An econometric analysis of the COVID-19 pandemic on the Caribbean tourism industry

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Abstract

The COVID-19 pandemic had a profound and long-lasting impact on the economies of the world. One of the industries that was substantially affected by the pandemic is the tourism sector. The number of flights or cruises to tourist destinations plummeted. The introduction of quarantine restrictions aggressively limited incoming visitors and prohibited many recreational activities. A large proportion of jobs in tourism were put on hold and in many cases were terminated. As highlighted by the International Monetary Fund, tourism-dependent regions were most notably and severely impacted by the COVID-19 outbreak and "will likely feel the negative impacts of the crisis for much longer than other economies[1]." One such case study is that of the Caribbean countries, which have a high economic reliance on tourism and thereby have been especially susceptible to the negative financial consequences of the COVID-19 outbreak. Therefore, studying the impact of the COVID-19 pandemic on the Caribbean economy represents an opportunity to analyze the immediate and long-term effects of a health crisis on similar tourism-dependent regions and may help shape predictions about how future pandemic events will affect tourism.

This project seeks to investigate the impact of the COVID-19 pandemic on the tourism industry in the context of the Caribbean region. This senior project is divided into two main parts—an econometric-driven analysis and a software development component—that fulfills the Computer

[1] https://www.imf.org/en/Publications/fandd/issues/2020/12/impact-of-the-pandemic-on-tourism-behsudi

Science and Economics requirements of the CSEC senior thesis. First, through the investigation of the real-world data, we wish to quantitatively identify the direct economic effects of the COVID-19 outbreak and health restrictions on the tourist-dependent Caribbean economy. We plan to analyze key economic metrics pertinent to tourism, such as changes in revenue, number of visitors, and mode of travel (e.g., flight; cruise) that we expect to be timely correlated with the onset of the COVID-19 pandemic. Finally, we attempt to estimate the causal impact of COVID-19 cases and health restrictions on the Caribbean economy in order to better understand the financial impact of the COVID-19 pandemic on the tourism industry.

Second, using the results from the previous section, we wish to create a predictive model for estimating future changes in key economic variables associated with COVID-19 cases, leveraging the results found in the first part of this project. The objective is to generalize our findings of the impact of COVID-19 on the tourism-dependent Caribbean economy to other countries that similarly rely heavily on tourism for the growth and generation of revenue. We wish to present this model and other economic insights by building software data visualizations, such as interactive graphs and intuitive data presentations, through the use of software programming in order to provide a clear understanding of the impact of a health crisis on the tourism sector.

Deliverables

1. Perform an econometric analysis on the impact of COVID-19 on the tourism industry in the Caribbean region by studying the effect on baseline economic metrics, investigating the seasonal trend of tourism in the Caribbean region, and quantifying the correlation of COVID-19 cases with selected economic variables.
2. Attempt to establish a causal relationship between COVID-19 cases and the tourism industry in the Caribbean economy—to avoid the issue of potential endogeneity, one

idea is to use Instrumental Variables or a pseudo-experimental method of analysis such as Difference-in-Differences.

3. Construct intuitive and interactive visualizations through the use of programming (e.g., Python) and software visualization libraries (e.g., matplotlib; Dash; Streamlit) in order to provide a clear visual representation of the relationship between the COVID-19 outbreak and the impacted economic variables in the Caribbean region.
4. [*Stretch Goal*] Using the results of the empirical investigation, formulate a predictive model for how future pandemic outbreaks will shape similar tourism-dependent economies.

Timeline

Week	Date	Deliverable
1	Jan 30	-
	Feb 2	-
2	Feb 6	Work on Project Proposal with Dr. Blenman
	Feb 9	**Project proposal due**
3	Feb 13	Conduct literature review and general background research, set up development environment, familiarize self with previous project work
	Feb 17	**Project proposal presentation**
4	Feb 20	Econometric analysis
5	Feb 27	Econometric analysis
6	Mar 6	Causal relationship modeling
7	Mar 13	Causal relationship modeling
8	Mar 20	Create dynamic and interactive visualizations
	Mar 27	Create dynamic and interactive visualizations

9	Mar 31	**Midterm progress report presentation**
10	Apr 3	*Develop predictive model for future pandemic outbreaks
11	Apr 10	Work on Poster
		*Develop predictive model for future pandemic outbreaks
12	Apr 17	Work on Report write-up
13	Apr 24	Work on Report write-up
	Apr 28	**Poster presentation**
14	May 1	Work on Report write-up
	May 4	**Final report due**
*If time permits		