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NOTE



The effects of Coronavirus (COVID-19) on expected tourism revenues for natural preservation. The case of the Galapagos Islands

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ABSTRACT

This research reports the effects of Coronavirus COVID-19 outbreak on expected tourism revenues for preservation in the Galapagos Islands, a well-known international tourism destination. We explore the trends and construct a seasonal index to estimate the expected number of visitors in the Galapagos National Park (GNP) as well as the potential revenue from the fee entrance in the park, which is used for preservation activities. Our results indicate that in our optimistic scenario, losses would account for half of the revenues in 2020, having a high impact on the Galapagos National Park preservation activities. Based on our results, we recommend GNP and Ecuadorian authorities to look for alternative sources of funding, so conservation programs in the park can continue with no interruption.

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COVID-19; Coronavirus;
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Introduction

Ecuador has always shown a strong policy of conservation in the Galapagos Islands. So much so that about 97% of the islands surface was declared as Galapagos National Park (GNP) by the Ecuadorian government in 1959. The other 3% belongs to inhabited spaces in the archipelago. As a matter of fact, all itineraries and/or explorations must be approved by the GNP and follow a set of specific rules to ensure both the safety of the islands and its visitors. In line with this strong policy of conservation, the entrance to the Galapagos Islands is strictly regulated and controlled, even for Ecuadorians.

Ecuadorian authorities estimate that the impact of COVID-19 on tourism will depend on the time that travel restrictions last. In that sense, if they last 30, 60, or 90 days the losses may account for 150, 345, or 540 M USD, respectively (LA HORA, 2020). In that venue, we believe that the impact of COVID-19 on tourism is two-fold. Firstly, country-and-regions travel policy restrictions are narrowing the sector. On the other hand, the fear of COVID-19 contagion outside potential travelers place of regular residence will also have a negative incidence on tourism revenues.

The preservation of the GNP is significantly financed with a fee that is detailed in Table 1. The GNP strategy of sustainable development aims to conserve and restore the ecological integrity of ecosystems and their biodiversity, to maintain their resilience and capacity

Table 1. Cost breakdown of visiting GNP fee.

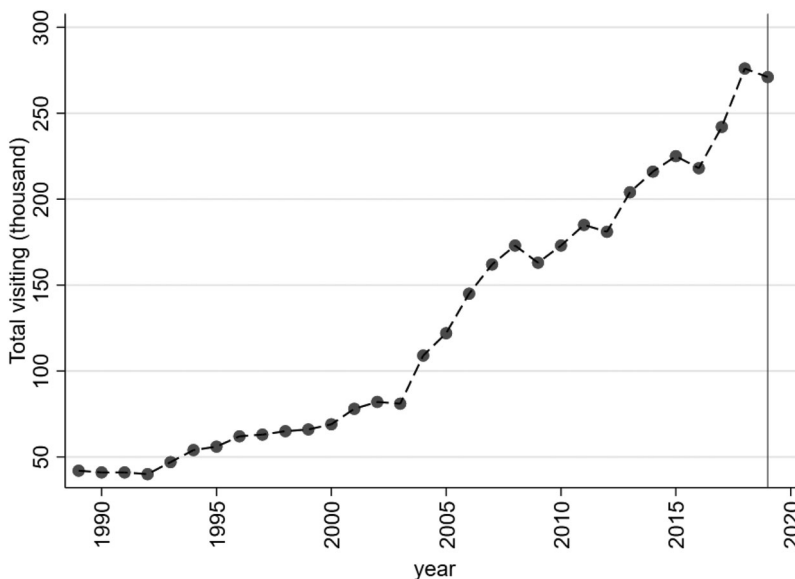
Type of tourist	Age of the tourist	Fee (USD)
Foreign currently not residing in Ecuador	>12 years old	100
Foreign currently not residing in Ecuador	≤12 years old	50
Ecuadorian or foreign currently residing in Ecuador	>12 years old	6
Ecuadorian or foreign currently residing in Ecuador	≤12 years old	3

to generate services for local people (GNP, 2020a).¹ Here, we analyze the effect in revenue in the GNP given by the fully ban of visiting restriction to the Galapagos Islands which has started in March 3rd, 2020.

Methodology

The data comes from the Annual Report of GNP visitors (GNP, 2020c). According to this official source, the number of visitors presents an increasing trend over time from 1989 to 2019 in the Galapagos Islands (see Figure 1). Interestingly, the increase of visitors accelerates in 2004. In this year, entrances in GNP increased 34% with respect to 2003. Moreover, 2012, 2017 and 2018 show increases of 14% more visitors with respect to their immediate previous years, respectively. In 2019, the archipelago had about 271 K visitors among Ecuadorians and foreigners.

The Galapagos Islands entrance is strongly marked by seasonality. The months of August, September and October are the months with a smaller number of visitors in the Galapagos Islands; meanwhile, the peak of visitors is reached in July of every year. Assuming that time trends would have kept – meaning no COVID-19 appearance – and using a seasonal index based on January 2015 to December 2019 official data from GNP (2020a), we are able to estimate the values of expected visitors and revenues in

**Figure 1.** Number of visitors in the GNP (yearly).

2020 in the GNP. Relation (1) introduces the seasonal index.

$$S_{ij} = \frac{X_{ij}}{\bar{X}_j} \tag{1}$$

where the seasonal index, S , of the month i in the year j , is the ratio between the total visitors in the month i in the year j , X_{ij} , and the average of total visitors in that year j ,

$$\bar{X}_j = \frac{\sum_{i=1}^m X_{ij}}{m},$$

where m is equal to 12 months. The seasonal index can be adjusted, S^a , by means of the averaged of the years, where n is the number of years analyzed, which in our case is 4. This is presented in relation (2).

$$S_i^a = \frac{\sum_{j=1}^n S_{ij}}{n} \tag{2}$$

where X is the expected value of 270 K total visitors in 2020.² Thus, the identity needs to follow Equation (3)

$$X_{2020} = \sum_{i=1}^m (X_{2020} * S_i^a) \tag{3}$$

We prefer to use the adjusted seasonal index due to its simplicity. In addition, it is preferred in presence of short samples – as in our case of 4 sample years and the forecasting of 1 additional year – considering that the output -2020 scenarios – are stable.

Annual Report of GNP visitors (GNP, 2020c) also presents information regarding visitors' nationality. Therefore, GNP visitors can be divided into domestic and foreign visitors. In 2019, domestic visitors (Ecuadorians and residents in Ecuador) represent the 33% of the total of visitors, while the foreigners are the other 67%. In 2019, GNP (2020a) reports that USA tourists represent the 29% of the total visitors while the remainders are from UK (5%), Germany (5%), Canada (4%), Australia (3%), France (2%), among others of smaller relevance.

According to Annual Report of GNP visitors (GNP, 2020c), the share of visitors younger than 12 years old in 2019 compose 15% of total domestic visitors in GNP, meaning that the other 85% correspond to visitors older than 12 years old. As for foreigners, 5% of the visitors are people younger than 12 years old, thus the other 95% are older than that age. If time trends would have kept – meaning no COVID-19 appearance – and using a basic seasonal index based on January 2015 to December 2019 data, we are able to estimate values of expected visitors and revenues in 2020 in the GNP.

Results

Figure 2 shows the results of the seasonal and adjusted seasonal indices. We find that there is a pattern of high correlation -94%- between the seasonal and adjusted indices. The months that present more relative weight in all years (i.e. more visitors in the park) are July–August, and March–April, coinciding, this latter, with the beginning of the entrance ban in the GNP.

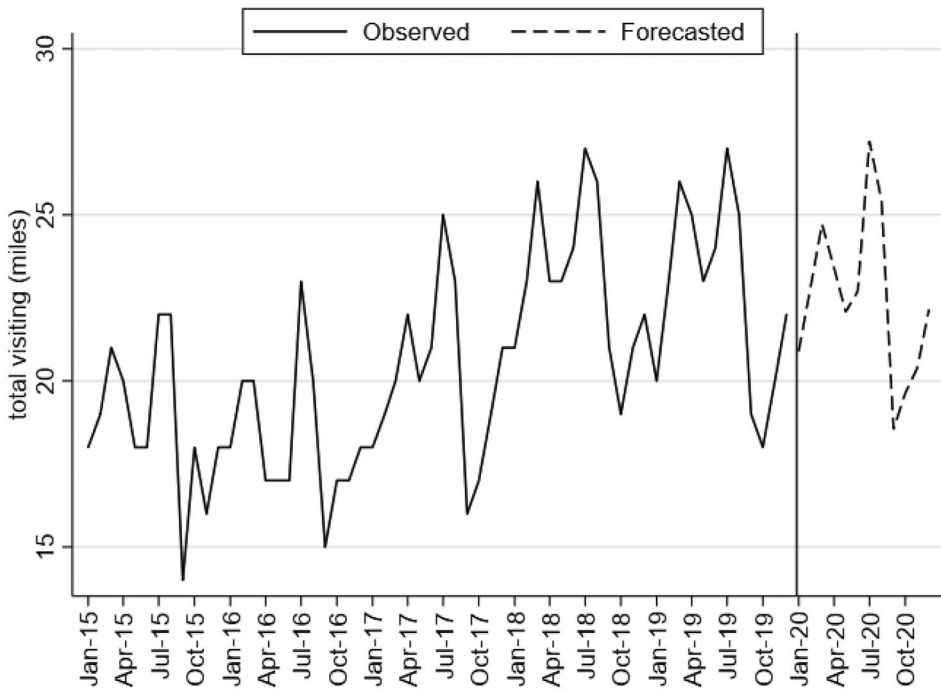


Figure 2. Observed and forecasted values of total GNP visitors.

Table 2, which has been generating using our seasonal index calculating visitors according to origin and age trends, presents the expected revenues for 2020 in terms of the fee, which according to GNP (2020b), is used for funding ‘... conservation and management activities of the protected area [...], as well as sustainable development activities’. Column (a) presents the expected revenues from foreign visitors which is the most relevant due to the quantity and the amount of the fee; as a matter of fact, it represents around 97% of the total expected income. Column (b) shows the expected revenue from domestic visitors which is about 0.5 M USD. Column (c) indicates the total expected revenues that

Table 2. Expected visitors and losses of GNP in 2020 (expressed in K USD).

Month	(a) Expected foreign visitors revenue	(b) Expected domestic visitors revenue	(c) Expected total monthly revenue	(d) Expected losses Scenario 1	(e) Expected losses Scenario 2
Jan	1361.14	38.26	1399.40		
Feb	1487.89	41.82	1529.71		
Mar	1610.95	45.28	1656.23	828.11	828.11
Apr	1525.07	42.86	1567.93	783.96	1567.93
May	1438.58	40.43	1479.02	739.51	1479.02
Jun	1478.86	41.56	1520.43	760.21	1520.43
Jul	1773.54	49.85	1823.39		1823.39
Aug	1657.52	46.59	1704.11		1704.12
Sep	1207.98	33.95	1241.93		620.97
Oct	1279.11	35.95	1315.06		
Nov	1328.26	37.33	1365.60		
Dec	1443.56	40.57	1484.14		
Total	17592.53	494.505	18,087.03	3111.81	9544.97

would have been collected by the entrance fee in 2020 if the time trend would have kept, i.e. without COVID-19 appearance. Finally, columns (d) and (e) present two scenarios of losses while the Galapagos is closed. The first scenario (Column (d)) considers that the ban of arrivals lasts during 3 months (from March 16–15 July), while the other scenario (Column (e)) considers that the closure of GNP lasts 6 months in 2020 (from March 16–15). In the optimistic scenario, i.e. Column (d), the losses accounts for 17% of the total expected income by the entrance fee in 2020; while, in the pessimistic scenario the losses are 53% of the total yearly income. These losses introduce a hard situation for the Galapagos Islands, and it becomes worst for a larger period of six months.

Concluding, the expected revenue for entrance fee in the Galapagos National Park would have been 18 M USD in 2020, money which is mainly used for natural preservation programs in the park. As a matter of fact, the ban of tourist entrance into the park, considering that the measure only lasts three months (our most optimistic scenario) will imply a loss between 35% and 55% of the total revenues. We consider that authorities must find different sources of funding, such as international aid or loans, in order to guarantee the continuity of conservation programs in the park.

Notes

1. In addition to the mandatory fee described in Table1, all GNP visitors must pay 20.00 USD by the concept of the so-called Transit Control Card (TCC).
2. To get this estimation we, firstly, smooth the sample using moving average methods of order 4; then, over this trend, we use OLS to compute the next year based on simple trend of time ($Y_t = \hat{a} + \hat{b}t + u_t$), where a is the constant, b the slope, t represents the time and u is the iid. We use this as the last years there is some peaks that might more difficult to estimate as it was not perfectly linear (see [Figure 1](#)), after smoothing it becomes linear.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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