1 Summary

Does the revenue of Indian restaurants in London depend on the weather? I attempt to answer this question using daily take-out order data from two Indian restaurants in London obtained from Kaggle[1]. This data set contains information on the ordered food item names along with the quantity and price. I merge this data set with monthly weather information in London obtained from the Meteorological Office which is UK's national weather service[2]. Since I am only able to obtain monthly weather data, the analyses will be done at the monthly frequency. The results should obviously be taken with a grain of salt, as I only have data of two restaurants which is very likely not representative of the Indian restaurant market in London.

The revenues of the two Indian restaurants are aggregated at the monthly level. Table 1 presents summary statistics of the data. The average combined revenue of the two Indian restaurants is $21,347$ pounds per month. The minimum revenue is extremely low, though, this is an outlier due to the data being incomplete for the earlier months in the sample. The results are robust with or without the inclusion of the earlier months of the sample. The average temperature of 12 degrees, the average rainfall of 51 mm, and the average sunlight of 125 hours all seem very indicative of UK's notorious weather. Figure 1 shows a word cloud of the ordered food items which reveals a very typical menu of Indian restaurants in the UK.

Table 1: Summary Statistics

This table presents summary characteristics of take-out orders from two Indian restaurants in London along with weather information over the period from January 2015 until December 2019. The take-out order statistics include the combined total revenue of the take-out order, the average number of order, and the average order price per month. The weather inforamtion include the temperature in Celsius, the rainfall in millimeters, and the duration of sun in hours.

	mean	SD	min	25th prctile	50th prctile	75th prctile	max	# obs
Revenue	21,347	11,895	12	8,660	25,556	30,989	39,587	53
Quantity	623	346	1	271	747	911	1,107	53
Price	32.61	5.96	3.95	32.84	33.98	35.12	37.09	53
Temperature	12.05	5.29	3.65	7.15	11.70	16.70	22.35	53
Rain (mm)	51.00	26.23	0.40	33.60	50.00	65.20	116.80	53
Sun (hours)	125.17	61.89	35.00	66.70	120.10	176.30	272.50	53

[1] https://www.kaggle.com/henslersoftware/19560-indian-takeaway-orders
[2] https://www.metoffice.gov.uk/

Figure 1: Word Cloud of Indian Take-Out Orders

This figure plots a word cloud of take-out orders from two Indian restaurants in London over the period from January 2015 until December 2019. The size of the font represents the frequency of the word in the data.
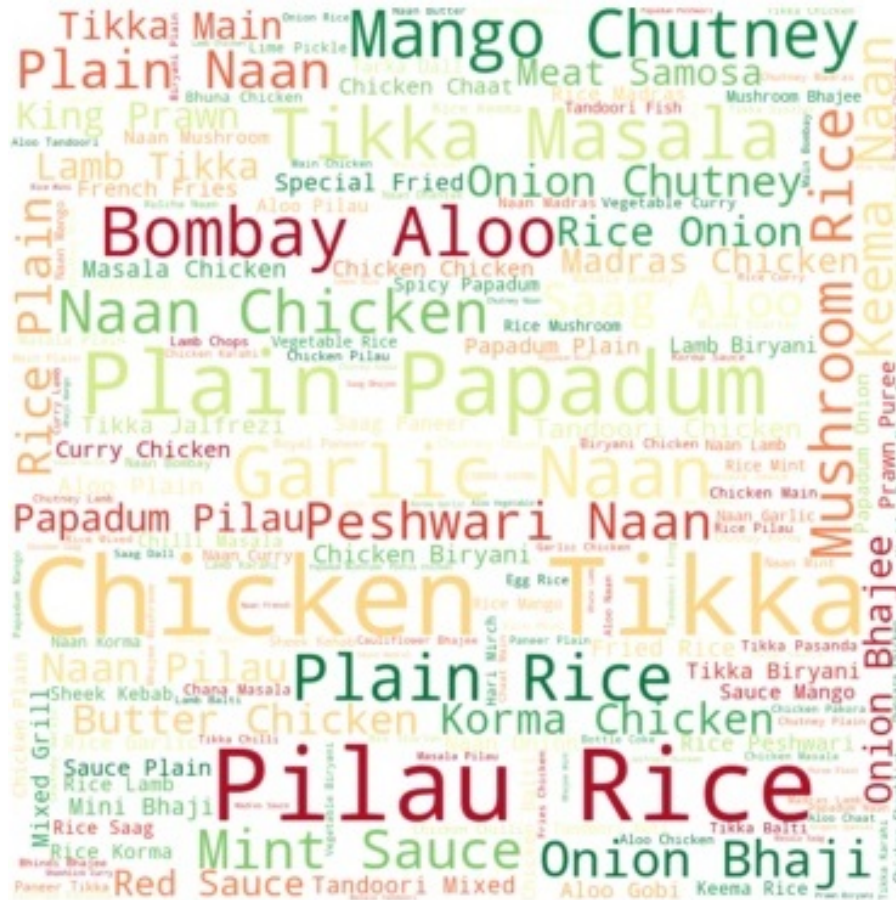
I perform a simple regression analysis to examine the effect of the weather on revenue of these Indian restaurants with the following model:

$$Revenue_t = \beta_0 + \beta_1 Temperature_t + \beta_2 Rain_t + \beta_3 Sun_t + \varepsilon_t, \tag{1}$$

where $Revenue_{i,t}$ is the combined total revenue of the Indian restaurants at month t. The independent variables include the temperature in Celsius, the rainfall in millimeters, and the duration of sun in hours. I also include month fixed effects to control for seasonality. The results shown in Table 2 show there is no effect of the weather on the revenue of these Indian restaurants. Again, this could be simply explained due to lack of data.

Table 2: The Effect of Weather on Indian Take-Out Revenue

This table presents OLS regression results of the following model using a sample of take-out orders from two Indian restaurants in London over the period from January 2015 until December 2019:

$$Revenue_t = \beta_0 + \beta_1 Temperature_t + \beta_2 Rain_t + \beta_3 Sun_t + \varepsilon_t,$$

where $Revenue_{i,t}$ is the combined total revenue of the Indian restaurants at month t. The independent variables include the temperature in Celsius, the rainfall in millimeters, and the duration of sun in hours. The first column shows the estimation results in terms of total revenues, whereas the second and third column breaks down revenue in terms of the average number of orders and average order price at each month. The standard errors are shown in parentheses.

	(1) Revenue	(2) Quantity	(3) Price
Temperature	-7.496	0.411	-293.250
	(45.730)	(0.737)	(1573.074)
Rain	-2.765	-0.061	-97.503
	(2.534)	(0.041)	(87.173)
Sun	2.342	-0.002	76.617
	(2.216)	(0.036)	(76.241)
Observations	53	53	53
R^2	0.140	0.264	0.141
Month Fixed Effects	Y	Y	Y

***, ** and * show significance at the 1%, 5% and 10% level respectively.