded.

3.3. Data Analysis

The number of Xitou Nature Education Area visits is considered as the measurement of tourism demand in this study. This study selected two indexes as indicators of the COVID-19 pandemic, one is the “unblocking index” proposed by Chen [57], which is the cumulative number of confirmed cases in the country divided by the number of recovered cases multiplied by 1 minus the case fatality rate (the number of deaths divided by the number of confirmed cases), and finally minus 1. The unblocking index at time t can be derived by Equation (1), where c represents confirmed cases and r and d denote the recovery cases and deaths at time t , respectively. Ideally, the above ratio would reach 1 when all confirmed cases have recovered without death. Therefore, the unblocking index would be close to zero after subtracting 1, indicating that the area has fully recovered from the COVID-19 outbreak and can return to normal status. If the unblocking index is greater than 1, it is still necessary to maintain social distancing. Otherwise, it is recommended to unblock. The other is the “social distancing index” proposed by the Taiwan National Center for High-performance Computing [59], which is the cumulative number of new confirmed cases in Taiwan for the last fifteen days before a certain date multiplied by a coefficient, which is fifteen minus the date of the day plus one and then totally divided by fifteen. As shown in Equation (2).

$$\text{Unblocking index} = \left[\frac{ct}{rt \times \left(1 - \frac{dt}{ct}\right)} \right] - 1 \quad (1)$$

$$\text{Social Distancing Index}_{\text{date}} = \sum_{i=1}^{15} \text{new confirmed cases}_{(\text{date}-i+1)} \times \frac{(15-i+1)}{15} \quad (2)$$

To identify the contributions of variables, a linear regression analysis model was established. As shown in Equation (3).

$$Y = \beta_0 + \beta_1 X_i + \varepsilon_i \quad (3)$$

where Y represents the number of visitors per month/week and denotes the dependent variable; β is the constant value, X is a critical variable with a magnitude among the variables affecting visitor count ($i = 1, 2$), and (1) Unblocking index, (2) Social distancing index; ε is a residual error ($i = 1, 2$).

Descriptive data were presented and a regression modeling, and paired sample *t*-test analysis were used for significance testing using SPSS Statistics 22 (IBM Corporation, Armonk, NY, USA). A *p*-value less than 0.1 was considered significant.

4. Results

4.1. Data Trends

To provide some preliminary insights into further analysis, descriptive statistics of the selected variables were summarized. According to data from the Taiwan Centers for Disease Control (Figure 1), the number of newly diagnosed cases daily increased rapidly from March 2020 to May 2020. Observed by the two COVID-19 indexes, it was also found that March and May were the peaks of the COVID-19 pandemic in Taiwan. After June, the COVID-19 epidemic relatively slowed and stabilized (Figure 3).

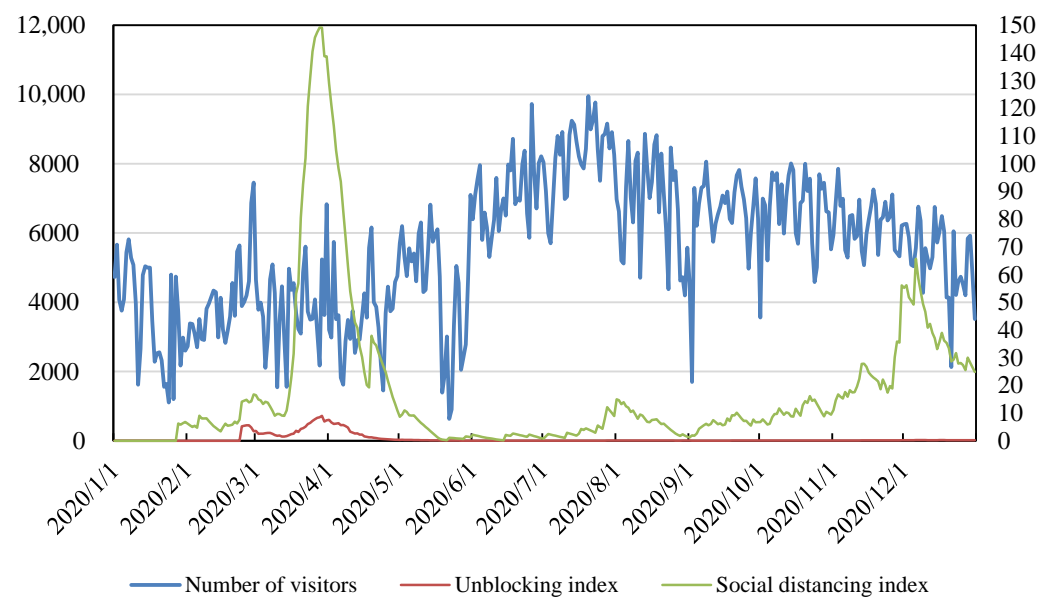


Figure 3. Visitation numbers of Xitou Nature Education Area and COVID-19 index in 2020. Note: Restrict social distancing on 1 April, ease restrictions on April 30, revitalize subsidies on 15 July, and strengthen prevention on 1 December.

Most of the confirmed cases were imported from inbound travelers, and no domestic confirmed cases were found during the period studied. Comparing the monthly visitation numbers of the Xitou Nature Education Area during the COVID-19 pandemic in 2020 to the same months in the past 3 years, this study found that the degree of decrease falls between 0.2% in December and 54.4% in April, while the number of visitors from June to November in 2020 has a positive growth (Table 1).

Table 1. Comparison of visitation numbers to top five forest recreation sites between average of last 3 years and 2020 in Taiwan (source: Taiwan Tourism Bureau Statistics and Xitou Nature Education Area).

| Recreation Sites | | Jan | Feb ¹ | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|--------------------|---------|------------------|----------|----------|---------|---------|---------|--------|--------|--------|---------|---------|
| Xitou Nature Education Area | Number of visitors | −6085 | 13,000 | −23,084 | −58,586 | −37,065 | 50,819 | 34,443 | 19,500 | 3106 | 6038 | 11,606 | −290 |
| | Ratio | −5.0% | 12.0% | −19.2% | −54.4% | −26.2% | 23.1% | 13.0% | 8.9% | 1.6% | 2.8% | 6.1% | −0.2% |
| Alishan National Forest Recreation Area | Number of visitors | −41,818 | −51,364 | −103,246 | −140,699 | −73,166 | −23,392 | −10,342 | 5909 | −1745 | −9084 | −30,201 | −33,459 |
| | Ratio | −35.5% | −36.7% | −45.8% | −79.5% | −72.0% | −26.8% | −8.7% | 5.2% | −2.2% | −8.0% | −26.7% | −27.7% |
| Taipingshan National Forest Recreation Area | Number of visitors | 5067 | −1676 | −5551 | −11311 | −2738 | 11,038 | 18,529 | 44,754 | 16,157 | 32,524 | 28,643 | 13,615 |
| | Ratio | 16.4% | −3.9% | −21.6% | −34.5% | −9.2% | 33.7% | 35.5% | 95.4% | 47.7% | 70.6% | 63.6% | 32.9% |

Table 1. Cont.

| Recreation Sites | | Jan | Feb ¹ | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|--------------------|--------|------------------|---------|--------|-------|--------|-------|-------|-------|--------|--------|-------|
| Wuling National Forest Recreation Area | Number of visitors | 363 | 29,542 | −12,219 | −9467 | −1215 | 10,588 | 8994 | 9262 | 5339 | 11,988 | 20,344 | 7985 |
| | Ratio | 1.2% | 32.3% | −25.9% | −41.0% | −8.3% | 65.3% | 29.9% | 34.4% | 31.0% | 48.4% | 48.9% | 22.0% |
| Aowanda National Forest Recreation Area | Number of visitors | −7209 | −822 | −1351 | −549 | 341 | 677 | 8489 | 6255 | 2046 | 5746 | 16,309 | 6738 |
| | Ratio | −31.4% | −4.3% | −17.7% | −8.8% | 8.0% | 11.2% | 95.2% | 95.1% | 35.9% | 36.7% | 40.8% | 10.3% |

Note: ¹ It was a leap year in 2020.

4.2. Regression Analysis

The results of linear regression analysis are presented in Table 2. The coefficient of the unblocking index and social distancing index is reported in a negative value, which showed that the COVID-19 epidemic had a negative impact on the number of visitors. After adjustment, the regression correlation coefficient is 0.501 in the unblocking index and monthly visitors, and 0.329 in weekly visitors. Further, the regression correlation coefficient is 0.297 in the social distancing index and monthly visitors, and 0.17 in weekly visitors. The explanatory power of this model reached 50.1%, 32.9%, 29.7%, and 17.0% with a Durbin–Watson value of 1.653, 0.755, 1.147, and 0.613, respectively. The numerical value is close to two, which indicates that there is no relative correlation between the residuals. Furthermore, the regression analysis results were further used in residual analysis to determine the difference between the observed dependent variable and the estimated values (see Table 3). The results demonstrate that when the residual scores are standardized, the overall mean is 0, the standard deviation is 1, and the standardized residual values are between −2.717 and 2.012, which indicates that this regression model possesses a considerable amount of explanatory power.

Table 2. The impact of the unblocking index and social distance index on the visitation.

| | Total Number of Visitors | Coefficient | t Value | R ² | Adjusted R ² | Significance | DW Value |
|-------------------------|--------------------------|-------------|---------|----------------|-------------------------|--------------|----------|
| Unblocking index | Monthly data | −881.888 | −3.325 | 0.551 | 0.501 | 0.009 *** | 1.653 |
| | Weekly data | −526.012 | −4.799 | 0.344 | 0.329 | 0.000 *** | 0.755 |
| Social distancing index | Monthly data | −51.15 | −2.286 | 0.367 | 0.297 | 0.048 ** | 1.147 |
| | Weekly data | −25.208 | −3.192 | 0.188 | 0.170 | 0.003 *** | 0.613 |

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

Table 3. Linear regression residuals statistics.

| | Total Number of Visitors | | Minimum Value | Maximum Value | Mean | Standard Deviation | Number |
|-------------------------------|-----------------------------|---------------------------|------------------|------------------|-------------|-----------------------|--------|
| Unblocking index | Monthly data | Predictive value | 89,019.289 | 200,666.266 | 178,340.000 | 38,042.946 | 11 |
| | | Residuals | −55,314.004 | 63,854.754 | 0.000 | 34,322.230 | 11 |
| | | Standard predictive value | −2.348 | 0.587 | 0.000 | 1.000 | 11 |
| | | Standard residuals | −1.529 | 1.765 | 0.000 | 0.949 | 11 |
| | Weekly data | Predictive value | 15,452.257 | 43,890.598 | 40,686.174 | 6537.216 | 46 |
| | | Residuals | −24,830.416 | 18,386.439 | 0.000 | 9035.751 | 46 |
| | | Standard predictive value | −3.860 | 0.490 | 0.000 | 1.000 | 46 |
| | | Standard residuals | −2.717 | 2.012 | 0.000 | 0.989 | 46 |
| Social distancing index | Monthly data | Predictive value | 117,610.453 | 205,251.969 | 178,340.000 | 31,050.908 | 11 |
| | | Residuals | −79,563.539 | 63,065.953 | 0.000 | 40,756.869 | 11 |
| | | Standard predictive value | −1.956 | 0.867 | 0.000 | 1.000 | 11 |
| | | Standard residuals | −1.852 | 1.468 | 0.000 | 0.949 | 11 |

Table 3. Cont.

| Total Number of Visitors | | Minimum Value | Maximum Value | Mean | Standard Deviation | Number |
|--------------------------|---------------------------|---------------|---------------|------------|--------------------|--------|
| Weekly data | Predictive value | 20,904.895 | 43,929.949 | 40,686.174 | 4836.037 | 46 |
| | Residuals | −25,014.949 | 18,838.615 | 0.000 | 10,049.514 | 46 |
| | Standard predictive value | −4.090 | 0.671 | 0.000 | 1.000 | 46 |
| | Standard residuals | −2.461 | 1.854 | 0.000 | 0.989 | 46 |

4.3. Revenge Travel

Compared to other countries, Taiwan has a smaller number of COVID-19 confirmed cases, while the impact on the tourism industry is greater with reinforced border closure to international travelers. In contrast, the impact of domestic tourism in Taiwan is quite small. Along with the monthly COVID-19 confirmed cases, the COVID-19 pandemic had two severe peaks in Taiwan: (1) from March to May; and (2) December in 2020. The results showed COVID-19 confirmed case numbers had a significant negative impact ($p < 0.1$) on the visitation numbers compared to the average visitation numbers from the previous three years at the Xitou Nature Education Area from March to May 2020. On the other hand, after the first severe peak, the COVID-19 pandemic slowed down, and the domestic traveling restrictions loosened in Taiwan. The results also showed that there is a significant increase ($p < 0.05$) in visitation numbers between June and December 2020 compared to the same period from the previous three years' data at the Xitou Nature Education Area (Table 4).

Table 4. Difference analysis of visitation numbers to Xitou Nature Education Area in recent years.

| | | Mean | Standard Deviation | t Value | p |
|---------|--------------|------------|--------------------|---------|----------|
| Mar–May | Past 3 years | 162,894.67 | 17,896.54 | −3.833 | 0.062 * |
| | 2020 | 123,316.33 | 17,156.94 | | |
| Jun–Dec | Past 3 years | 192,684.57 | 22,831.22 | 2.536 | 0.044 ** |
| | 2020 | 210,573.43 | 30,660.63 | | |

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

Traveling abroad is the most popular travel choice for Taiwanese residents. In 2019, Taiwan had 17 million outbound travelers. With the outbreak of the COVID-19 pandemic, overseas travel was restricted and Taiwanese were trapped in their hometowns within the island. After three months of severe restrictions due to the COVID-19 pandemic, people minimized the chance of going out and maintained social distancing. As the COVID-19 epidemic slowed down, Taiwan's Centers for Disease Control introduced incentives for safe travel to promote domestic travel.

Looking at the monthly number of visitors during the 2020 epidemic, we compared the number of visitors in the same month for the past three years who went to the top five popular forest recreation areas. This study found that the number of visitors in the period from March to April had negative growth, with a decrease of 8.8 to 79.5%, and the number of visitors in August 2020 had positive growth, with an increase of 5.2 to 95.4% (Table 1).

When comparing the overall number of visitors in 2020 to the number of visitors from the past three years, Alishan National Forest Recreation Area had negative growth, while the other four forest recreation areas all showed positive growth. This was because Alishan's visitors mainly relied on foreign tourists in the past, and it was negatively affected by the COVID-19 epidemic. Excluding the Alishan National Forest Recreation Area, the number of visitors rebounded between June and November in 2020 in the other four forest recreation areas (Table 1). Thus, domestic revenge travel boomed in most of Taiwan's suburban forests.

5. Discussion

5.1. COVID-19 and Forest Recreation

Suburban forests and green spaces provide people with the effects of reducing mental stress, improving sleep quality, reducing the risk of depression and anxiety and anti-social behavior, stimulating human natural killer cells, and improving personal adaptability and management capabilities [67–70]. The benefit of forest recreation has become more prominent during the COVID-19 pandemic, which includes a wide range of material and non-material benefits to local residents, also known as ecosystem services. In addition, political deliberation of forests may lead to a strategic coalition among the policy domains of forestry and public health. Many factors affect the number of visitors at a tourist destination. The long-term trend of changes in visitations can usually be predicted by socio-demographic factors such as income, population composition, and the number of inbound tourists. However, sudden and unusual events often result in short-term changes in visitations. Derks et al., Geng et al., Grima et al., and Kupfer et al. in [27,28,32,51] showed six popular national parks in the United States as an example, the visitation of the national parks fell sharply in the early days of the COVID-19 outbreak when compared with visitation numbers in 2019. As restrictions eased, and people were allowed to resume enjoying the benefits of outdoor recreation, the visitor numbers returned to 2019 levels by late summer and early fall in 2020.

People's interest in national parks in the early days of the COVID-19 pandemic varied considerably across countries. While tourists' interest in national parks declined in most countries, it increased in Finland [71]. In countries with severe COVID-19 outbreaks, daily increases in confirmed cases were inversely correlated with park visits. For countries with milder outbreaks, neither the daily increase in confirmed cases nor the government's response was associated with park visitor numbers [28]. In the early stage of the pandemic, the epidemic was well managed in Taiwan compared to other countries under the impacts of COVID-19. The Taiwan CECC implemented specific measures aiming at COVID-19 such as facial coverings and social distancing in public areas, and implementing health and safety protocols to keep guests and staff safe in hotels and tourist destinations.

Taiwan residents had a difficult time practicing their routine leisure or recreational activities after the Taiwan government declared a state emergency and suspended most tourism activities in March 2020 followed by the COVID-19 pandemic. As a result, both international and domestic travels were either canceled or minimized, employees faced pay cuts and layoffs, and facial coverings and social distancing were reinforced in public areas. Many hospitality and tourism businesses ceased operations almost completely, except for those essential businesses. In particular, some tourist attractions, mainly for foreign tourists, experienced the hardest hits of COVID-19, such as the Alishan National Forest Recreation Area (Table 1). That said, natural tourism using the forest environment has become a healthy travel option trusted by Taiwan residents. The number of visitors to suburban forests mainly for recreational purposes began to rebound when the COVID-19 epidemic slowed down (Tables 1 and 4). Such crowds bring many operational challenges to forest recreation areas, with forest management services trying to slow down the spread of the coronavirus.

5.2. Revenge Travel and Suburban Forests

Most countries started reinforcing specific measures and protocols to tackle this deadly virus when the COVID-19 pandemic hit. One thing that was prevalent in most government policies was social restrictions and other restrictions involving travel, dining, and gatherings [72]. The restrictions forced people from all areas of life to stay at home, or at least minimize social interactions and physical contact [3,16]. This often leads to boredom, depression, and a sense of isolation from friends and family, which further distresses people psychologically and physically [11,12].

Evidence indicates that the psychological impacts of the quarantine experience, including loss of routine, could exacerbate stress and depression, and increase the need for

outdoor activities [28,73]. Thus, more people went outdoors or to forest recreation activities and stayed longer while social gathering restrictions were reinforced. There were more people flocking to tourist destinations compared to pre-COVID-19 to catch up with things they missed during the lockdowns. Most people planned to travel within two months of the COVID-19 epidemic slowing down, and their first trip tended to be a short visit to a domestic recreation forest area with family members [74,75]. At the beginning of the opening-up phase, tourists are more likely to come from metropolitan areas or regions with a closer distance, and as time goes by, these recreation forest areas should attract tourists who live farther away [51], which has been confirmed by this study. The distance between the suburban recreation forest areas and the city and a destination's accessibility will affect the mechanism of attracting tourists.

Of the five most popular forest recreation areas in Taiwan, the Xitou Nature Education Area's visitation numbers mostly depend on domestic visitors [39,66], either before or during the COVID-19 pandemic. From 2010 to late 2019, the visitation numbers were growing at a stable rate annually in Xitou (Figure 2). However, as the pandemic reached the region and an increasing number of confirmed cases in March and April 2020, visitor arrivals at Xitou Nature Education Area dropped by nearly 20% in March and another fall of more than 50% in April 2020, compared to the average visitation numbers from the previous three years (Table 1).

The administration of Xitou is different from the management approaches in other forest recreation areas in Taiwan. Although COVID-19 has negatively impacted the tourism market, Xitou remained strong on its overall visitation numbers. It has only 2% less in 2020 compared to its visitation number in 2019. Xitou has fewer policy subsidies for tourism revitalization, and the number of tourists in Xitou grew from June to November in 2020. However, the tourist growth rate in Xitou is not as high as that of the forest recreation area under the Forestry Bureau. This may be because of the substitution effect of the forest recreation areas; tourists prefer to travel to the subsidized forest recreation areas. In addition, due to the social distancing protocol in place, Xitou had fewer visitors taking public transportation and coaches, while there were more visitors who went by car in 2020 when the COVID-19 outbreak slowed down. This forced forest recreation area managers to turn their large vehicle parking lots into small vehicle parking spaces to solve the problem. Revenge travel has been reported in India, the U.S., and other countries [11], while we have not seen the taillights of the COVID-19 pandemic.

Forest recreation is one of the important functions of forest resources, and tourists' demand for forest recreation is growing gradually. Forest managers also need to be proactive and continue to attract tourists from different directions to ensure financial sustainability [76]. Crowding and congestion within popular tourist destinations have long been a persistent problem; however, there are no boundaries for what the recreation forests can offer and the capability of those green spaces [52]. When COVID-19 restrictions are eased, travelers may go easy or even forget about COVID-19 measures, and asymptomatic or mildly ill confirmed cases may spread among the population, and such travel is high risk [13]. Balancing forest recreation areas' supply and demand is also an important goal of forest management, while forest owners, administrations, and managers have the opportunity to proactively plan and communicate with societies about the multiple benefits of forest resources.

6. Implications and Conclusions

Epidemics are short-term shock events [23,35]. Chiou et al. and Bar-On in [23,35] further indicated that short-term shocks will decrease as the incident ends and time passes, and will finally return to the levels before the incident. However, the COVID-19 pandemic has been around since 2020, and it is known as the longest-lasting global outbreak in history. Although COVID-19 vaccines have been unveiled, the virus has not completely disappeared. More and more studies tend to believe that COVID-19 is a permanent impact on the tourism industry [77,78], and the New Normal is going to dominate our daily routine.

The Taiwan government and residents suffered and learned from the SARS epidemic in 2003. The CECC of Taiwan was established with a transparent strategy to keep all parties aware of any outbreaks, and it stipulated the required measurements in responding to the uncertainties of the COVID-19 epidemic. This approach has become one of the most successful and the best practices globally in 2020. The Chief Accounting Office of the Executive Yuan also announced that Taiwan's economic growth rate in 2020 is as high as 2.98%, which is higher than expected. That said, it also leads all developed countries in the world and shows that Taiwan's epidemic protocols in slowing down the first wave of COVID-19 pandemics were successful.

After May 2020, the COVID-19 outbreak slowed down in Taiwan, and hospitality and tourism businesses followed the CECC's guidelines for their operations and kept their staff and tourists safe and away from the virus. The Xitou Nature Education Area also adapted to the new normal and developed alternative solutions to regain visitors' confidence as well as recommendations for a sustainable and resilient recovery from the COVID-19 outbreak. Along with the Taiwan government's promotion of domestic tourism, reactivating the economy and recognizing the importance of access to leisure lifestyles for everyone after a few months of being locked down are the two main focuses. Therefore, domestic tourism has grown strongly as its cost has been reduced thanks to the "Triplicate Stimulus Coupons" and "Safe to Travel" mechanism, which has benefitted the domestic tourism industry. The adoption of self-isolation measures also increases the demand for visiting an outdoor tourist destination such as the Xitou Nature Education Area. In July 2020, it set a new historical high record in visitation numbers for a single month in the 50 years since the opening of the Xitou Nature Education Area. The results of this study confirmed the conclusion by [56] and also showed that if the short-term shock events are prolonged, people will be overly suppressed. Combining the results of this study and [79], it is suggested that there will be greater revenge travel and economic growth in the post-COVID-19 world. Once the rebound occurs, it is further expected to return to the level before the epidemic.

In the era of the COVID-19 pandemic, people still wish to engage in outdoor recreational activities, especially activities in suburban forest areas. In addition to the open ventilation environment, spending time in nature and forests appears to be beneficial for human health [80], such as enhancing immune functioning, promoted by various compounds and microorganisms contained in the forest air [67]; reducing the occurrence of anxiety [69]; and stress reduction [70]. Through the measurement of medical instruments, the efficacy of the forest is proved in a scientific option, which is known as "forest therapy", which mainly uses the forest ecosystem services to innovate projects that specifically target their participants [81]. This can relieve stress and facilitate mental relaxation, maintain human physical and mental health, and hope to achieve the goal of disease prevention [68,69]. Studies have pointed out that short-term travel to the forest can promote the activation of natural killer cells, help boost immunity, and have the potential to promote immune function health effects.

The total cost of health risks caused by the COVID-19 pandemic is exceptionally high [82]. If the pandemic lasts for a long time, it may bring down the entire medical system. Thus, there should be more effort made to address the health and well-being of humans. In the forest environment, Phytoncide and negative air ions can regulate the autonomic nervous system, relax and improve immunity through endocrine activities, and promote human health. It is the concept that prevention is more important than treatment to achieve the goal of preventive healthcare, and the convenience of suburban forests provides the best place for urban citizens. Continued closures or restrictions on the use of green spaces or suburban forest areas may lead to a greater revenge travel rebound during the COVID-19 era. This study suggests that forest management policymakers and practitioners may consider imposing a social distance diversion for visitors and promoting personal health and hygiene when entering a forest recreation area. Forest managers can also achieve the result of diverting visitors from business and sales strategies, such as offering discounted tickets during off-peak times. This not only alleviates the peak hours

of travelers' visits, but it also reduces the risk of COVID-19 risk for visitors. In the post-COVID-19 era, forest recreation services should take tourism needs, safety, and health of visitors into consideration, which is a new trend in recreation forest management.

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References

1. Zhu, N.; Zhang, D.; Wang, W.; Li, X.; Yang, B.; Song, J.; Zhao, X.; Huang, B.; Shi, W.; Lu, R.; et al. A novel coronavirus from patients with pneumonia in China, 2019. *N. Engl. J. Med.* **2020**, *382*, 727–733. [CrossRef] [PubMed]
2. Chang, C.L.; McAleer, M.; Wong, W.K. Risk and financial management of COVID-19 in business, economics and finance. *J. Risk. Insur.* **2020**, *13*, 102. [CrossRef]
3. Gössling, S.; Scott, D.; Hall, C.M. Pandemics, tourism and global change: A rapid assessment of COVID-19. *J. Sustain. Tour.* **2020**, *29*, 1–20. [CrossRef]
4. Škare, M.; Soriano, D.R.; PoradaRochoń, M. Impact of COVID-19 on the travel and tourism industry. *Technol. Forecast. Soc. Change* **2021**, *163*, 120469. [CrossRef]
5. Chakraborty, I.; Maity, P. COVID-19 outbreak: Migration, effects on society, global environment and prevention. *Environ. Sci. Technol.* **2020**, *728*, 138882. [CrossRef] [PubMed]
6. Chang, C.L.; McAleer, M.; Ramos, V. The future of tourism in the COVID-19 era. *Advances in Decision Sciences. Adv. Decis. Sci.* **2020**, *24*, 218–230.
7. Wang, L.E.; Tian, B.; Filimonau, V.; Ning, Z.; Yang, X. The impact of the COVID-19 pandemic on revenues of visitor attractions: An exploratory and preliminary study in China. *Tour. Econ.* **2021**, *28*, 153–174. [CrossRef]
8. Qiu, R.T.; Park, J.; Li, S.; Song, H. Social costs of tourism during the COVID-19 pandemic. *Ann. Tour. Res.* **2020**, *84*, 102994. [CrossRef]
9. Wilson, M.E.; Chen, L.H. Re-starting travel in the era of COVID-19: Preparing anew. *J. Travel Med.* **2020**, *27*, taaa108. [CrossRef]
10. Uğur, N.G.; Akbiyık, A. Impacts of COVID-19 on global tourism industry: A cross-regional comparison. *Tour. Manag. Perspect.* **2020**, *36*, 100744. [CrossRef]
11. Choudhary, N.; Manda, V.K. Revenge travel or the road less traveled? Opting for a suitable option in pandemic times. *Int. J. Adv. Innov. Res.* **2021**, *8*, 37–45.
12. Revenge Travel is the Phenomenon That Could Bring Back Tourism with a Bang. Available online: <https://www.washingtonpost.com/travel/2020/07/29/revenge-travel-is-phenomenon-that-could-bring-back-tourism-with-bang/> (accessed on 27 May 2022).
13. Girish, V.G. COVID-19 pandemic and the emergence of revenge travel. *Int. J. Cult. Tour. Hosp. Res.* **2021**, *35*, 125–129. [CrossRef]
14. Wassler, P.; Fan, D.X. A tale of four futures: Tourism academia and COVID-19. *Tour. Manag. Perspect.* **2021**, *38*, 100818. [CrossRef] [PubMed]
15. Oktaviani, D.; Sutisna, D. An analytical study of the readiness of eco-tourism based transactions in the mount Putri Bandung (Indonesia) tourism area. *Rev. Int. Geogr. Educ. Online* **2021**, *11*, 229–234.
16. Kuščer, K.; Eichelberger, S.; Peters, M. Tourism organizations' responses to the COVID-19 pandemic: An investigation of the lockdown period. *Curr. Issues Tour.* **2022**, *25*, 247–260. [CrossRef]
17. Lee, Y.F.; Chi, Y.Y. Natural disaster impact on annual visitors of recreation area: The Taiwan case. *Int. J. Econ. Manag. Eng.* **2013**, *7*, 2715–2719. [CrossRef]
18. Hui, T.K.; Yuen, C.C. A study in the seasonal variation of Japanese tourist arrivals in Singapore. *Tour. Manag.* **2002**, *23*, 127–131. [CrossRef]
19. Cho, V. A comparison of three different approaches to tourist arrival forecasting. *Tour. Manag.* **2003**, *24*, 323–330. [CrossRef]
20. Taylor, T.; Ortiz, R.A. Impacts of climate change on domestic tourism in the UK: A panel data estimation. *Tour. Econ.* **2009**, *15*, 803–812. [CrossRef]
21. Albalade, D.; Bel, G. Tourism and urban public transport: Holding demand pressure under supply constraints. *Tour. Manag.* **2010**, *31*, 425–433. [CrossRef]
22. McAleer, M.; Huang, B.W.; Kuo, H.I.; Chen, C.C.; Chang, C.L. An econometric analysis of SARS and Avian Flu on international tourist arrivals to Asia. *Environ. Model. Softw.* **2010**, *25*, 100–106. [CrossRef] [PubMed]
23. Chiou, C.R.; Huang, M.Y.; Tsai, W.L.; Lin, L.C.; Yu, C.P. Assessing impact of natural disasters on tourist arrivals: The case of Xitou nature education area (XNEA), Taiwan. *Int. J. Tour. Sci.* **2013**, *13*, 47–64. [CrossRef]
24. Pichlerová, M.; Önkál, D.; Bartlett, A.; Výboštok, J.; Pichler, V. Variability in forest visit numbers in different regions and population segments before and during the COVID-19 pandemic. *Int. J. Environ. Res. Public Health* **2021**, *18*, 3469. [CrossRef] [PubMed]

25. National Parks Hosted 237 Million Visitors in 2020. Available online: <https://www.nps.gov/orgs/1207/02-25-21-national-parks-hosted-237-million-visitors-in-2020.htm> (accessed on 27 May 2022).
26. Schägner, J.P.; Brander, L.; Maes, J.; Paracchini, M.L.; Hartje, V. Mapping recreational visits and values of European national parks by combining statistical modelling and unit value transfer. *J. Nat. Conserv.* **2016**, *31*, 71–84. [[CrossRef](#)]
27. Derks, J.; Giessen, L.; Winkel, G. COVID-19-induced visitor boom reveals the importance of forests as critical infrastructure. *For. Policy Econ.* **2020**, *118*, 102253. [[CrossRef](#)]
28. Geng, D.C.; Innes, J.; Wu, W.; Wang, G. Impacts of COVID-19 pandemic on urban park visitation: A global analysis. *J. For. Res.* **2021**, *32*, 553–567. [[CrossRef](#)]
29. Chen, Y.; Liu, X.; Gao, W.; Wang, R.Y.; Li, Y.; Tu, W. Emerging social media data on measuring urban park use. *Urban For. Urban Green.* **2018**, *31*, 130–141. [[CrossRef](#)]
30. Wolff, M.; Scheuer, S.; Haase, D. Looking beyond boundaries: Revisiting the rural-urban interface of Green Space Accessibility in Europe. *Ecol. Ind.* **2020**, *113*, 106245. [[CrossRef](#)]
31. Thomsen, J.M.; Powell, R.B.; Allen, D. Park health resources: Benefits, values, and implications. *Park Sci.* **2013**, *30*, 30–36.
32. Grima, N.; Corcoran, W.; Hill-James, C.; Langton, B.; Sommer, H.; Fisher, B. The importance of urban natural areas and urban ecosystem services during the COVID-19 pandemic. *PLoS ONE* **2020**, *15*, e0243344. [[CrossRef](#)]
33. Liu, H.; Liu, W.; Wang, Y. A study on the influencing factors of tourism demand from mainland China to Hong Kong. *J. Hosp. Tour. Res.* **2021**, *45*, 171–191. [[CrossRef](#)]
34. Millhäusler, A.; Anderwald, P.; Haeni, M.; Haller, R.M. Publicity, economics and weather—Changes in visitor numbers to a European national park over 8 years. *J. Outdoor Recreat. Tour.* **2016**, *16*, 50–57. [[CrossRef](#)]
35. Bar-On, R.R. Middle East and the Mediterranean to 1999, and preliminary worldwide estimates for 2000. *Tour. Econ.* **2001**, *7*, 89–103. [[CrossRef](#)]
36. Huang, J.H.; Min, J.C. Earthquake devastation and recovery in tourism: The Taiwan case. *Tour. Manag.* **2002**, *23*, 145–154. [[CrossRef](#)]
37. Prideaux, B. Tourism perspectives of the Asian financial crisis: Lessons for the future. *Curr. Issues Tour.* **1999**, *2*, 279–293. [[CrossRef](#)]
38. Chuang, C.; Liu, W.Y. An analysis of influencing factors on visitor numbers of national parks in Taiwan. *Agric. Econ.* **2018**, *60*, 65–100. [[CrossRef](#)]
39. Liu, W.Y. Examining attributes associated with tourist arrivals to forest parks through linear and curve estimations. *Adv. Hosp. Leis.* **2018**, *14*, 93–109. [[CrossRef](#)]
40. Yu, C.P.; Chang, W.C.; Ramanpong, J. Assessing visitors' memorable tourism experiences (MTEs) in forest recreation destination: A case study in Xitou nature education area. *Forests* **2019**, *10*, 636. [[CrossRef](#)]
41. Wen, Z.; Huimin, G.; Kavanaugh, R.R. The impacts of SARS on the consumer behaviour of Chinese domestic tourists. *Curr. Issues Tour.* **2005**, *8*, 22–38. [[CrossRef](#)]
42. Zeng, B.; Carter, R.W.; De Lacy, T. Short-term perturbations and tourism effects: The case of SARS in China. *Curr. Issues Tour.* **2005**, *8*, 306–322. [[CrossRef](#)]
43. Marafa, L.M.; Tung, F. Changes in participation in leisure and outdoor recreation activities among Hong Kong people during the SARS outbreak. *World Leis. J.* **2004**, *46*, 38–47. [[CrossRef](#)]
44. Vaishar, A.; Št'astná, M. Impact of the COVID-19 pandemic on rural tourism in Czechia preliminary considerations. *Curr. Issues Tour.* **2022**, *25*, 187–191. [[CrossRef](#)]
45. Kuo, H.I.; Chen, C.C.; Tseng, W.C.; Ju, L.F.; Huang, B.W. Assessing impacts of SARS and Avian Flu on international tourism demand to Asia. *Tour. Manag.* **2008**, *29*, 917–928. [[CrossRef](#)] [[PubMed](#)]
46. Min, J.C. The effect of the SARS illness on tourism in Taiwan: An empirical study. *Int. J. Manag.* **2005**, *22*, 497.
47. Min, J.C.; Lim, C.; Kung, H.H. Intervention analysis of SARS on Japanese tourism demand for Taiwan. *Qual. Quant.* **2011**, *45*, 91–102. [[CrossRef](#)]
48. Mao, C.K.; Ding, C.G.; Lee, H.Y. Post-SARS tourist arrival recovery patterns: An analysis based on a catastrophe theory. *Tour. Manag.* **2010**, *31*, 855–861. [[CrossRef](#)]
49. Impact Assessment of the COVID-19 Outbreak on International Tourism. Available online: <https://www.unwto.org/impact-assessment-of-the-covid-19-outbreak-on-international-tourism> (accessed on 27 May 2022).
50. 2020: Worst Year in Tourism History with 1 Billion Fewer International Arrivals. Available online: <https://www.unwto.org/news/2020-worst-year-in-tourism-history-with-1-billion-fewer-international-arrivals> (accessed on 27 May 2022).
51. Kupfer, J.A.; Li, Z.; Ning, H.; Huang, X. Using mobile device data to track the effects of the COVID-19 Pandemic on spatiotemporal patterns of national park visitation. *Sustainability* **2021**, *13*, 9366. [[CrossRef](#)]
52. Miller, Z.D.; Freimund, W.; Dalenberg, D.; Vega, M. Observing COVID-19 related behaviors in a high visitor use area of Arches National Park. *PLoS ONE* **2021**, *16*, e0247315. [[CrossRef](#)]
53. Tran, B.L.; Chen, C.C.; Tseng, W.C.; Liao, S.Y. Tourism under the early phase of COVID-19 in four APEC economies: An estimation with special focus on SARS experiences. *Int. J. Environ. Res. Public Health* **2020**, *17*, 7543. [[CrossRef](#)]
54. Eichner, M.; Schwehm, M.; Wilson, N.; Baker, M.G. Small islands and pandemic influenza: Potential benefits and limitations of travel volume reduction as a border control measure. *BMC Infect. Dis.* **2009**, *9*, 160. [[CrossRef](#)]
55. Chang, Y.K.; Hung, C.L.; Timme, S.; Nosrat, S.; Chu, C.H. Exercise behavior and mood during the COVID-19 pandemic in Taiwan: Lessons for the future. *International journal of environmental research and public health*. *Int. J. Public Health* **2020**, *17*, 7092. [[CrossRef](#)] [[PubMed](#)]

56. Landry, C.E.; Bergstrom, J.; Salazar, J.; Turner, D. How has the COVID-19 pandemic affected outdoor recreation in the US? A revealed preference approach. *Appl. Econ. Perspect. Policy* **2021**, *43*, 443–457. [\[CrossRef\]](#)
57. Chen, S.L.S.; Yen, A.M.F.; Lai, C.C.; Hsu, C.Y.; Chan, C.C.; Chen, T.H.H. An index for lifting social distancing during the COVID-19 pandemic: Algorithm recommendation for lifting social distancing. *J. Med. Internet Res.* **2020**, *22*, e22469. [\[CrossRef\]](#)
58. Remuzzi, A.; Remuzzi, G. COVID-19 and Italy: What next? *Lancet* **2020**, *395*, 1225–1228. [\[CrossRef\]](#)
59. International Social Distance Calculation Formula. Available online: <https://covid-19.nchc.org.tw/docs/distance5.png> (accessed on 27 May 2022).
60. Suppasri, A.; Goto, K.; Muhari, A.; Ranasinghe, P.; Riyaz, M.; Affan, M.; Mas, E.; Yasuda, M.; Imamura, F. A decade after the 2004 Indian Ocean tsunami: The progress in disaster preparedness and future challenges in Indonesia, Sri Lanka, Thailand and the Maldives. *Pure Appl. Geophys.* **2015**, *172*, 3313–3341. [\[CrossRef\]](#)
61. Henderson, J.C.; Ng, A. Responding to crisis: Severe acute respiratory syndrome (SARS) and hotels in Singapore. *Int. J. Tour. Res.* **2004**, *6*, 411–419. [\[CrossRef\]](#)
62. Pine, R.; McKercher, B. The impact of SARS on Hong Kong's tourism industry. *Int. J. Contemp. Hosp. Manag.* **2004**, *16*, 139–143. [\[CrossRef\]](#)
63. Page, S.; Song, H.; Wu, D.C. Assessing the impacts of the global economic crisis and swine flu on inbound tourism demand in the United Kingdom. *J. Travel Res.* **2012**, *51*, 142–153. [\[CrossRef\]](#)
64. Tsai, M.J. *The Experimental Forest, College of Bio-Resources and Agriculture, National Taiwan University*; The Experimental Forest, College of Bio-Resources and Agriculture, National Taiwan University: Nantou, Taiwan, 2018; 56p.
65. Ramanpong, J.; Wu, C.D.; Yu, C.P.; Tsai, M.J. A retrospective analysis of injury cases for visitor risk management in a nature-based touristic destination. *Curr. Issues Tour.* **2021**, *24*, 3552–3568. [\[CrossRef\]](#)
66. Wang, Y.N.; Lin, L.C.; Chang, P.C.; Huang, Y.R.; Wang, C.T. Preliminary investigation of visitor arrivals and management implication in Xitou nature education area. *J. Exp. For. Natl. Taiwan Univ.* **2011**, *25*, 181–191. [\[CrossRef\]](#)
67. Kuo, M. How might contact with nature promote human health? Promising mechanisms and a possible central pathway. *Front. Psychol.* **2015**, *6*, 1093. [\[CrossRef\]](#) [\[PubMed\]](#)
68. Tsao, T.M.; Tsai, M.J.; Hwang, J.S.; Cheng, W.F.; Wu, C.F.; Chou, C.K.; Su, T.C. Health effects of a forest environment on natural killer cells in humans: An observational pilot study. *Oncotarget* **2018**, *9*, 16501–16511. [\[CrossRef\]](#) [\[PubMed\]](#)
69. Yu, C.P.; Hsieh, H. Beyond restorative benefits: Evaluating the effect of forest therapy on creativity. *Urban For. Urban Green.* **2018**, *51*, 126670. [\[CrossRef\]](#)
70. Simkin, J.; Ojala, A.; Tyrväinen, L. Restorative effects of mature and young commercial forests, pristine old-growth forest and urban recreation forest-A field experiment. *Urban For. Urban Green.* **2020**, *48*, 126567. [\[CrossRef\]](#)
71. Souza, C.N.; Rodrigues, A.C.; Correia, R.A.; Normande, I.C.; Costa, H.C.; GuedesSantos, J.; Ladle, R.J. No visit, no interest: How COVID-19 has affected public interest in world's national parks. *Biol. Conserv.* **2021**, *256*, 109015. [\[CrossRef\]](#)
72. Zaman, U.; Raza, S.H.; Abbasi, S.; Aktan, M.; Fariás, P. Sustainable or a butterfly effect in global tourism? nexus of pandemic fatigue, COVID-19-branded destination safety, travel stimulus incentives, and post-pandemic revenge travel. *Sustainability* **2021**, *13*, 12834. [\[CrossRef\]](#)
73. Hawryluck, L.; Gold, W.L.; Robinson, S.; Pogorski, S.; Galea, S.; Styra, R. SARS control and psychological effects of quarantine, Toronto, Canada. *Emerg. Infect. Dis.* **2004**, *10*, 1206. [\[CrossRef\]](#)
74. Wachyuni, S.S.; Kusumaningrum, D.A. The effect of COVID-19 pandemic: How are the future tourist behavior. *J. Educ. Soc. Behav. Sci.* **2020**, *33*, 67–76. [\[CrossRef\]](#)
75. Ivanova, M.; Ivanov, I.K.; Ivanov, S. Travel behaviour after the pandemic: The case of Bulgaria. *Anatolia* **2021**, *32*, 1–11. [\[CrossRef\]](#)
76. Weiss, G.; Martin, S.; Matilainen, A.; Vennesland, B.; Nastase, C.; Nybakk, E.; Bouriaud, L. Innovation processes in forest-related recreation services: The role of public and private resources in different institutional backgrounds. *Small-Scale For.* **2007**, *6*, 423–442. [\[CrossRef\]](#)
77. Gil-Alana, L.A.; Poza, C. The impact of COVID-19 on the Spanish tourism sector. *Tour. Econ.* **2022**, *28*, 646–653. [\[CrossRef\]](#)
78. Payne, J.E.; GilAlana, L.A.; Mervar, A. Persistence in Croatian tourism: The impact of COVID-19. *Tour. Econ.* **2021**. [\[CrossRef\]](#)
79. Jin, X.; Bao, J.; Tang, C. Profiling and evaluating Chinese consumers regarding post-COVID-19 travel. *Curr. Issues Tour.* **2021**, *25*, 745–763. [\[CrossRef\]](#)
80. Zhao, J.; An, Y. Behavioural intention of forest therapy tourism in China: Based on health belief model and the theory of planned behaviour. *Curr. Issues Tour.* **2021**, *24*, 3425–3432. [\[CrossRef\]](#)
81. Zhang, S.; Paterson, J.S.; Hujala, T. Sustaining forest ecosystem services through social enterprises: Motivations and challenges from a case study in Scotland. *Small-Scale For.* **2021**, *20*, 627–647. [\[CrossRef\]](#)
82. Viscusi, W.K. Pricing the global health risks of the COVID-19 pandemic. *J. Risk. Uncertain.* **2020**, *61*, 101–128. [\[CrossRef\]](#)