

# The Effects of Coronavirus (COVID-19) on Expected Tourism Revenues for Natural Preservation. The Case of the Galapagos Islands

Juan Pablo Díaz-Sánchez

Moisés Obaco

**Abstract:** This paper reports an investigation of the effects of Coronavirus COVID-19 outbreak on expected tourism revenues for preservation in the Galapagos Islands, a well-known international tourism destination. To do so, we use 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 (pessimistic) scenario, losses would account for 3,1 (9,5) M USD. 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.

**Keywords:** COVID-19, Coronavirus, Galapagos Islands, Ecuador.

## 1. Introduction

The coronavirus (COVID-19) outbreak disease was firstly reported from Wuhan, China, at late December, 2019 (WHO, 2020a). Since then, there are more than one million of reported cases of COVID-19 in more than 100 countries.<sup>1</sup> The propagation of the virus is quite fast. It only took 30 days to expand from Hubei, the province in which Wuhan is located, to the rest of Mainland China (Novel Coronavirus Pneumonia Emergency Response Epidemiology Team, 2020). Experts indicate that COVID-19 is an acute resolved disease but it can also be deadly, with a 2% case fatality rate (Xu et al., 2020).

The effects of this pandemic<sup>2</sup> are all over the world in the majority of economic sectors. The cancelation of flights, reduction of frequencies, the prohibition to travel abroad or even inside the cities and countries, jointly with borders closure are leading to a crash in the global tourism. In this context, countries and regions that are highly economic dependent of tourism will face not only serious deficits in terms of public income, i.e. the taxes and fees on tourism, but also in the private sector that will see a shortage in the revenues of hotels, travel agencies and, in general, the spillover effect of tourism in the rest of economic activities.

---

<sup>1</sup> Counting at March 9<sup>th</sup>, 2020 according to WHO (2020b).

<sup>2</sup> Declared as that by the WHO in March 11<sup>th</sup>, 2020.

This study seeks to understand the effects of COVID-19 on the Galapagos Islands. More precisely, we aim to respond the following question: What are the effects of COVID-19 on the Galapagos Islands tourism revenues? To do so, we propose to analyze data regarding this archipelago and quantify the COVID-19 effects.

We have focused our attention on the effects of COVID-19 on tourism because it is considered one of the leading economic sectors in the world; moreover, it is also a key driver of sustainable development and supports millions of livelihoods worldwide (UNWTO, 2020). Further, we have selected the Galapagos Islands as unit of analysis due to its highly dependence on tourism activities. In addition, data about tourists entering into the archipelago is quite precise due to its remoteness from mainland and inexistence of illegal ports/airports.

The remainder of the article is organized as follows: a review of the socio-economic effects of COVID-19 pandemic, especially on tourism, is presented in the second section. The third section sets the case study, Ecuador, and specifically, the Galapagos Islands. The fourth section presents and discusses the data and methods. The fifth section indicates the obtained results. Finally, the sixth section concludes by summarizing the main findings and suggesting some policy recommendations.

## **2. COVID-19 and tourism**

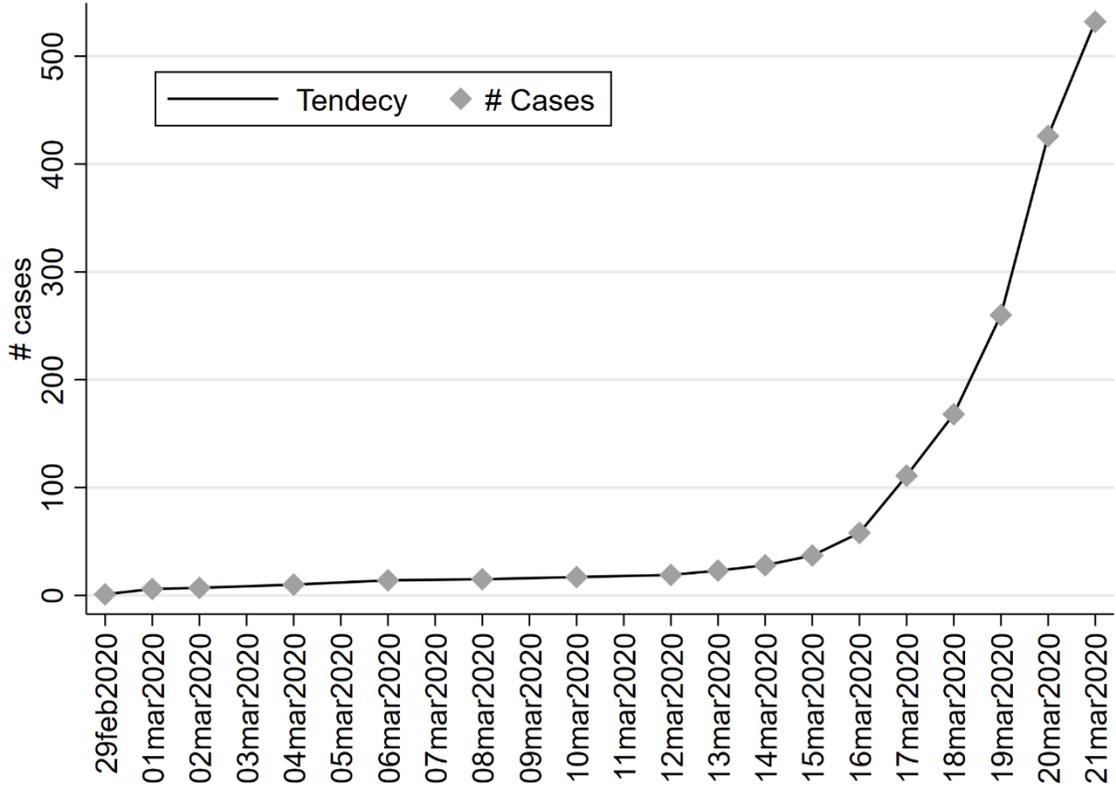
According to Anderson et al. (2020), governments will not be able to minimize both deaths from COVID-19 and the economic impact of viral spread; Clearly, keeping mortality as low as possible will be the highest priority for authorities. In that venue, the majority of countries have implemented travel restrictions, especially from extensive spread COVID-19 countries such as China, Italy, Iran, South Korea, and Japan in early stages of the global spread.

As time passes by, governments take stronger measures to prevent COVID-19 risk of contagion. For instance, at least 89 countries have imposed restrictions, quarantines or any other sanitary restriction to Spaniards (RTVE, 2020). In the same line, The USA have suspended all flights from Europe since March 13, 2020 for one month (EL PAIS, 2020); in addition, the European Union has also announced on March 16, 2020 the close of its borders, so that no one of a third country may enter in this set of countries.

In Latin America, travel restrictions are also taking place in most of the countries of the region depending on the number of COVID-19 confirmed cases and prevention interests.

In Galapagos Islands, there are not positive confirmed cases of COVID-19. However, that is not the case in the continental Ecuador. In this country mainland, the first case was confirmed in February 28<sup>th</sup> and it was officially announced the next day. After that, the confirmed cases started to increase exponentially. Figure 1 shows the tendency of COVID-19 confirmed cases in Ecuador over time. Thus, the restriction travel policies have two important points in time. Firstly, government asked travelers to put themselves in quarantine at home when they arrived from abroad. Secondly, when the confirmed COVID-19 cases started to increase significantly, government announced the borders closing since March 16<sup>th</sup>, 2020 for 21 days.

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).



**Figure 1.** Evolution of COVID-19 confirmed cases in Ecuador

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.

**3. Setting the context**

*Ecuador*

According to Royuela et al. (2019), Ecuador is a small country (283,561 km<sup>2</sup> and 16 million inhabitants in 2017) lying on the north-west coast of South America. Politically and administrative speaking, Ecuador is divided in twenty-four provinces, twenty-three in the mainland (Coast, Highlands, Amazon) plus the Galápagos Islands. Each province is in turn made up of cantons (a total of 224) and each canton is formed by parishes (a total of 1024).

In economic terms, GDP per capita in Ecuador has presented a growing trend; so much so that according to the World Bank (2019) it is a medium-high level country. It also presents a higher inequality and heterogeneity across-areas (Matano et al., 2020).

In 2000, Ecuador officially adopted the US Dollar as official currency in its economy. Considering that Ecuador cannot print its money, it is highly dependent on exports (mainly oil) and tourism in order to make its economy works.

### *Galapagos*

The Galapagos Islands belong to Ecuador, as mentioned in the previous paragraph. This archipelago is 926 km (570 mi) off the Ecuador's east coast in the Pacific Ocean. According to the 2010 Census, the islands have a population about 25,000 inhabitants. The Galápagos Archipelago is made up of 13 main islands, 6 smaller islands, and 107 rocks and islets. They consist of 7,880 km<sup>2</sup> of land spread over 45,000 km<sup>2</sup> of ocean. The largest island is named Isabela and it is about three-quarters of the total land area of the Galápagos.

The tourism in the archipelago was almost null until the 70's. The sector began to emerge with the 1978 UNESCO's most important World Heritage Sites and 1985 Biosphere Reserve declarations.

Ecuador has consistently shown a strong policy of conservation in the Galapagos. So much so that about 97% of the islands surface were declared as Galapagos National Park (GNP) by the Ecuadorian government in 1959. The other 3% belongs to inhabited spaces in the archipelago. GNP authority monitors all flora and fauna conservation initiatives as well as tourists' interaction with the wildlife and scenery. 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.

The preservation of the Galapagos National Park (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 to generate services for local people (GNP, 2020a). Further, this strategy has three axes of action. First, protect native and endemic species. Second, control and monitoring rational use of the services generated by the ecosystems of the protected areas, promoting compliance with current regulations. Lastly, control of invasive species<sup>3</sup> (GNP, 2020a).

---

<sup>3</sup> For detailed information about the conservation strategy implemented in the Galapagos Islands, please visit the official site of the GNP: [www.galapagos.gob.ec](http://www.galapagos.gob.ec)

**Table 1.** Cost breakdown of visiting GNP fee

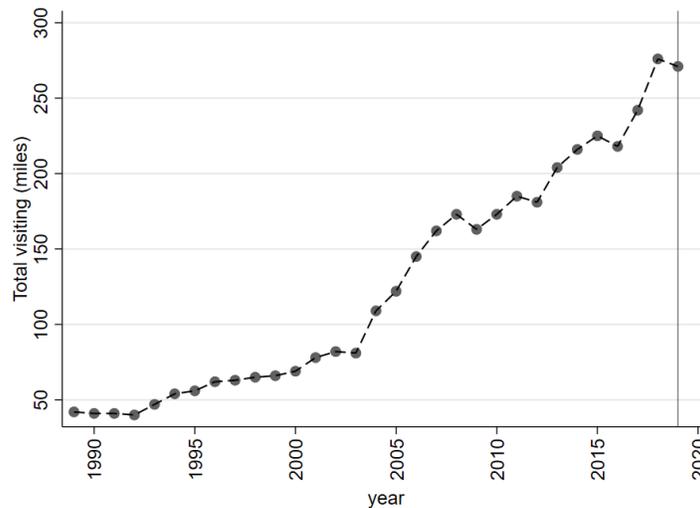
Type of tourist	Age of the tourist	Fee (USD)
Foreign currently not residing in Ecuador	> 12 years old	100
Foreign currently not residing in Ecuador	≤ 12 years old	50
Ecuadorian or foreign currently residing in Ecuador	> 12 years old	6
Ecuadorian or foreign currently residing in Ecuador	≤ 12 years old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

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).

#### 4. Data and Methodology

##### *Data*

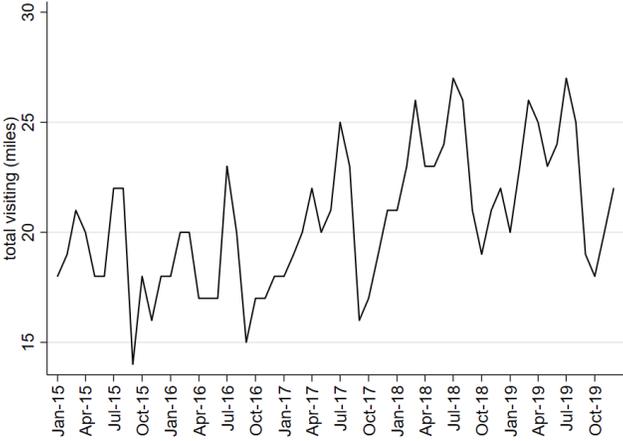
Our data comes from the Annual Report of Galapagos National Park visitors (GNP, 2020b). The number of visitors in the Galapagos Islands presents an increasing trend over time from 1989 to 2019 (see Figure 2). Interestingly, the increase of visitors in the Galapagos Islands accelerates in 2004. In this 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. Therefore, the last decade were good years for the tourism in the Islands. We might expect similar trend.



**Figure 2.** Number of visitor in GNP.

As the majority of tourism activities, the entrance of visitors in the Galapagos Islands is strongly marked by seasonality. Figure 3 presents the evolution of visitors from January 2015 to December of 2019, monthly. Clearly, August, September and October are the months with smaller number of visitors in the Galapagos Islands; meanwhile, the peak of visitors is

reached in July of every year. Based on the seasonality of this data and variation rates with monthly periodicity, we are able to estimate the demand of visitors in the GNP in 270 K visitors in 2020. Evidently, this quantity does not take into account that COVID-19 appears in scene.



**Figure 3.** Entrance in visitors in the GNP.

The distribution GNP visitors can be divided into domestic and foreign visitors. Domestic visitors (Ecuadorians and residents in Ecuador) are the 33% of the total of visitors, while the foreigners are the other 67%. By analyzing the nationality of foreign GNP visitors (See Figure A1 in the Appendix), we found 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.

*Methodology*

Tendentially, in terms of domestic GNP entrances, visitors younger than 12 years old compose the 15% of total domestic visitors, meaning that the other 85% correspond to visitors older than 12 years old. As for foreigners, the 5% of the visitors are people younger than 12 years old, thus the other 95% are older than that age. Assuming that time trends would have kept –meaning no COVID-19 appearance- and using a 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. 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).

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

Where  $X$  is the expected value of 270 K total visitors in 2020. Thus, the identity needs to follow equation (3)

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

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.

## 5. Results

Table 2 presents the results of the seasonal and adjusted seasonal indices. We find that there is a pattern of high correlation -94%- between the two series of 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 A2, in the Appendix, shows the observed and forecasted visitors for the sample.

**Table 2.** Seasonal and adjusted seasonal indices

Month	Year					Adjusted seasonal index
	2015	2016	2017	2018	2019	
January	0.964	0.986	0.896	0.913	0.882	0.928
February	1.017	1.095	0.946	1	1.014	1.014
March	1.125	1.095	0.995	1.130	1.147	1.098
April	1.071	0.931	1.095	1	1.102	1.040
May	0.964	0.931	0.995	1	1.014	0.981
June	0.964	0.931	1.045	1.043	1.058	1.008
July	1.178	1.260	1.244	1.173	1.191	1.209
August	1.178	1.095	1.145	1.130	1.102	1.130
September	0.750	0.821	0.796	0.913	0.838	0,823
October	0.964	0.931	0.846	0.826	0.794	0.872
November	0.857	0.931	0.946	0.913	0.882	0.906

December	0.964	0.986	1.045	0.956	0.970	0.984
Total	12	12	12	12	12	12

Table 3 presents the expected revenues for 2020 in terms of the fee used for funding preservation activities in the GNP. 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 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 to 15 July), while the other scenario (Column (e)) considers that the closure of GNP lasts 6 months in 2020 (from March 16 to 15). In the optimistic scenario, i.e. Column (d), the losses accounts for the 17% of the total expected income by the entrance fee in 2020; while, in the pessimistic scenario the losses are the 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.

**Table 3.** Expected visitors and losses of GNP in 2020 (expressed in K USD)

	(a)	(b)	(c)	(d)	(e)
Month	Expected foreign visitors revenue	Expected domestic visitors revenue	Expected total monthly revenue	Expected losses Scenario 1	Expected losses Scenario 2
Jan	1,361.14	38.26	1,399.40		
Feb	1,487.89	41.82	1,529.71		
Mar	1,610.95	45.28	1,656.23	828.11	828.11
Apr	1,525.07	42.86	1,567.93	783.96	1,567.93
May	1,438.58	40.43	1,479.02	739.51	1,479.02
Jun	1,478.86	41.56	1,520.43	760.21	1,520.43
Jul	1,773.54	49.85	1,823.39		1,823.39
Aug	1,657.52	46.59	1,704.11		1,704.12
Sep	1,207.98	33.95	1,241.93		620.97
Oct	1,279.11	35.95	1,315.06		
Nov	1,328.26	37.33	1,365.60		
Dec	1,443.56	40.57	1,484.14		
Total	1,7592.53	494.505	18,087.03	3,111.81	9,544.97

## 6. Conclusion and Discussion

In this paper, we have estimated, using a seasonal index, that 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 into the park. Nevertheless, the

COVID-19 outbreak will considerably affect this estimation. 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 of 3,1 M USD due to this pandemic; meanwhile, in our pessimistic scenario (GNP closure of 6 months) the losses would account for 9,5 M USD.

In both scenarios, we do believe that our calculations are underestimated. This affirmation is mainly driven by the fact that we assume that after the ban of entrance in the GNP is lifted, the number of visitors, domestic and foreigners, will come back immediately to be as previous years, which, in our view, will not happen. In any case, our estimations present to policy makers an idea of what are going to be the minimum losses due to COVID-19 outbreak.

In the case of Galapagos Islands, GNP and national authorities have to find another sources of funding, such as international aid or loans, in order to guarantee the continuity of conservation programs in the park.

In this research, we only have analyzed the COVID-19 effect on revenues collected by the entrance fee in the GNP. Nevertheless, further research can be address to identify COVID-19 impact on the Galapagos tourism sector as a whole.

Finally, this research sheds some light about future international pandemics and their effects on revenues from a specific economic activity, so that policy makers can anticipate policy plans and strategies to ameliorate the impact in such activity.

## References

- Anderson, R. M., Heesterbeek, H., Klinkenberg, D., Dã, T., & Hollingsworth, irdre. (2020). Comment How will country-based mitigation measures influence the course of the COVID-19 epidemic? *The Lancet*. [https://doi.org/10.1016/S0140-6736\(20\)30567-5](https://doi.org/10.1016/S0140-6736(20)30567-5)
- EL PAIS. (2020). Vuelos a Estados Unidos: Trump suspende los viajes desde Europa durante un mes por el coronavirus | Sociedad | EL PAÍS. 2020. Retrieved from <https://elpais.com/sociedad/2020-03-11/estados-unidos-supera-los-1000-infectados-por-coronavirus-y-prepara-nuevas-medidas-de-contencion.html>
- GNP, G. N. P. (2020a). Protected Areas – Dirección del Parque Nacional Galápagos. Retrieved March 21, 2020, from <http://www.galapagos.gob.ec/en/protected-areas-2/>
- GNP, G. N. P. (2020b). VISITOR STATISTICS – Dirección del Parque Nacional Galápagos. Retrieved March 21, 2020, from <http://www.galapagos.gob.ec/en/visitor-statistics/>
- LA HORA. (2020). *El sector turístico podría tener pérdidas de entre \$150 a \$540 millones : País : La Hora Noticias de Ecuador, sus provincias y el mundo*. Retrieved from [https://lahora.com.ec/noticia/1102312801/el-sector-turistico-podria-tener-perdidas-de-entre-\\$150-a-\\$540-millones?fbclid=IwAR0WY243KKIKSD1ZlItkbIEBBkw3C6lvi0\\_c9dgcSxrofjRSIHhBLTDmyvII](https://lahora.com.ec/noticia/1102312801/el-sector-turistico-podria-tener-perdidas-de-entre-$150-a-$540-millones?fbclid=IwAR0WY243KKIKSD1ZlItkbIEBBkw3C6lvi0_c9dgcSxrofjRSIHhBLTDmyvII)
- Matano, A., Obaco, M., & Royuela, V. (2020). What drives the spatial wage premium in

formal and informal labour markets? The case of Ecuador. *Journal of Regional Science*  
<https://doi.org/10.1111/jors.12486>

Novel Coronavirus Pneumonia Emergency Response Epidemiology Team. (2020). [The epidemiological characteristics of an outbreak of 2019 novel coronavirus diseases (COVID-19) in China]. *Zhonghua Liu Xing Bing Xue Za Zhi = Zhonghua Liuxingbingxue Zazhi*, 41(2), 145–151. <https://doi.org/10.3760/cma.j.issn.0254-6450.2020.02.003>

Royuela, V., Díaz-Sánchez, J. P., & Román, J. (2019). Migration effects on living standards of the left behind. The case of overcrowding levels in Ecuadorian households. *Habitat International*, 102030. <https://doi.org/10.1016/J.HABITATINT.2019.102030>

RTVE. (2020). *¿Qué países han restringido la entrada de españoles por el coronavirus?*

UNWTO, U. N. W. T. O. (2020). Statement on the Containment of Coronavirus COVID-19 | UNWTO. Retrieved March 11, 2020, from <https://www.unwto.org/news/unwto-statement-on-the-containment-of-coronavirus-covid-19>

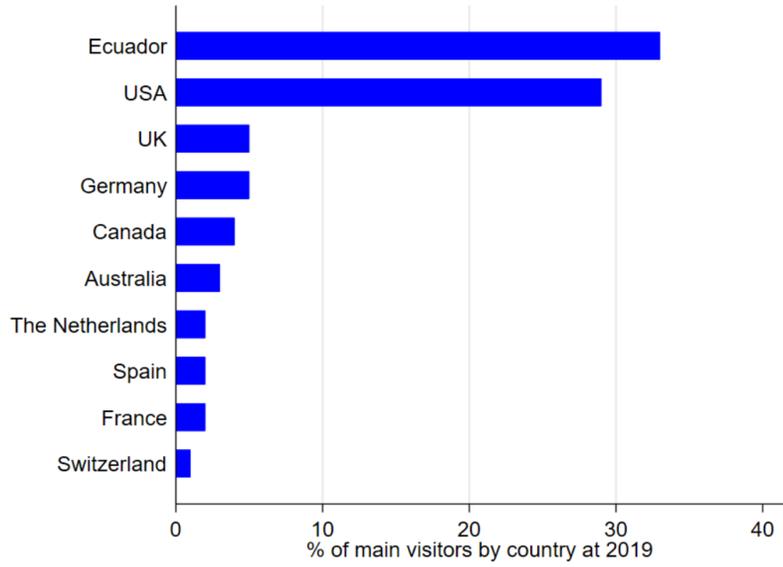
WHO. (2020a). Coronavirus disease 2019. <https://doi.org/10.1001/jama.2020.2633>

WHO, W. H. O. (2020b). WHO Director-General's opening remarks at the media briefing on COVID-19 - 9 March 2020. Retrieved March 11, 2020, from <https://www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---9-march-2020>

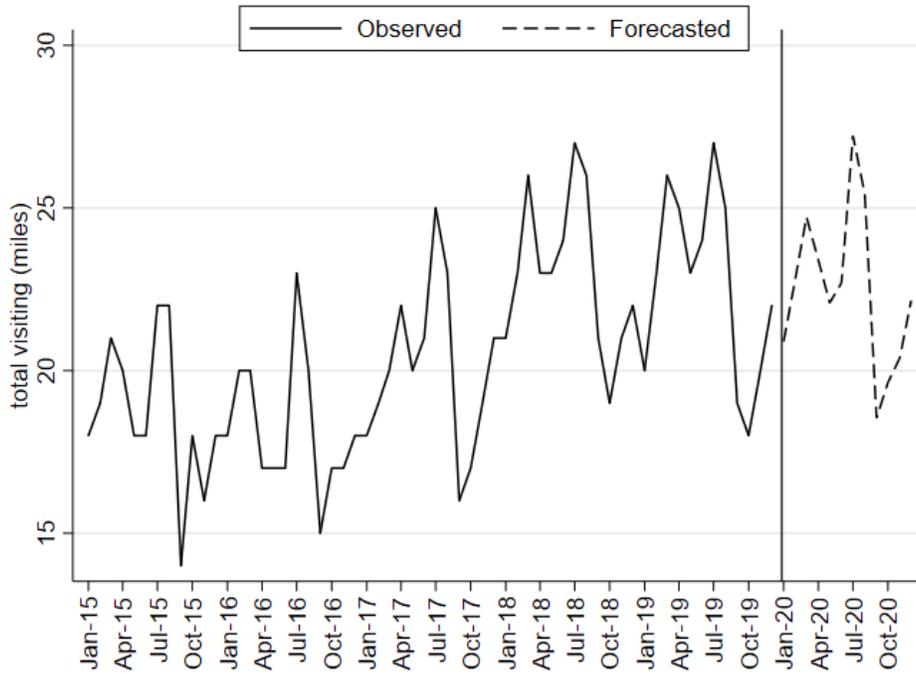
World Bank. (2019). Ecuador | Data. Retrieved February 8, 2019, from <https://data.worldbank.org/country/ecuador>

Xu, Z., Shi, L., Zhang, J., Huang, L., Zhang, C., Liu Bsc, H., ... Dong, J. (2020). *Case Report Pathological findings of COVID-19 associated with acute respiratory distress syndrome*. [https://doi.org/10.1016/S2213-2600\(20\)30076-X](https://doi.org/10.1016/S2213-2600(20)30076-X)

## Appendix



**Figure A1.** Origin of visitors in the Galapagos Islands.



**Figure A2.** Observed and forecasted values of total GNP visitors.