Can You Tell the Price of a Restaurant's Food—Without Going Inside?

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Summary:

Restaurants provide food to most people at most times on most days at a price given on their pre-printed menu. Economists will tell you that restaurants choose the prices of their food by finding where their marginal revenue meets their marginal cost—this will maximize their profit. While economists know this, it is common knowledge that not all restaurants charge the same prices. Therefore, each individual restaurant must have some factors that change their marginal cost, or marginal revenue curves, thus shifting their price equilibrium away from that of another restaurant's.

It seems logical to assume that while no restaurant is exactly like another, some have similar characteristics. It is equally logical to assume that the same factors that shift the price of a meal in one restaurant will shift the price the same direction in a similar restaurant. The results of this project dissect these different factors influencing a restaurant's pricing differences. It develops a model that can be used to predict the price of a meal an individual restaurant based on factors that can be determined from the outside looking in. In short, I found out which factors inflated the price so that I could always dine at the cheapest possible establishment.

After running a least squares regression on the collected data, it was found that the price of a meal at a restaurant can be successfully determined without setting foot in the door. The model that does this was tested using two separate restaurant observations and found to be accurate within a 2 to 3 dollar margin of error per plate. The biggest factors in the pricing at a restaurant were found to be: if they take reservations for two (+$5), if people dress-up to dine there (+$7), if they have a full bar (+$2), if they sell fast food (-$2.50), and their distance from the city center (-$0.30 / mile).

Restaurants: Good & Cheap

For an econometrics class it seems logical to examine prices and factors that influence prices in a certain market. However, no one wants to study something that they have no interest in, or something that does not directly affect them unless they are getting paid by to do so by some research grant (and I am not). I decided that as a genetically cheap and situationally poor college student, there is nothing that more directly relates to me than the price of a meal.

A brief look at restaurants shows that every restaurant has some feature that separates it from the next, be it atmosphere, location, clown mascot, or view. Continuing to act in my own self-interest, for this project I decided to examine restaurants and their prices. My goal was to use these features to determine what factors influence the price of a meal and how.

It is possible to determine the approximate price of a meal in any given restaurant in Seattle without entering the establishment by noting the different features the restaurant has. This model shows what a dollar can buy, and how it is possible to save a buck or two while being accurate within two dollars.

Surveying the Servers

For the first part of the project, I set out to classify as many different features that might affect the price of food at a restaurant as possible. Every restaurant seemed to have its own claim to fame. A feature that makes food expensive in one restaurant did not always seem to make the food cheaper in a restaurant without it—this made choosing the

possible influential factors difficult. In the end, I settled on the following factors: the time they opened and the time they closed; the restaurant's elevation above street level; size (in number of tables); distance from the city center; the existence of a view; whether-or-not they served fast food; had a bar; took reservations for two; operated out of their own building; had a foreign name; required their wait staff to wear a uniform; specialized in lunch; specialized in dinner; and if people dress up to dine there.

I set out to code 100 restaurants within the city limits of Seattle. I recorded the restaurant's address and all of possible influential factors. I later used the restaurant's address to find the distance from the center by using Yahoo! maps' driving directions[1]. At each restaurant, I went inside, and asked to see the menu. I averaged out how much money someone might expect to shell out for dinner and drink for two, and then divided it by two to get the price for one meal. This eliminated problems with family-style restaurants and pizza places where dinner for one gives plenty of leftovers.

After, 3 days, 2 parking tickets, and 1 tank of gas, I had observations from 100 restaurants all over the city of Seattle. I ran a standard least squares regression on my observations (Appendix A); the following is what I found.

Your Dollar at Work

Several factors can influence the price of a meal. Some of these factors have more significant influences on price than others. Surprisingly, the most notable factor is whether-or-not a restaurant takes reservations for a party of two. A person can expect to pay an additional five dollars per plate if the restaurant so much as offers dining-insurance—better known as "reservations."

[1] Yahoo! Maps <http://maps.yahoo.com/> chooses a city center at 6th Ave and Cherry for Seattle.

Less surprisingly, restaurants that offer their patrons a view charge about three dollars more per plate than establishments that don't. Further, if the restaurant being considered offers its patrons the added delight of spirits from a full bar while they dine, an additional two dollars per plate should be expected. The restaurant might defend that this goes to cover the two thousand dollar per year license required to serve spirits, beer, and wine with a meal[2]. However, simple mathematics shows that restaurants are severely overcharging.

What else are patrons almost certain to pay extra for? Clearly, it's not necessary to pay more to dine while dressed up. However, if dining expectations require other patrons to be to be wearing suspenders and a tie in addition; expect to pay an additional $7 per plate. This can be examined in two ways. Either people who dress up are willing to pay more to keep the slobs out, or people are willing to pay more to eat at a place where slobs don't dine.

It's been disputed and argued before but here is the definitive answer: size does not matter. The number of tables in a restaurant does not seem to influence the price of a meal with a respectable degree of significance.

Saving a Buck or Two

Anyone caught in the city without a lick of dining experience take note: the base price for a meal in Seattle is about $12 per plate. Don't fear, this can be knocked down to much less—trust me, I did it. One big saver is going to a restaurant that specializes in fast food. You have the potential to save over $2 for this and perhaps you'll be fuller faster, provided the restaurant does not also offer reservations or a view. If you can find

[2] Washington State Liquor Control Board <http://www.liq.wa.gov/licensing/license_fees.asp>

a restaurant that is open for business and specializes in serving food during the lunch time hours, you're in luck, another dollar falls from the price.

Interestingly, price and distance from the city center are related. For every mile away from the center of Seattle you travel you'll save about 30 cents per plate. Even more surprising, if you find a place that is open after 10:00 PM you'll likely get to keep another dollar in your wallet. Overall, if you work at it, you can knock about $5-$6 off of the price of a meal in Seattle. Perfection and stinginess take practice.

How Successful is this Model?

This model works well for predicting the price of a meal in any given restaurant in Seattle as the regression explains just under eighty-percent of the data, however it does have some downfalls. Surprisingly, several features that needed to be observed of restaurants were subjective. For example, it is difficult to record the hours of a restaurant that closes mid-day; and I'm still unsure as to whether-or-not a white stained shirt can be referred to as a uniform, even if everyone there is wearing one. Further, it is difficult to capture the intrigue of every restaurant surveyed. The model does not take into consideration pictures of celebrities on the wall, or waiters wearing roller skates. Adding more dummy variables is not the answer either. Adding a variable called 'has revolving restaurant' will not help the model. With merely one observation the variable would simply work to catch errors. Clearly adding more variables won't make this model more accurate. One idea to improve the model is to add some less subjective variables rather than more dummy variables. These less subjective variables might include: the use of tablecloths, linen napkins, and metal silverware. However I'm sure that I'd come across

a restaurant that used very thick, almost cloth-like paper napkins; or butcher paper as a table cloth. Both of which are again subjective.

Examining the results suggests that the model is successful, but empirical evidence is much more convincing. I put this model to the test by attempting to predict the price of two restaurants in Seattle: Azteca and Nasai Teriyaki—two restaurants that were not part of the original 100 observations. The model predicts a meal at Azteca would set someone back about $10.71. The actual cost of a meal at Azteca is approximately $12. The model also predicts a meal at Nasai Teriyaki to be about $6.46 where the actual cost when surveyed was $7.00. These figures show that this model not only works, but it works well. It is possible to determine the price of a meal in a restaurant without going inside.

Conclusion:

In the end, it is possible to predict the price of a meal of a restaurant without going inside as long as you don't mind being a couple dollars off. However, it was my experience that finding the price of a restaurant's food is easy—most restaurants post their menus in their front window. So instead of wondering, you could be wandering over to see that menu for yourself.

Appendix A

Dependent Variable: PRICE
Method: Least Squares
Date: 11/12/02 Time: 12:04
Sample: 1 100
Included observations: 87
Excluded observations: 13

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	11.32436	1.319700	8.581010	0.0000
FAST	-2.513715	1.083800	-2.319353	0.0232
CLOSE>22	-1.188784	0.887170	-1.339973	0.1845
OWNBL	0.872592	0.889546	0.980940	0.3299
RESER	5.072011	0.928620	5.461883	0.0000
SIZE	-0.016745	0.033461	-0.500431	0.6183
TOCTY	-0.303870	0.150943	-2.013144	0.0478
VIEW	2.791242	1.244418	2.243009	0.0280
BAR	2.140046	0.914634	2.339784	0.0221
UNIFRM	0.694439	0.704447	0.985794	0.3275
LUNCH	-0.949667	0.841808	-1.128128	0.2630
DINNER	0.057284	0.921336	0.062174	0.9506
SUIT	7.106275	1.851934	3.837217	0.0003
NAME	0.305919	0.790332	0.387077	0.6998
ELEV	-0.386287	0.563377	-0.685663	0.4951

R-squared	0.785783	Mean dependent var	12.66379
Adjusted R-squared	0.744130	S.D. dependent var	5.840519
S.E. of regression	2.954346	Akaike info criterion	5.160018
Sum squared resid	628.4277	Schwarz criterion	5.585174
Log likelihood	-209.4608	F-statistic	18.86484
Durbin-Watson stat	1.813458	Prob(F-statistic)	0.000000