

THE IMPACTS OF THE COVID-19 PANDEMIC ON
TOURISM ALONG THE OREGON COAST

by

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A THESIS

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On March 17, 2020, Oregon Governor Kate Brown issued Emergency Order 20-12 in response to the COVID-19 pandemic, prohibiting gatherings of 25 or more people, banning on-site consumption of food and drink at food establishments, and requiring social distancing protocols at retail businesses. This “Stay Home, Save Lives” campaign was bound to have impacts, especially on communities and economies that are reliant on tourism. Using cell phone data to track weekly visits to various points of interests along the Oregon Coast, I find that tourist visits to business establishments in the food, service, and retail sectors were most affected by the restrictions, whereas visits to natural landmarks, like beaches, ports, and marinas, as well as to recreational goods rental stores remained largely unchanged. These results can help policymakers understand the short-term impacts of stay-at-home orders and thus, inform future policies.

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Introduction

The economic impacts of the global coronavirus pandemic have yet to be fully studied, especially since, as of when this paper was written, the health crisis has not ended. For the past two years, while in the midst of the pandemic, all levels of government have had to respond instantaneously, issuing emergency orders to mitigate the spread of the disease. Thus, at a time when the world is in crisis, research on the short-term effects of stay-at-home orders is necessary to inform policymakers on how to proceed. This project uses cell phone data to measure tourism to the Oregon Coast and explore how the “Stay Home, Save Lives” campaign affected small coastal economies in Oregon.

As the coronavirus (COVID-19) spread rapidly across the United States in winter of 2020, the state of Oregon was no exception to the aforementioned swift government action. Oregon State Governor Kate Brown declared a state of emergency on March 3, 2020, less than a week after appointing the State of Oregon’s Coronavirus Response Team (Executive Order 20-03, 2020). This emergency order was followed shortly by a series of stay-at-home restrictions, known as “Stay Home, Save Lives,” that collectively “prohibited gatherings of 25 or more people,” closed educational institutions and retail businesses, “banned on-site consumption of food and drink at food establishments,” and “require[ed] social distancing measures for...public and private facilities” (Executive Order 20-12, 2020).

Tourism-based economies stood to be affected more than other areas by the “Stay Home, Save Lives” campaign. In general, local businesses are more reliant on foot traffic than large global corporations, so when in-person activities of retail shops

and restaurants are restricted, small businesses are more likely to lose out on sales and customers. In addition, the loss of revenue is compounded when the local economy in which the businesses operate is reliant on tourists because stay-at-home orders discourage travel.

The Oregon Coast is chosen as the scope of this project because it is an example of a tourism-reliant economy that would likely suffer negative consequences from the stay-at-home restrictions. This project aims to answer the following two research questions: (1) How did tourism to the Oregon Coast change, if at all, during the COVID-19 pandemic? (2) Which industry sectors were most affected and which were least affected by Oregon's stay-at-home orders? By investigating these questions, policymakers would have a better idea of what the impacts of stay-at-home orders and similar policies would have on tourism and local businesses along the Oregon Coast.

Literature Review

This project is situated in the wider context of tourism studies and economic research into COVID-19 pandemic policies. As such, understanding the history of Oregon coastal economies as well as the current effects of emergency orders are both important. Additionally, the monetary and social impacts of tourism have been investigated within the economics field, and this body of research can serve as a guide to the traditional and experimental methods of economic analysis. All three sections, (1) coastal economies in Oregon, (2) COVID-19 pandemic policies in Oregon, and (3) economic analyses of tourism are discussed in the following sections.

Section 1. Coastal Economies in Oregon

On the whole, Oregon's economy has historically been heavily reliant on natural resource-based, exporting sectors, including timber, forestry, and fishing, all of which are known as "basic industries." While the Oregon Coast is no exception, its dependency on basic industries has been declining since the 1990s, which has resulted in a shift to increases of opportunity and employment in the tourism and service sectors (Zamora Arroyo, 1994). According to the Oregon Tourism Commission, between 2010 and 2018, the Oregon Coast saw a 4% increase in visitor spending, from \$1.5 billion to \$2.2 billion; a 2.2% increase in direct employment, from 19,690 jobs to 23,460 jobs; and a 5.9% increase in total employee earnings, from \$427 million to \$674 million (2019). These numbers clearly show that the coastal tourism industry has been on the rise in recent years.

The shift away from basic industries to service industries is not due to random factors; the Oregon government had passed bills and budget proposals to promote tourism and hospitality sectors in the state. In 2003, a 1% state lodging tax was established, with the passing of the Oregon Tourism Investment proposal, and the tax has since increased to 1.5% in 2020 (Oregon Tourism Commission, 2019). As of 2019, the Oregon Coast region was expected to receive \$3.2 million over the course of 2019-2021 from Travel Oregon's Regional Cooperative Tourism Program (Oregon Tourism Commission, 2019). With so much financial and government support in recent years, it is no wonder why tourism is emerging as a pillar of Oregon coastal economies. That said, it can be assumed then that drastic changes to the number of tourist visits would then have significant impacts on the local economies.

Section 2. COVID-19 Pandemic Policies in Oregon

Oregon State Governor Kate Brown issued an initial emergency order in early March of 2020, which was quickly followed by Executive Order 20-12 introducing the "Stay Home, Save Lives" campaign. Governor Brown wrote:

On March 17, 2020, I prohibited gatherings of 25 or more people, banned on-site consumption of food and drink at food establishments statewide, and extend[ed] school closures until April 28, 2020. I also encouraged all businesses not subject to the prohibitions to implement social distancing protocols. (Executive Order 20-12, 2020)

The document also specifically prohibited "the operation of...businesses, for which close personal contact is difficult or impossible to avoid" (Executive Order 20-12, 2020).

A fair amount of research on the impacts of COVID-19 lockdown restrictions such as Oregon's "Stay Home, Save Lives" campaign has been conducted, though

primarily at national and international scales, including, but not limited to, the following three studies: Rose (2021) explores a comparison of the economic impacts of COVID-19 in the United States to the economic impacts of other recent natural and human-caused disasters; Barua (2020) provides a comprehensive, macroeconomic look at the implications of the health crisis globally; and Mueller et al. (2020) analyze how urban-centric COVID-19 policies significantly impact the lives and well-being of rural America. While these three papers by no mean represent the substantial amount of published research on coronavirus lockdowns, they do show that much of the focus has been on the pandemic's national and global effects, rather than state and local ones.

In terms of a specific look into the impacts of the COVID-19 pandemic in Oregon and Oregon communities, the research is much sparser. Dahl, Dall'Osto & Harrington (2021) investigated how reduced economic activity due to the pandemic affected the environment by analyzing low-frequency underwater noise off the Oregon Coast. Ettliger & Hensley (2021) published quantitative evidence of how COVID-19 restrictions affected employment by state. For Oregon, the researchers found the top three industries with the largest decreases in jobs between February 2020 and September 2021 to be Arts, Entertainment, & Recreation, with a 38.5% decrease in jobs; Accommodation & Food Services, 17.0% decrease; and Education Services, 12.1% decrease (Ettliger & Hensley, 2021). Ettliger & Hensley (2021) also found that in February 2020, before the stay-at-home orders, the unemployment rate in Oregon was 3.3%, but by April 2020, unemployment in the state rose sharply to 13.2%. From these statistics, it is clear that the public health crisis and the subsequent policies had

significant effects on Oregon, which this project will investigate at a local level and with an economic lens.

Section 3. Economic Analyses of Tourism

Given the significant policy implications of tourism studies, economists have been researching the monetary and social impacts of tourism for a long time. Historically, economic analysis of tourism has been conducted at the county level, and as such, “most of the readily available information [and data are] at the county level” (Zamora Arroyo, 1994). However, more recently, the field has been shifting its scope to examining effects at the smaller community level, and, while a fair amount of economic research has honed in on the impacts of national and international tourism, such as Faber & Gaubert (2018) and Sunlu (2003), the methods can be applied to local and state tourism as well.

Traditional input-output models, which mathematically model the flow of money within an economy, are commonly used in tourism economic impact studies (Stynes, 1997). However, this project is interested in measuring tourism as both an economic and non-economic activity, which is why tourist visits to natural landmarks, where no monetary transactions occur, and to business establishments, where monetary transactions do occur, will both be counted and considered. Aside from input-output models, economists have also often utilized contingent value methods in the form of surveys to gauge the social impact of tourism (Lindberg & Johnson, 1997; Zamora Arroyo, 1994). Since this project uses quantitative cell phone data to track visits to various establishments, the contingent value methods will not be used.

Data and Methods

In order to measure tourism levels, I use cell phone data from a private company, SafeGraph¹, to track weekly visits to various locations along the Oregon Coast between 2018 and 2022. SafeGraph provides a sample of about 10% of total cell phone devices in the United States (Squire, 2019). The locations investigated, known as “points of interests (POIs),” in SafeGraph terms, are all within 20 kilometers of the Oregon Coast. The POIs were sorted as natural landmarks or business establishments, so as to distinguish between whether or not economic activity would take place at the location. “Beaches” and “Ports and Marinas” fall under natural landmarks, and “Recreational Goods Rental,” “Restaurants,” “Hotels and Motels,” and “Gift and Souvenir Stores” represent business establishments, for a total of six POI categories. The raw data contained 883,779 daily observations, which were cleaned and binned into weekly visits, resulting in 209 weeks’ worth of data² for each category.

Natural landmarks contain locations that, for the most part, do not result in direct economic transactions. This category includes visits to beaches, ports, and marinas, as well as water activities, such as fishing and whale watching. All of these POIs encourage and provide outdoor activities that can be enjoyed while safely socially distancing. Thus, even though the locations are definite tourist attractions of the Oregon Coast, they are less likely than business establishments to be negatively affected by stay-at-home orders. In fact, one may hypothesize that visits to natural landmarks could

¹ “SafeGraph [is] a data company that aggregates anonymized location data from numerous applications in order to provide insights about physical places, via the SafeGraph Community. To enhance privacy, SafeGraph excludes census block group information if fewer than two devices visited an establishment in a month from a given census block group” (Mortimer, 2021).

² See Tables 1 and 2 for the specific numbers of observations for each category.

have increased during the lockdown because people were anxious to travel locally and to venture outdoors.

Business establishments encompass locations that often result in an economic transaction. I looked at four major tourist industries in particular: (1) “Recreational Goods Rental,” which include stores that rent out dune buggies, ATVs, ocean kayaks, and windsurfing and kiteboarding gear, as well as agencies that provide land or water tours of the coast; (2) “Restaurants,” which represent retail food establishments; (3) “Hotels and Motels,” which cover traveler accommodation, including inns, lodges, and resorts; (4) “Gift and Souvenir Stores,” which comprise of businesses that sell coastal art and other specialty goods. Because customers were urged to stay at home and food, service, and retail businesses faced restrictions, POIs in the business establishment category would likely be negatively affected by the lockdown.

After cleaning and categorizing the data, I created event study graphs and ran ordinary least squares regressions with clustered standard errors to both visually and mathematically investigate the impacts of the stay-at-home orders on tourist visits to the six categories of POIs. The model used for each category regresses weekly visits to POIs on an indicator variable for the date March 17, 2020³ and seasonality controls for month and year:

$$\begin{aligned} \text{Weekly Visits to POIs}_t = & \beta_0 + \beta_1 \text{Lockdown} \\ & + \beta_2 \text{Feb} + \beta_3 \text{Mar} + \beta_4 \text{Apr} + \beta_5 \text{May} + \beta_6 \text{Jun} + \beta_7 \text{Jul} + \beta_8 \text{Aug} + \beta_9 \text{Sep} \\ & + \beta_{10} \text{Oct} + \beta_{11} \text{Nov} + \beta_{12} \text{Dec} + \beta_{13} \text{Yr2019} + \beta_{14} \text{Yr2020} + \beta_{15} \text{Yr2021} + \varepsilon_t \end{aligned}$$

³ “On March 17, 2020, I prohibited gatherings of 25 or more people, banned on-site consumption of food and drink at food establishments statewide, and extend[ed] school closures until April 28, 2020. I also encouraged all businesses not subject to the prohibitions to implement social distancing protocols.” (Executive Order 20-12, 2020)

Results

I began by creating event study plots of the raw data for each category. Figure 1 shows the total weekly visits to beaches, ports, and marinas between 2018 and 2022. The red line marks March 17, 2020 as the date of the strict COVID-19 lockdown. The clear seasonal variation in weekly visits, evidenced by large numbers of visits in the summer of each year, supports the claim that the majority of visits to the Oregon Coast are for tourism. A small decrease is seen in visits to beaches at the time of the policy; visits to ports and marinas are seemingly unchanged.

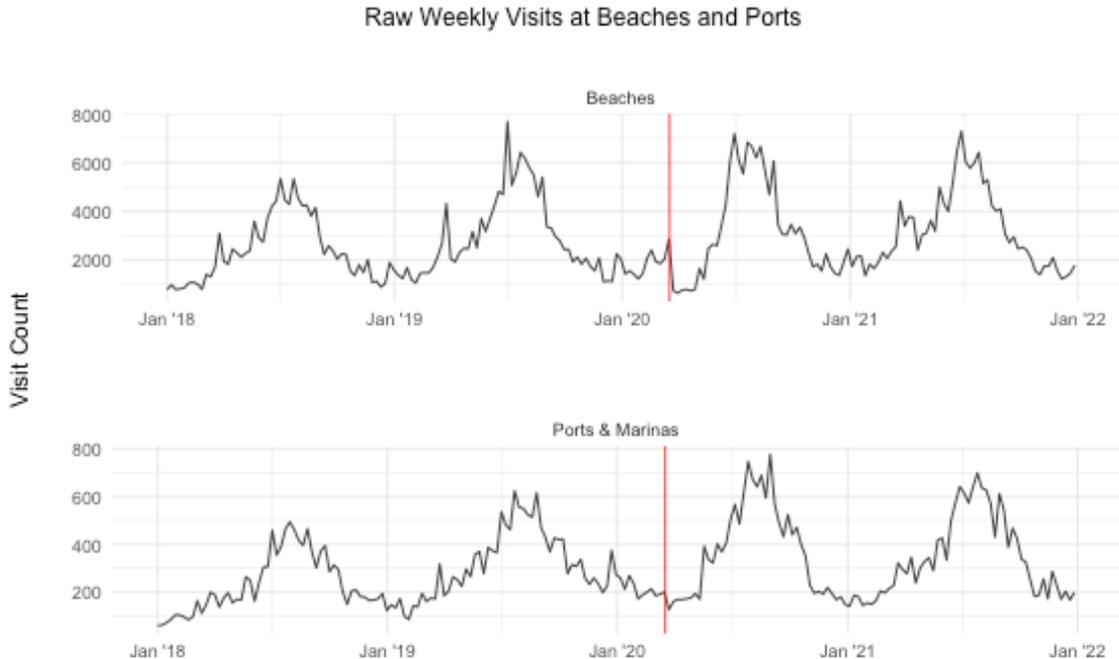


Figure 1: Weekly Visits to Beaches and Ports, Raw Count



This event study plot shows the total number of weekly visits to all beaches, ports, and marinas. The red line marks March 17, 2020, the date Governor Brown prohibited gatherings of >25 people, banned on-site consumption of food and drink at restaurants, and encouraged social distancing (Emergency Order 20-12, 2020).

Similar event study plots for visits to business establishments, broken down by industry category, are shown in Figure 2. Month-to-month seasonality is still very prominent in these figures, which can be evidence of how the Oregon Coast is economically influenced by tourism. There are sharp drops in visits to restaurants, hotels, and gift and souvenir stores at the time of the policy. Interestingly, there is a large jump in visits to recreational goods rental stores between 2020 and 2021. These identified trends will be explored more in later regressions.

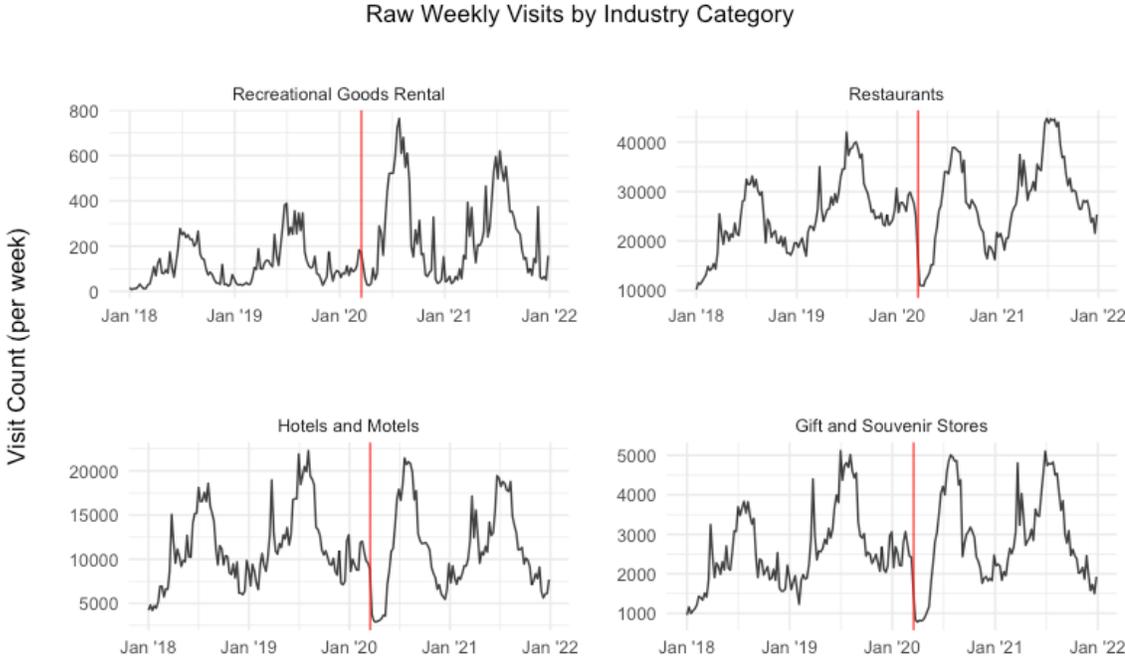


Figure 2: Weekly Visits to POIs by Industry Category, Raw Count

This event study plot shows the total number of weekly visits to business establishments, broken down by industry category.

Given the amount of noise in the raw data as well as the monthly seasonality, I created event study plots using moving averages in Figures 3 and 4 to confirm that the trends seen in the previous two figures are still present after smoothing.

Weekly Visits at Beaches and Ports

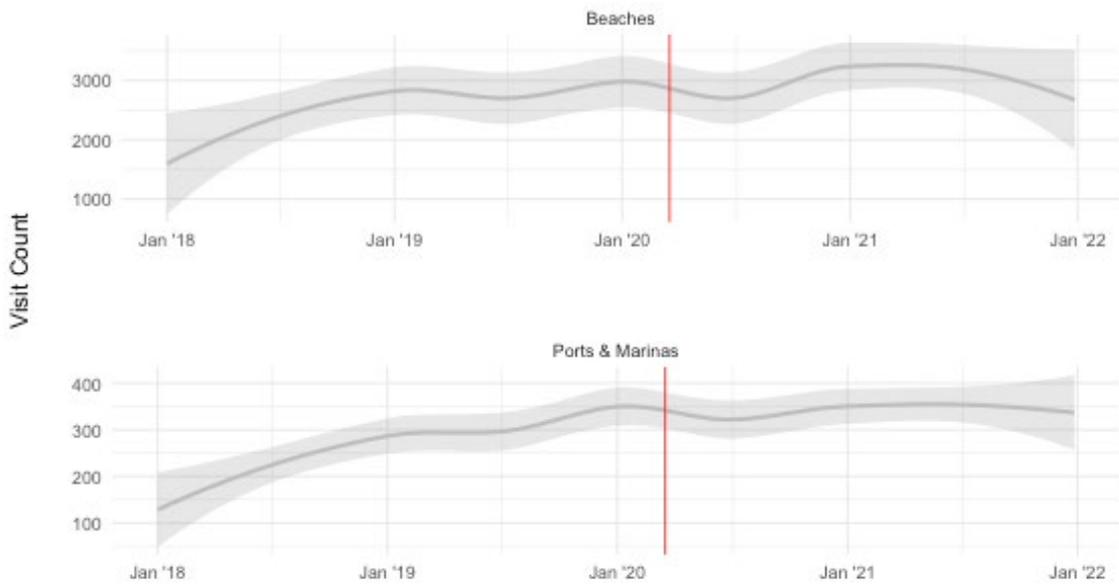


Figure 3: Weekly Visits to Beaches, Moving Average

This event study plot shows the total number of weekly visits to business establishments, broken down by industry category. Locally estimated scatterplot smoothing was used to calculate moving averages.

Weekly Visits by Industry Category

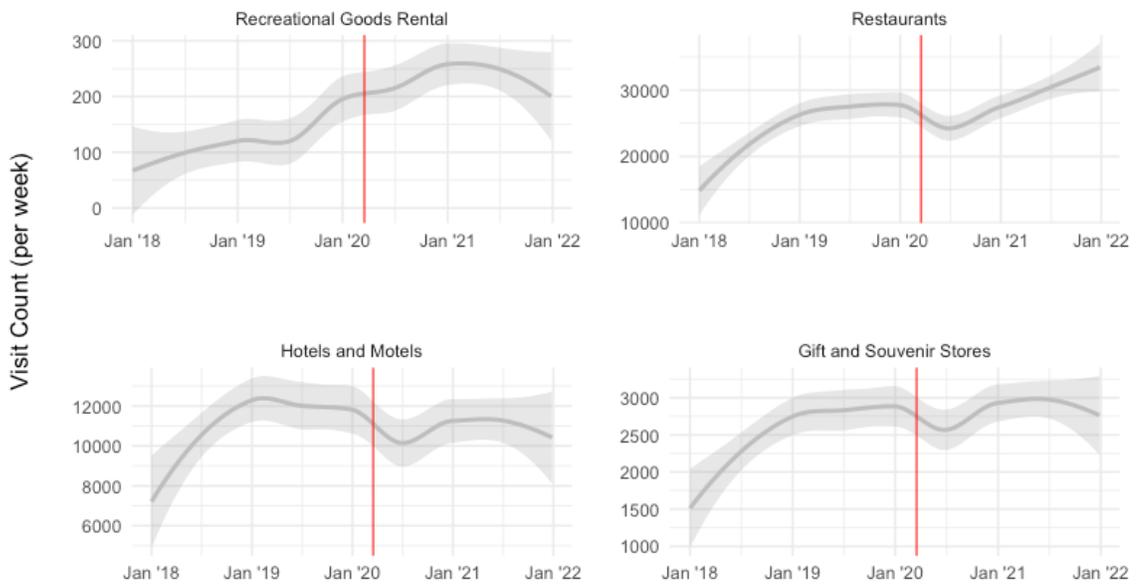


Figure 4: Weekly Visits to POIs by Industry Category, Moving Averages

To substantiate the trends seen in the previous graphs, I ran OLS regressions of weekly visits on the date of the COVID-19 lockdown and seasonality controls⁴. The results from the POIs within the natural landmarks category are shown in Table 1.

	Weekly Visits	
	Beaches (1)	Ports and Marinas (2)
Lockdown	-4.59 (3.34)	-1.13 (3.10)
Controls	Month, Year	Month, Year
2019 Mean	64.28	21.21
2019 SD	34.36	8.88
<i>N</i>	9,533	3,018
R2	0.11	0.16

Notes: ***Significant at the 1 percent level.
 **Significant at the 5 percent level.
 *Significant at the 10 percent level.

Table 1: Effects of COVID-19 Lockdown on Weekly Visits to Natural Landmarks

Regression results of weekly visits to individual beaches and visits to individual ports and marinas on March 17, 2020, the date of Oregon’s strict COVID-19 lockdown and controls for seasonality, i.e. month and year. Standard errors were clustered by POI. These statistics represent 10% of the total population.

Table 1 reports the raw output of my regression; however, since SafeGraph provides a 10% sample of the total cell phone data, I scale up the coefficients in my interpretation. The scaled-up β_1 coefficient on Lockdown in Model (1) tells us that the average Oregon Coast beach had a decrease of about 50 visits per week after the strict

⁴ Regression Model: $Weekly\ Visits\ to\ POIs_t = \beta_0 + \beta_1 Lockdown + \beta_2 Feb + \beta_3 Mar + \beta_4 Apr + \beta_5 May + \beta_6 Jun + \beta_7 Jul + \beta_8 Aug + \beta_9 Sep + \beta_{10} Oct + \beta_{11} Nov + \beta_{12} Dec + \beta_{12} Yr2019 + \beta_{13} Yr2020 + \beta_9 Yr2021 + \varepsilon_t$

stay-at-home order on March 17, 2020. Similarly, the Lockdown coefficient in Model (2) indicates a decrease of about 10 visit per week for the average port and marina. That said, neither coefficient is statistically significant, so I cannot conclude that there was a significant difference in weekly visits to natural landmarks before and after the policy.

Results of the industry-specific OLS regressions for business establishments are shown in Table 2.

	Weekly Visits			
	Rentals (1)	Restaurants (2)	Hotels (3)	Gift Stores (4)
Lockdown	3.5 (4.6)	-15.1*** (1.4)	-11.2*** (1.3)	-7.0*** (1.3)
Controls	Month, Year	Month, Year	Month, Year	Month, Year
2019 Mean	12.38	41.8	46.31	30.75
2019 SD	8.18	8.97	15.17	10.21
<i>N</i>	2,198	139,498	56,210	19,733
R2	0.1	0.01	0.1	0.03
<i>Notes:</i>		***Significant at the 1 percent level.	**Significant at the 5 percent level.	*Significant at the 10 percent level.

Table 2: Effects of COVID-19 Lockdown on Weekly Visits by Industry Category

Regression results of weekly visits to POIs of each of the four business establishment industries on March 17, 2020, the date of Oregon’s strict COVID-19 lockdown and controls for seasonality, i.e. month and year. Standard errors were clustered by POI. These statistics represent 10% of the total population.

There are statistically significant coefficients on Lockdown in Models (2), (3), and (4). After scaling, there was a decrease of 150 weekly visits to the average restaurant on the Oregon Coast after the stay-at-home order, coastal hotels had an average decrease of 110 weekly visits, and gift and souvenir stores lost an average of 70 weekly visits. These industries would be expected to have a drop in visits because the

businesses were greatly affected by the bans on on-site food consumption and required social distancing protocols.

Interestingly, Model (1) has a positive coefficient. Though statistically insignificant, the average increase of about 40 visits to recreational goods rental stores, compared to the significant and consistent declines in every other category, stands out. Referring back to the panels for recreational goods rental in Figures 2 and 4, there is an increase of weekly visits after March 17, 2020; people's behavior in response to the emergency order differs for recreational goods rental stores in comparison to the other industries. One potential explanation for this difference is that recreational rentals, such as dune buggies, ATVs, and ocean kayaks, are used for outdoor activities that can be conducted while safely socially distancing. Thus, similar to visits to natural landmarks, the lockdown restrictions may not have affected or, in fact, may have encouraged visits to recreational goods rentals stores.

Overall, restaurants, hotels, and gift stores were the only POIs with statistically significant decreases in weekly visits before and after the stay-at-home orders. These industries are primarily service-based and would have suffered negative economic consequences from the loss of customers. The natural landmarks, which include beaches, ports, and marinas, saw insignificant changes in weekly visits, as did recreational goods rental stores, likely because these POIs are outdoors, are unaffected by bans of on-site food consumption, and are easily compliant with social distancing requirements.

Discussion

The analysis in this project is intended to be purely descriptive. The trends in the figures and results of the regressions that reflect changes in weekly visits to the Oregon Coast over time can only be interpreted as correlation. In other words, while the pre-lockdown period does serve as the control for the lockdown period, the changes in visits from this study are not interpreted as causal because there were many other factors that could have affected tourism to the coast, unrelated to the emergency orders. For instance, the 2020 summer wildfire season in Oregon began merely a couple months after the introduction of “Stay Home, Save Lives,” which could have led people to evacuate to the coast.

In order to tease out the causal effects of the COVID-19 pandemic on Oregon’s coastal tourism, one would need to apply a rigorous quasi-experimental design, such as regression discontinuity (RD), requiring sound assumptions. It would have been difficult to conduct and justify an RD with this limited data set because of how many observable and unobservable factors, aside from the stay-at-home orders, changed during the time period.

Another important point to make is that the results of this study only reflect short-term impacts. The data set is limited to only two years after the emergency order, and the pandemic continues as of when this paper was written. Thus, it is impossible to predict what the long-term effects of the COVID-19 policies on coastal tourism will be based on this project’s results.

Though the results are only descriptive and global pandemics have been historically rare occurrences, research into the impacts of the coronavirus and its

subsequent policies on coastal tourism and economies is likely to become more and more relevant to policymakers and the greater society over time. In fact, there are already connections being drawn between the causes of climate change and increased probabilities of pandemics, including a study by Dr. Aaron Bernstein, the Director of the Harvard Center for Climate, Health, and the Global Environment. He writes:

Many of the root causes of climate change also increase the risk of pandemics. Deforestation, which occurs mostly for agricultural purposes, is the largest cause of habitat loss worldwide. Loss of habitat forces animals to migrate and potentially contact other animals or people and share germs. Large livestock farms can also serve as a source for spillover of infections from animals to people. (Bernstein, 2020)

Given the relation between environmental degradation and the increased possibilities of infectious diseases, pandemics may become more frequent. Thus, the emergency orders implemented during the COVID-19 crisis could serve as the blueprint for future policies, which is why research into the impacts of stay-at-home orders, including on coastal tourism and economies, is necessary.

Pandemics aside, one other broader potential policy implication of this research is that similar lockdowns have been issued in response to natural disasters. The 2020 wildfire season, as aforementioned, was devastating to the environment. The fires also produced huge amounts of smoke and ash that travelled throughout most parts of Oregon, Washington, and California. Similar to the COVID-19 policies, many local and state governments urged people to stay inside, in this case to avoid unhealthy air quality. Extreme weather events, natural disasters, and air pollution are likely to become more frequent and more dangerous due in part to climate change (National Wildlife Federation, 2019). As a consequence, all levels of governments may begin to implement more policies that are comparable to the stay-at-home orders used during COVID-19.

Conclusions

This project set out to answer the following two research questions: (1) How did tourism to the Oregon Coast change, if at all, during the COVID-19 pandemic? (2) Which industry sectors were most affected and which were least affected by Oregon's stay-at-home orders? After analyzing cell phone data from SafeGraph, I find statistically significant decreases in weekly visits to restaurants, hotels, and gift stores after March 17, 2020, when Governor Brown issued "Stay Home, Save Lives." Visits to business establishments in the food, service, and retail sectors were most affected by COVID-19 restrictions, whereas visits to natural landmarks, like beaches, ports, and marinas, as well as to recreational goods rental stores remained mostly unchanged. These descriptive results are unsurprising, since bans on on-site consumption of food and drink and social distancing protocols would affect the operations of restaurants, hotels, and gift stores much more than locations for outdoor activities.

Because businesses suffered significant declines and natural landmarks did not, it could be argued that the stay-at-home orders had a negative impact on Oregon Coast economies. It is not unrealistic to assume that visits to restaurants, hotels, and gift stores generally translate to sales. Thus, decreases in visits would correspond with decreases in economic activity on the whole.

With the results of this project in mind, a couple of informed policy recommendations are proposed. First, short-term relief provided by the government is beneficial to local economies during stay-at-home orders. Judging by the event study plots, although there was a significant drop in tourism to the coast at the time of the emergency order, the visit rates to most of the points of interest rose back to pre-

lockdown levels after about a year. Therefore, the immediate and direct impacts of the lockdown on tourism seem to be short-term, and so the government should implement policies that are likewise short-term to avoid inflation. Second, extra financial support should be provided to industry sectors hardest hit by a stay-at-home order. In the case of Emergency Order 20-12, strict restrictions on food, retail, and travel accommodation businesses resulted in larger losses of customers and thus, implied revenue for those locations, as compared to other industries. So, policymakers should be sure to provide adequate, if not additional, support to more vulnerable sectors.

Given the scope of the project's data set and the timing of this paper, it is still too early to tell how these short-term, descriptive trends will play out in the future. The Oregon emergency order was officially lifted on April 1, 2022, a time period not included in this project's data set. While the pandemic had not ended yet, by that date, the Office of the Governor decided "the emergency declaration itself [was] no longer necessary to [their] ongoing COVID-19 response" (Executive Order 22-03, 2022). The economic and social impacts of the pandemic and its subsequent policies will undoubtedly be studied for years to come to better understand long-term effects.

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