

## Effects of the COVID-related stay-at-home order on hospitality sales and automobile traffic counts

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### Abstract

This paper examines the effects of the COVID-related Stay-at-Home order on hospitality sales and automobile traffic counts in the State of Maine, USA. Empirical results show that the Stay-at-Home order did not impact either measure of state economic activity. Instead, households adjusted their behavior as a result of COVID-19 in advance of the Stay-at-Home order. These results are similar to those found in other states, where Stay-at-Home orders did not impact hospitality sales. This is an important public policy issue given the large health and economic impacts of the pandemic, and widespread use of Stay-at-Home orders. Even beyond the COVID pandemic, however, the extent to which people respond to government restrictions is important for policy development and implementation.

*Keywords:* COVID-19; Hospitality Sales; Maine; Stay-at-Home Order; Traffic Counts

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### 1. Introduction

Measures used to slow the spread of COVID-19—e.g., encouraging social distancing and prohibiting the assembly of big groups—curtailed economic activity worldwide. The hospitality sector experienced particularly severe impacts because many hotels and restaurants serve large groups gathered in confined spaces. For example, U.S. employment in the Accommodation and Food Services sector fell by 48.5 percent between February and April of 2020.<sup>1</sup> This reduction in employment conceals the exact timing of when people stopped eating in restaurants and staying in hotels, and when these businesses slowed down their operations. The period includes several COVID-related milestones that may have impacted household behavior.

About one month after the United States recorded its first confirmed case (January 21)—at that time—the country had its first confirmed death (at the time) from COVID-19 on February 29, 2020.<sup>2</sup> The United States approved widespread testing for Coronavirus on March 3, a

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<sup>1</sup> Employment figures are from the Current Employment Statistics series of the U.S. Bureau of Labor Statistics.

<sup>2</sup> These dates are from Taylor (2020).

national emergency was declared on March 13, the U.S. Centers for Disease Control and Prevention (CDC) recommended against gatherings of 50 or more people on March 15, and—by March 26—the United States had the largest number of confirmed cases in the world. States such as New York, Texas and Florida issued Stay-at-Home orders on March 22, April 2 and April 3, respectively (Chetty et al. 2020).

In some places, it appears that a reduction in hospitality sales happened before states issued their Stay-at-Home orders (Gabe and Crawley 2020). For example, Florida experienced a 62-percent drop in spending at restaurants and hotels on March 27 (Chetty et al. 2020), which was seven days before the state’s Stay-at-Home order. Likewise, U.S. restaurant and hotel spending had already fallen by 19 percent, as of March 15, when the CDC discouraged the gatherings of 50 or more people.

This paper investigates the effects of a COVID-related Stay-at-Home order on daily hospitality (i.e., restaurant and lodging) sales and vehicle traffic counts in the State of Maine, USA. The state’s hospitality sector is an important source of economic activity—e.g., it accounts for five percent of statewide GDP—which makes Maine a useful region to examine restaurant and lodging sales during the early stages of the pandemic.<sup>3</sup> The analysis is based on monthly hospitality sales data from Maine Revenue Services, daily observations on the impacts of COVID-19 on Maine consumer spending at restaurants and hotels (Chetty et al. 2020), and—as a second indicator of economic activity—daily traffic counts.

There has been much speculation on the extent to which Stay-at-Home orders, which have been widely used in many countries, affect economic activity. Bloom, Kuhn and Pretzner (2020) suggest that Stay-at-Home orders have a tradeoff between limiting disease spread and the economic impacts of these restrictions. They note that lockdowns are “a double-edge sword; telling workers to stay home has an obvious and immediate negative economic impact, while not shutting down could lead to more workers getting sick...” Although the notion of lockdowns creating an “obvious and immediate economic impact” has a strong intuitive appeal, it is also plausible that—when faced with a new and unknown public health threat such as COVID-19—people will adjust their behavior even before such measures are imposed (Goolsbee and Syverson 2021). This idea of people taking action on their own, in advance of the government restriction, motivates our research on the effects of a Stay-at-Home order on two types of economic activity. The use of daily observations for hospitality sales and traffic counts in the period immediately before and after the government restriction allows us to answer the question: Did people change their behavior because of the Stay-at-Home order, or had they already taken action in response to COVID-19?

This paper contributes to a new literature on the impacts of COVID-19 (Bauer and Enzo 2020; Devaraj and Patel 2020; Gibson and Sun 2020; Grobys 2020; Harjoto, Rossi and Paglia 2020), and—specifically—how household behavior changed as a result of the pandemic. For example, Baker et al. (2020) found that U.S. household spending (e.g., groceries) increased between February 26 and March 16, followed by large reductions in spending (e.g. restaurants) from the middle to late March of 2020. Likewise, Lewis, Mertens and Stock (2020) uncovered a steep decline in U.S. economic activity near the end of March. An important disentanglement is to ascertain whether these large economic impacts happened because of the Stay-at-Home orders or whether household behavior changed because of a growing awareness of COVID-19. This is an important public policy issue given the large health and economic impacts of the pandemic, and widespread use of Stay-at-Home orders.<sup>4</sup> Even beyond the COVID pandemic, however, the extent to which people respond to government restrictions is important for policy development and implementation.

<sup>3</sup> This figure is from: <https://www.mdf.org/wp-content/uploads/2019/04/MOG-FullReport2019-FNL.pdf>.

<sup>4</sup> See, for example, <https://www.npr.org/sections/coronavirus-live-updates/2020/04/06/828506423/could-society-move-toward-normalcy-before-a-coronavirus-vaccine-is-ready>.

## 2. Method and data

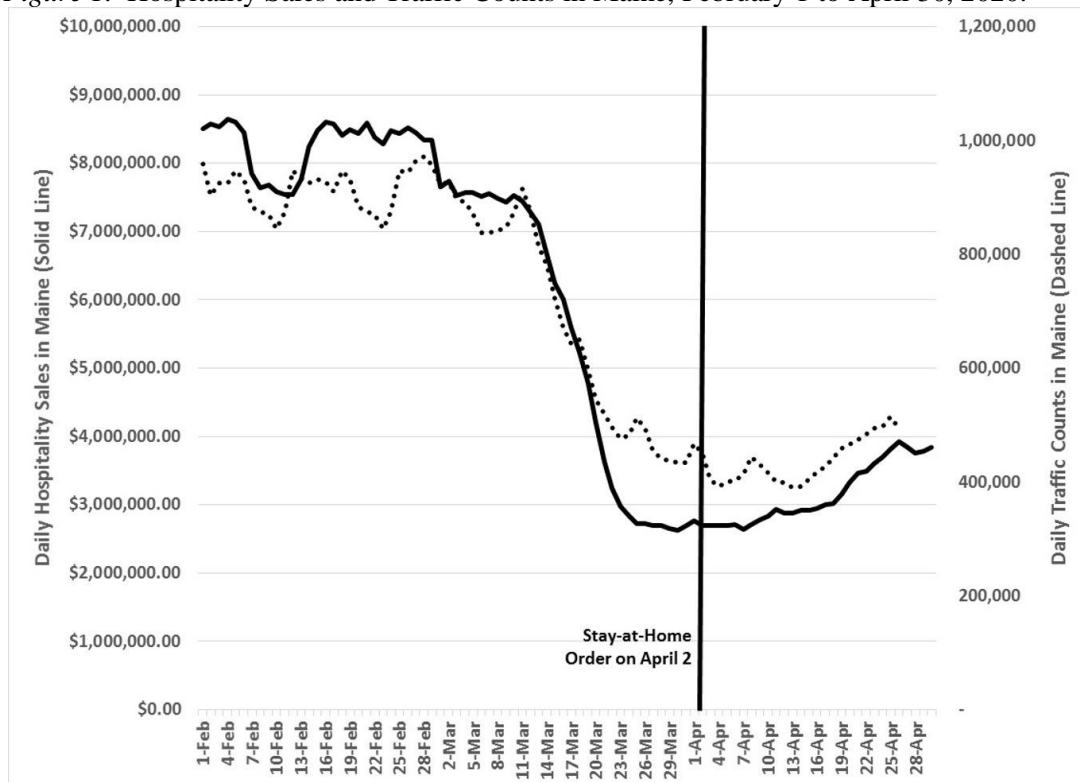
The method used to examine the effects of the Stay-at-Home order on state-level economic activity is a time-series regression analysis, described in more detail below, of hospitality sales and vehicle traffic counts. The analysis uses daily observations between February 1 and April 30 for these two measures of economic activity, which allows us to observe behavior in the period immediately before and after the restriction went into effect on April 2, 2020. Daily hospitality sales are estimated using information from Chetty et al. (2020) and the daily traffic counts come from the Maine Department of Transportation.

Figure 1 displays daily hospitality sales in Maine between February 1 and April 30, 2020. To calculate these values, we used data from Chetty et al. (2020) that show the daily impacts of COVID-19 on consumer spending. For example, Maine experienced a 42.1-percent reduction in consumer spending at restaurants and hotels on March 19, which suggests that spending was at a 57.9-percent level on that date (*Daily Percent<sub>t</sub>*).<sup>5</sup> The spending percentages for each day between February 1 and April 30 are used to apportion monthly taxable sales (for 29 days in February, 31 days in March, 30 days in April) at Maine restaurants and hotels into daily sales values.

$$Daily\ Sales_t = (Daily\ Percent_t / \sum_{t=1}^{29,30,31} Daily\ Percent_t) \times Monthly\ Taxable\ Sales \quad (1)$$

The hospitality sales in Figure 1 follow the exact pattern as the daily COVID-related impacts in Maine (Chetty et al. 2020), and the values sum to the exact amount of taxable hospitality sales in each month. As a second indicator of economic activity in Maine—and a check of the accuracy of the estimated hospitality sales numbers—Figure 1 also shows daily traffic counts from the Maine Department of Transportation. The traffic counts are based on hourly data, which are aggregated to daily values, from 71 permanent recorder sites in Maine.<sup>6</sup>

Figure 1. Hospitality Sales and Traffic Counts in Maine, February 1 to April 30, 2020.



<sup>5</sup> The daily COVID-19 impacts reported by Chetty et al. (2020) are relative to a baseline period of January 4 to 31, 2020.

<sup>6</sup> To smooth the data, the traffic counts in figure 1 are 5-day moving averages.

### 3. Results

Maine hospitality sales fell substantially from about \$8 million to \$3 million per day between the end of February and the third week of March. This reduction in economic activity is consistent with the patterns uncovered by Baker et al. (2020) and Lewis, Mertens and Stock (2020) and, similarly, Carvalho et al. (2020) found very sharp COVID-related declines in Portugal's hospitality sector. Sales in April, which cover 29 days of Maine's Stay-at-Home order starting on April 2, ranged from \$2.7 million to \$3.9 million per day with a slight upward trend over the period. Overall, the estimated Maine hospitality sales figures track very closely with daily traffic counts observed across the state ( $r = 0.99$ ).

Although hospitality sales and traffic counts fell sharply as a result of COVID-19, these variables were relatively flat in the days immediately before and after the Stay-at-Home order. To examine these results further, Tables 1 and 2 present evidence from a time-series analysis of the effects of the Stay-at-Home order—issued on April 2, 2020—on daily hospitality sales and traffic counts between February 1 and April 30. Augmented Dickey-Fuller tests (Table 1) indicate that the hospitality sales and traffic count variables are nonstationary. Given the potential of nonstationary data generating spurious results, we perform a first-difference transformation of the two dependent variables (Baltagi, Kao and Liu 2008; Mixon and Upadhyaya 1998), which are confirmed as stationary by augmented Dickey-Fuller tests of the transformed variables. Finally, the regression models include lagged values of the dependent variables as explanatory variables, given results of a preliminary analysis indicating the presence of autocorrelation.

To capture the effects of the Stay-at-Home order, we constructed two interval-scaled predictor variables (counting the days before and after the Stay-at-Home order), which allows the effects to be modulated over time unlike a traditional dummy variable.<sup>7</sup> Because of the strong multicollinearity between the two predictor variables, we estimate separate regression models focusing on the effects associated with the days leading up to and following the Stay-at-Home order.

The results in Table 2 indicate that the variables representing the number of days before and after the Stay-at-Home order do not have significant effects on hospitality sales or vehicle traffic counts in Maine. The lagged values of the dependent variables, however, are significant predictors of the first difference of daily hospitality sales and traffic counts. Overall, the regression results suggest—as shown in figure 1—that hospitality sales and traffic counts did not change very much as a result of the Stay-at-Home order.

As an extension to our analysis, and robustness check of our results focusing on Maine, we examined the effects of the “days before” and “days after” variables on hospitality sales, measured using data from Chetty et al. (2020), in the other 41 U.S. states that implemented COVID-19 Stay-at-Home orders. Results show that the Stay-at-Home orders—either days before or after—did not impact hospitality sales (at a 5-percent significance level) in any of the 82 additional regression models. Another extension to our analysis looked at the effects of the Stay-at-Home orders in neighboring states on tourism activity in Maine. Here, we find that the Stay-at-Home orders in Massachusetts (March 24), New Hampshire (March 27) and Vermont (March 24) did not affect hospitality sales or traffic counts in Maine. These two extensions to the analysis suggest that our results for Maine are representative of the impacts of Stay-at-Home orders in other places, and that the restrictions placed on residents in nearby states had no effect on the two indicators of economic activity in Maine.

<sup>7</sup> We also estimated versions of the models using a traditional dummy variable indicating the period of the Stay-at-Home order. Results are very similar to those presented in table 2, but the models with the interval-scaled predictor variables are more efficient (measured using the AIC).

Table 1. Dickey-Fuller Tests for Stationarity.

	Daily Level	First Difference
<i>Hospitality Sales</i>	1.544	-3.065*
<i>Traffic Counts</i>	2.091	-6.076*

Note: The superscript \* indicates significance at a 5-percent level.

Table 2. Time-Series Regression Results: Effects of Stay-at-Home Order on Economic Activity.

	Hospitality Sales		Traffic Counts	
<i>Days Before Stay-at-Home Order</i>	-244 (0.805)	NA	150 (0.784)	NA
<i>Days After Stay-at-Home Order</i>	NA	2,275 (0.228)	NA	1,115 (0.334)
<i>Lag(1) Hospitality Sales</i>	0.398*** (0.000)	0.375*** (0.001)	NA	NA
<i>Lag(2) Hospitality Sales</i>	0.294** (0.006)	0.270* (0.012)	NA	NA
<i>Lag(1) Traffic Counts</i>	NA	NA	-0.270* (0.012)	-0.278* (0.010)
<i>Lag(2) Traffic Counts</i>	NA	NA	-0.346** (0.002)	-0.354** (0.001)
<i>Constant</i>	-12,214 (0.611)	-32,426 (0.150)	-10,501 (0.429)	-13,547 (0.226)
<i>Sample Size</i>	87	87	83	83
<i>F-value</i>	16.55	17.30	4.863	5.205
<i>R<sup>2</sup></i>	0.35	0.38	0.15	0.16
<i>DA AC Test</i>	0.000	0.045	0.476	0.424

Notes: Dependent variables are transformed into first differences. P-values are shown in parentheses. The superscripts \*, \*\* and \*\*\* indicate significance at a 5-percent, 1-percent and 0.1-percent levels. Traffic counts are unavailable for the last four days of April.

#### 4. Concluding remarks

The U.S. hospitality sector experienced substantial losses due to COVID-19. These impacts were acutely felt by restaurants and hotels as, for example, sales fell by 43 percent nationwide between January and March 20, and by 64 percent from January to April 10 (Chetty et al. 2020). A variety of factors contributed to these reductions, including households acting to limit their exposure to COVID-19 and government authorities mandating the closures of nonessential businesses.

This paper analyzed whether the implementation of a statewide Stay-at-Home order affected economic activity, measured as hospitality sales and vehicle traffic counts. Our empirical results, using data from the State of Maine, suggest that the Stay-at-Home order did not trigger a sharp decline in hospitality sales nor drop in traffic counts. Instead, it appears that households changed their behavior in advance of the Stay-at-Home order. These results are qualitatively similar to the findings of Goolsbee and Syverson (2021) and Gibson and Sun (2020), who conclude that factors other than the Stay-at-Home order—“such as the spread of the virus and a general waning of consumer confidence”—may have contributed to the economic impacts of COVID-19. Although our findings for Maine are consistent with the impacts of Stay-at-Home orders issued in other states, the analysis does not explicitly account for local (e.g., county- or city-level) restrictions or the actions of businesses (e.g., national hotel chains) themselves to limit their capacity prior to the state-level Stay-at-Home order. Future research will consider these issues and seek to identify the exact events that triggered declines in economic activity and the behavioral adjustments of households.

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