Alain MERCERON - December 6 2023

DATA ANALYSIS

ASSIGNMENT 2

INTRODUCTION

We selected the city of Prague to conduct this analysis. From an initial number of 406 hotels, we worked on 320 units. We set a limit of USD600 per night, excluding 4 hotels from our analysis. Only hotels with proper ratings were kept.

75% of the Prague hotels selected are 3 stars and above. The average hotel rating is 4.0, seemingly high.

WORK

The first analysis of the data showed the strong correlation between price variation and the 3 variables: distance, rating, stars. See Scatter Plot (exhibit 1).

As far as ratings are concerned, we applied the three prediction tools LPM, Logit and Probit to establish what hotel features have an impact on rating and to what extent they determine the probability of getting a high rating (>4.0).

We looked at stars and distance both as categorical and binary values. We also explored promotional price cuts (not decisive) and number of reviews (marginal).

Whilst Stars and Distance showed high significance (<1%) on linear prediction analyzed separately, we obtained strange results with the combination of Stars and Distance (negative probability possibly due to the narrow distribution of hotels on Stars and Distance). We however got satisfactory results with the combination of both as binary variables: “4 stars and above” on one hand and “under 1 mile” on the other hand (exhibit 2). Those choices of cuts were the result of all the preliminary analysis on the data (see Python code).

CONCLUSION

The analysis of hotels from Prague confirms the impact that ratings have on price (high correlation of 70%). To better understand the probability of getting a high rating (on average 60%), we come to the conclusion that:

- the probability to get a high rating is impacted by the hotel quality (4 star and above - +35pts)
- and the distance from the center (in our analysis "under 1 mile" is adding 15 pts to the probability).
- the Probit (exhibit 3) and Logit give strong similar estimates. Results satisfy the 1% significance level. However some indicators are less conclusive like the probability distribution particularly with the LPM (size of the dataset too small?).

APPENDICES

Exhibit 1 - Hotel Sample

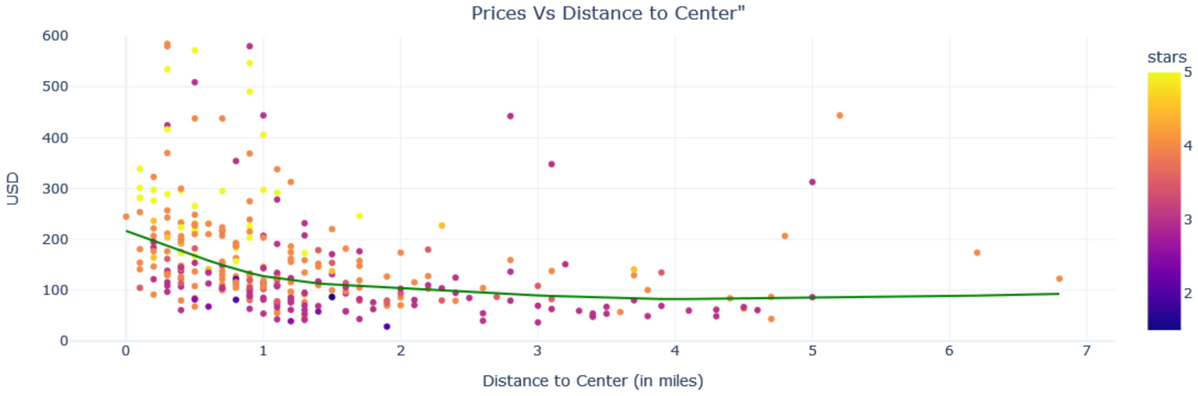
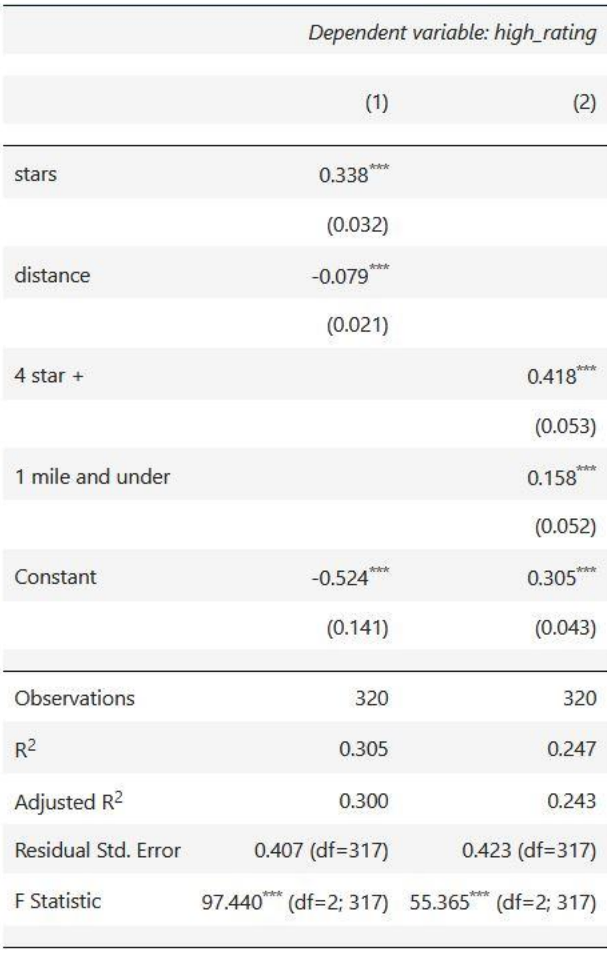


Exhibit 2 - LPM

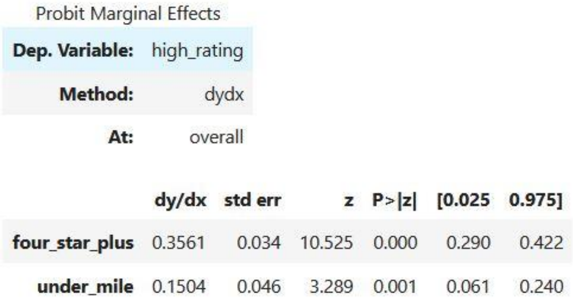
(1) = Vs stars (number) and distance (miles)

(2) = Vs binary variables “4 stars +” and “under 1 mile”



	Dependent variable: high_rating	
	(1)	(2)
stars	0.338***	
	(0.032)	
distance	-0.079***	
	(0.021)	
4 star +		0.418***
		(0.053)
1 mile and under		0.158***
		(0.052)
Constant	-0.524***	0.305***
	(0.141)	(0.043)
Observations	320	320
R^2	0.305	0.247
Adjusted R^2	0.300	0.243
Residual Std. Error	0.407 (df=317)	0.423 (df=317)
F Statistic	97.440*** (df=2; 317)	55.365*** (df=2; 317)

Exhibit 3 - Probit Marginal Effect



Probit Marginal Effects

Dep. Variable:	high_rating
Method:	dydx
At:	overall

	dy/dx	std err	z	P>|z|	[0.025	0.975]
four_star_plus	0.3561	0.034	10.525	0.000	0.290	0.422
under_mile	0.1504	0.046	3.289	0.001	0.061	0.240

The marginal results are very close to the logit numbers (within 1 pt range) on both variables.

In both instances, the P value is close to zero, the CI interval does not include. We can reject the null.