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How **Mobil** Stars Affect Restaurant- Pricing Behavior

by Michael J. Cotter and
Wayne W. Snyder

To paraphrase Shakespeare: "The prices, dear restaurateur,
lie not in our stars, but in our basic strategy."



The *Mobil Travel Guide* may well be the most widely used guide to lodging and restaurants in the United States and Canada. Its ratings, ranging from one to five stars, provide travelers with an indication of quality that is based on reliable and consistent criteria. Restaurants that maintain the guide's highest star awards generally expect a substantial amount of trade and usually enjoy strong menu prices. On the other hand, restaurants that "lose a star" might well see business fall off, possibly along with their menu prices. The study discussed in this article

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examined the extent to which operators change menu prices after Mobil modifies their restaurant's star status.

Our data come from over 2,000 restaurants in Illinois, Massachusetts, Ontario, and Quebec that are listed in the *Mobil Travel Guide*. The study started in 1972 in Illinois and in 1977 in the other regions, with all observations ending in 1994. Our principal objective was to determine whether and how a restaurant's prices change after the establishment receives either an increase or a decrease in its Mobil star rating. We also analyzed differences among the four regions and among the various star categories.

Prices: Proxy for Quality

Economic theory predicts that, given perfectly competitive conditions of supply and given that consumers have perfect information, differences in restaurant prices will reflect variations in quality. Such, however, is clearly not typical of the restaurant industry. Even acknowledging the considerable importance of fast-food chains, with their well-known and relatively homogeneous products, large segments of the restaurant industry remain characterized by heterogeneity. Theory suggests a danger that purveyors in a heterogeneous industry will devolve into low-quality outlets, particularly in the absence of sufficient consumer information. Indeed, in at least one nonhospitality enterprise the combination of heterogeneous products (automobiles) and limited or nonexistent consumer information led to a situation in which only the lowest-quality products were available. At least, that is what Akerlof found in an analysis of the market for automobile "lemons."¹

¹ George A. Akerlof, "The Market for Lemons: Quality, Uncertainty and the Market Mechanism," *Quarterly Journal of Economics*, Vol. 84 (1970), pp. 488-500.

Fortunately, restaurants are not in the category of used cars. Despite the restaurant industry's relatively heterogeneous products, extensive information is available about quality differences among restaurants (in the U.S. and Canada, at least) through an abundance of restaurant guides. Many guides provide examples of set menus, give *à la carte* prices, and describe dishes. Indeed, restaurant operators are well aware of customers' desire for information about their restaurants. A considerable number of operators exhibit their menus outside, for instance, to give customers an indication of what they'll find inside.

Even though no other industry may be so completely scrutinized as the restaurant industry, its extensive product differentiation still can create conditions of monopolistic competition that give producers considerable leeway to select a pricing strategy. That is, restaurant operators are always experimenting with new menu items and different prices. Thus, the restaurant industry offers a rich terrain for examining pricing strategies.

Hedonic-pricing equations have often been used to analyze markets consisting of differentiated products like those of the restaurant industry.² Convenience, service, ambience, and location were used to explain price differences among New Orleans restaurants, for example.³ A study of restaurant prices in France included such external factors as city size and proximity of other highly rated restaurants and tourist attractions to

² Hedonic pricing treats the market for a product as a group of interrelated submarkets for attributes associated with that product. The price of a product, therefore, is the sum of the implicit prices of the attributes linked to the product. Someone buying a Miller beer, for example, would expect to pay less in a bar than in a fancy restaurant.

³ Rodney E. Falvey, Harold O. Fried, and Bruce Richards, "An Hedonic Guide to New Orleans Restaurants," *Quarterly Review of Economics and Finance*, Vol. 32, No. 1 (Spring 1992), pp. 123-133.

examine price levels.⁴ Research in the United States has investigated so called "magic numbers," which are believed to be psychologically stimulating to sales. One study found that low-price meals often end in a "9" (\$5.99, for instance), while a majority of high-price meals end in a "0" or "5" (e.g., \$20.95).⁵

Excess demand. Gary Becker has offered an unusual and provocative theory that some restaurants intentionally maintain their prices below the level that would clear the market (i.e., match demand with supply).⁶ He begins by observing that popular restaurants often have long queues, but "do not raise their prices even with persistent excess demand." He contends that individual demand at such restaurants depends partly on how intensely others want to dine at the same restaurant. He argues further that this phenomenon can reverse the normal relationship of price and quantity, producing an unusual positive relationship between price and the aggregate quantity demanded.

Becker contends that if such restaurants were to raise their prices to the point that excess demand diminishes, customers would recognize that their entrance to the establishment had become easier, and that, in turn, would cause a further decline in demand and, consequently, decreased profits. He argues, therefore, that the most profitable strategy for restaurants whose popularity is based on some modi-

⁴ A. Bailly and J. Paelinck, *Restaurants, Espace, et Temps* (Aix-en-Provence: Centre des Hautes Etudes Touristiques, 1990).

⁵ Lee M. Kreul, "Magic Numbers: Psychological Aspects of Menu Pricing," *Cornell Hotel and Restaurant Administration Quarterly*, Vol. 23, No. 2 (August 1982), pp. 70-75.

⁶ Gary Becker, "A Note on Restaurant Pricing and Other Examples of Social Influences on Price," *Journal of Political Economy*, Vol. 99, No. 5 (October 1991), pp. 1109-1116.

Exhibit 1
Restaurant sample by location

Location	Number of restaurants
Illinois	951
Massachusetts	568
Ontario	363
Quebec	196
Total	2,078

Observations were taken between 1977 and 1994, except in Illinois, when observations began in 1972.

cum of exclusivity is to retain their excess demand. The behavior of some big-city restaurants is consistent with his analysis. At the Paris restaurant of culinary superstar Joël Robuchon, for example, the waiting list extends to two months.⁷

Stars and prices. Notwithstanding Becker's hypothesis and restaurants that employ queues as part of the dining experience, it remains logical that an improved rating from dining guides would encourage a restaurateur to raise prices. Any decrease in sales from existing clientele should be more than compensated by increased traffic from new customers attracted by an additional star. In this study we report our analysis of the pricing behavior of restaurants that saw their ratings either increase or decrease during the study period.

A Baedeker for Restaurants

While not the earliest such publication, the *Mobil Travel Guide* has become a widely consulted restaurant and hotel guide in the United States. Mobil's first guide, published in 1958, offered ratings of establishments in the southwest United States. Ironically, Mobil began its coverage just five years before the Duncan Hines Institute stopped publishing its long-running series of hospitality guidebooks, on the grounds that the American public no longer needed them.⁸ Mobil is one of several publishers, including the American Automobile Association, that have long filled that void. Today Mobil covers restaurants in the continental United States and Canada in seven separate volumes. Each restaurant considered in the guide is given a rating that ranges

from one to five stars. Mobil also lists a relatively small number of unrated restaurants.

The *Mobil Travel Guide* considers a five-star establishment to be one of the best in North America (see the sidebar on page 41). A four-star restaurant is outstanding and worth a special trip. Three-star restaurants are considered excellent; two stars are very good; and one star is considered better than average.⁹ Typically the guide offers information about menu prices for both modest and expensive meals, lists the house specialty, and describes any of the restaurant's unusual features. There were no major changes in the rating system during the period of our inquiry.

Mobil maintains a corps of about 100 inspectors who are involved in rating 20,000 restaurants annually. In addition to the inspectors' assessments, the guide encourages customers to communicate their opinions about restaurants. Mobil typically receives 2,000 letters annually, which also influence Mobil's restaurant ratings.

Mobil annually sells between 450,000 and 550,000 copies of its guides. Since the guides are available at most public libraries, the sales figures understate the number of people using the volumes. It seems reasonable that several million purchase decisions are made each year based on consumers' consulting the *Mobil Travel Guide*.

Restaurant prices published in the guide are collected months before it goes on sale in January each year and also before Mobil announces its star ratings for that year. While restaurants are under no obligation to maintain the prices they have reported to Mobil, we believe, nevertheless, that Mobil's published prices remain the benchmarks for most consumers.

⁷ Michel Greignou and Elisabeth de Neurville, "Les Guides sur la Sellette," *Le Monde Loisirs*, March 22, 1986, p. 23.

⁸ See: "Looking Back: Industry History," *Cornell Hotel and Restaurant Administration Quarterly*, Vol. 26, No. 1 (May 1985), p. 47.

⁹ *Mobil Travel Guide—Great Lakes* (New York: Fodor's Travel Publications, 1995), p. 25.

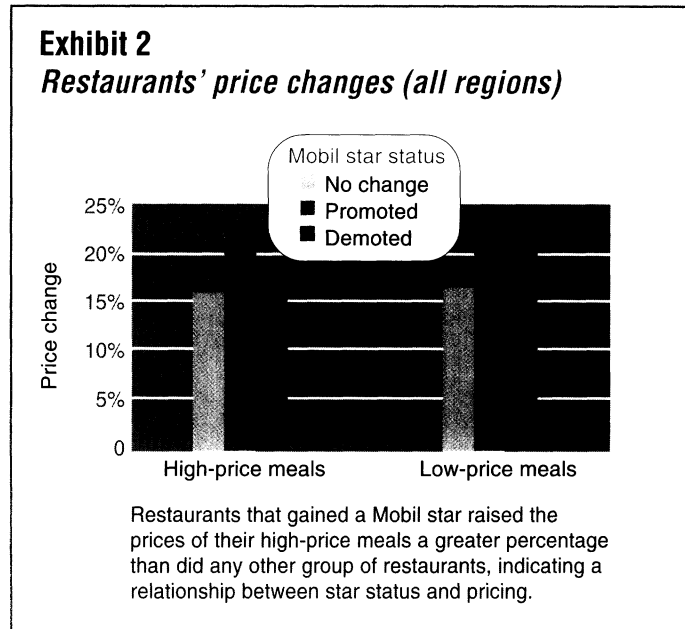
The Survey Data

Our analysis comprised all restaurants rated by Mobil during the survey years in Illinois, Massachusetts, Ontario, and Quebec. We selected those regions based on *Mobil Travel Guide* availability and a desire for international comparisons. Because some restaurants went out of business, others were demoted and removed from the *Guide*, and some were included too late to be incorporated in our survey, the total number of restaurants in our survey is smaller than the total number listed in the *Guide* between 1972 and 1994. Nevertheless, as shown in Exhibit 1, our analysis included over 2,000 restaurants.

Restaurant-Price Hypotheses

We examined the way restaurateurs modified prices following a change in their restaurants' Mobil star rating. Rather than looking only at a single year of change, we selected a longer period to avoid the possibility that the change from one year to the next might fail to capture the full impact of the changed rating. Instead, we measured the total percentage change in a restaurant's prices during a period beginning two years before its rating was changed, continuing during the year the change was made, and concluding in the two-year period after the change occurred. Thus, the results we report in this study refer to the cumulative changes measured in prices that occurred during a five-year period surrounding a change in a restaurant's rating. Because restaurant prices generally increased throughout the two decades covered by our survey, we examined only price increases. There were no instances when prices for an entire group of restaurants decreased during the five-year period.

Our purpose is to investigate how restaurateurs altered their prices after Mobil changed their



ratings. The hypotheses are expressed in terms of no change to see whether the data reject that so-called "null hypothesis." Because the change in a restaurant's rating can involve either a promotion or a demotion, we group the hypotheses accordingly.

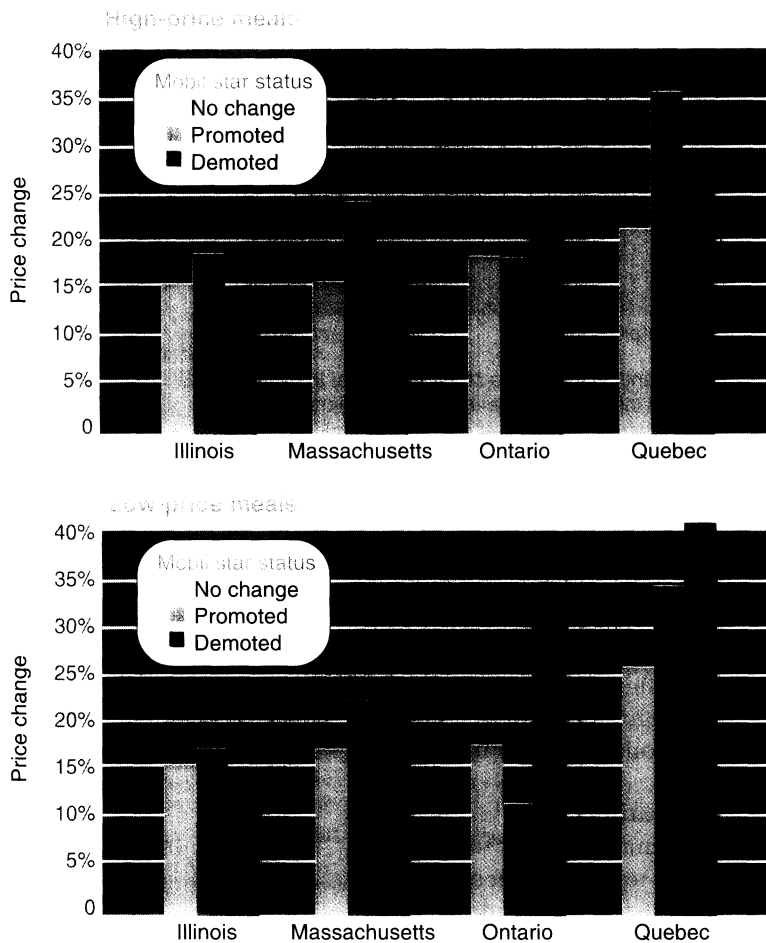
Increase in ratings. Our main theory is that gaining a Mobil star will encourage a restaurant operator to raise prices. We tested that idea by seeing whether the data were strong enough to reject a null hypothesis, stated thus:

H1: Within the combined four-region area and over the entire period, there were no differences in the rate of change in prices (either high- or low-price meals) between restaurants that had their ratings increased and those for which the ratings remained unchanged.

The test results for the combined four-region area, rejecting H1, are illustrated in Exhibit 2. Restaurants that gained a star raised prices of both their high- and low-price meals significantly more than restaurants whose ratings remained unchanged. Specifically, restaurants that gained a star increased their high-price meals an average of 23.7

Exhibit 3

Restaurants' price changes by region



percent compared to a boost of 16.5 percent for restaurants with unchanged ratings, or a difference of 7.2 percentage points ($t = 3.75$, $d.f. = 5261$, $p < .001$). Restaurants that gained a star raised their low-price meals an average of 21.7 percent compared to 17.2 percent for restaurants with unchanged ratings ($t = 2.10$, $d.f. = 5350$, $p = .036$).

Hypothesis 2 considers average price change by region in restaurants' high- or low-price meals when establishments that gained a Mobil star are compared to those with unchanged ratings. The results of these comparisons are illustrated in Exhibit 3.

H2: Within any of the individual four regions there was no difference in the rate of change in prices (either high- or low-price meals) between restaurants that had their ratings increased and those for which the ratings remained unchanged.

The figures shown in Exhibit 3 demonstrate rejection of H2, except in Ontario. (There is also an anomaly among demoted restaurants, as we will discuss in a moment.) The data generally reflect a significant increase in prices among promoted restaurants compared to those with unchanged status in the separate regions, except for Ontario. The largest difference occurred for high-price meals in Quebec, which increased 60 percent more than prices for similar meals in restaurants that did not enjoy a ratings increase. Ontario presents a puzzle because high-price meals for both the promoted and unchanged restaurants increased by similar percentages. Even more puzzling, however, are the changes in low-price meals in Ontario. The increase in low-price meals was 60 percent *higher* at restaurants with unchanged status than it was for restaurants that were promoted. The results have low reliability, however, because the number of observations was small.¹⁰

¹⁰ $d.f. = 34$; t -value = 1.92; $p = .06$

Falling star. If it is generally true that restaurants increase their prices more when they gain a star than when ratings remained unchanged, it would seem likely that the reverse would also be true. That is, one might expect restaurateurs to lower prices or at least hold them in response to the loss of a star. This proposition, stated in the null-hypothesis form, is:

H3: Within the combined four-region area there was no difference in the rate of change of restaurant meal prices between restaurants whose ratings were demoted by Mobil and other restaurants whose ratings did not change during the reference period.

The results go against what one might reasonably expect, for we were unable to reject null hypothesis H3 for either high- or low-price meals. Surprisingly, the price increases by restaurants that lost a Mobil star were generally *larger* than the increases of restaurants that retained their Mobil status unchanged. Restaurants that lost a star increased the prices of their high-price meals by an average of 17.4 percent compared to 16.5 percent for restaurants with unchanged status ($t = .53, d.f. = 5334, p = .569$). Establishments losing a star raised their low-price meals by 22.0 percent compared to 17.2 percent for restaurants retaining their Mobil rating, a difference of 4.8 percentage points ($t = 1.79, d.f. = 274, p = .075$).

The increase in low-price meals for the restaurants that lost a star was even *larger* than the similar increase by those restaurants that gained a star. We have no evidence to explain this curious situation.

As a final step, we tested the effects of the loss of a Mobil star on the restaurants' prices by region. Stated as a null hypothesis, we checked the following.

H4: There was no difference among restaurants in any of the four regions in the rate of change in prices (either high- and low-price meals) for those

Exhibit 4
Promoted restaurants' price changes by star ranking

Star rank*	PERCENTAGE CHANGE IN HIGH-PRICE MEALS		d.f.	t-value	p
	Unchanged Restaurants	Promoted Restaurants			
★	14.5	20.8	978	2.34	0.019
★★	15.0	25.4	102	3.75	0.001
★★★	18.9	27.4	1,581	0.95	0.342

Star rank*	PERCENTAGE CHANGE IN LOW-PRICE MEALS		d.f.	t-value	p
	Unchanged Restaurants	Promoted Restaurants			
★	15.5	18.5	986	0.93	0.351
★★	15.5	24.7	2,533	3.54	0.001
★★★	18.9	16.5	1,606	0.29	0.773

*Note: No four-star restaurants in our data set were promoted by Mobil during the period 1972-94 in any of the four regions.

restaurants that had their ratings decreased and those for which the ratings remained unchanged.

The results of these comparisons, shown in Exhibit 3, are inconsistent, puzzling, and not generally robust. Illinois is the only region where the prices of restaurants that were demoted had a smaller increase in prices (both high- and low-price meals) than the increases by restaurants whose status remained unchanged. In the other three regions, the prices of both high- and low-cost meals increased more at demoted restaurants than at restaurants that retained their star status. Moreover, it appears that the increase in low-price meals at demoted restaurants in Quebec was even greater than was the increase at restaurants in the same region that received an improved star rating. But the t -values are such that the level of confidence is low and it would be unwise to claim clear differences in these data.¹¹

¹¹ For example, the t -values for the differences in low-price-meal changes were: Illinois, $t = 0.98$; Massachusetts, $t = 1.76$; Ontario, $t = 1.29$; Quebec, $t = 2.06$.

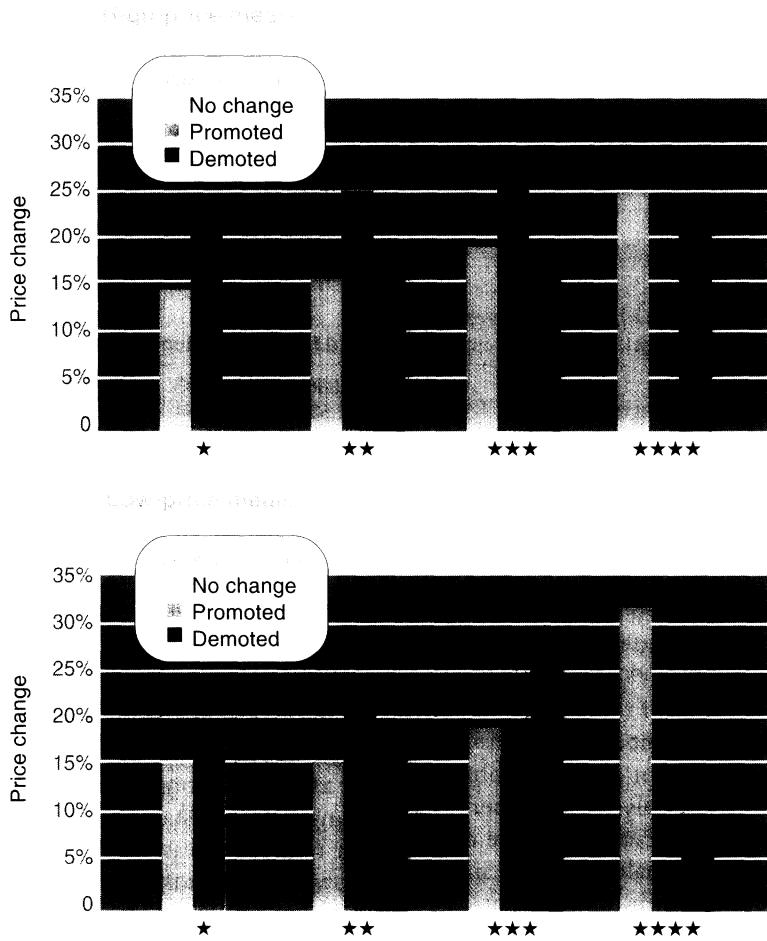
Price Variations by Star Rank

The data discussed so far were for all restaurants together or all restaurants in a region. We also examined how changes varied by star category for all four regions combined, beginning with restaurants for which star ratings increased. Exhibit 4 shows the comparison by original star category of price changes on the part of restaurants that were promoted to a higher class and restaurants that remained in the original star class.

In all instances save one, restaurants promoted to a higher star category increased their prices by a larger percentage than did the restaurants with unchanged star ratings. The percentage increase by two-star restaurants that were promoted to three-star status was about 50 percent greater than the increase for the other two categories. The only anomaly occurred for low-price meals in three-star restaurants that were promoted to four-star status, the prices of which increased somewhat *less* than did the low-price meals of the other (unpromoted)

Exhibit 5

Restaurants' price changes by original star ranking



Note: When a one-star restaurant is demoted, it is removed from Mobil's listings and there is no way to track any further price changes. No four-star restaurants in this sample were promoted to five stars. Hence, the absence of a bar graph for "demoted" one-star restaurants and for "promoted" four-star restaurants.

three-star restaurants. These findings are shown in Exhibit 5.

Demotions. The comparisons of price changes occurring when a restaurant was demoted by Mobil (shown in Exhibit 5 and summarized in Exhibit 6) are far less conclusive than for restaurants that had their star ratings increased. In half of the comparisons, the price increases for restaurants losing a star was *higher* than for restaurants with unchanged status. The two-star restaurants that lost a star raised both their high- and

low-price meal prices more than the restaurants for which ratings remained unchanged. We know of no factors that would explain this curious situation. The only situation consistent with what one might expect from a decreased star status occurred among four-star restaurants. As illustrated in Exhibit 5, the increase in both their high- and low-price meals was less than that of other four-star restaurants, the status of which remained unchanged.

Puzzling Results

Our analysis in part supports the commonsense expectation that the Mobil star ratings affect restaurant price behavior by allowing promoted restaurants to increase their prices. However, the results are also puzzling, because after restaurants lost a star they generally increased the prices of both their high- and low-cost meals by *more* than the restaurants that retained their star status. These latter results are not robust, because the t-values translate into probabilities that have low reliability. Nevertheless, even without strong statistical significance, the direction of the findings is puzzling. One can only wonder whether similar results would occur in a similar study of other regions or studies during the next two decades.

Limitations. The study is limited by the fact that just four regions were examined in the analysis. For example, restaurant operators in other regions of the United States and Canada may have pricing strategies that differ from those examined in this study. Another limitation was the dearth of changes in the status of five- and four-star restaurants, which limited the number of price comparisons. We also recognize that there are other important variables that affect restaurant pricing, including location, longev-

ity, and competition. This study does not address these powerful influences on pricing, but the aggregate data are substantial enough to attenuate those effects on the sample as a whole.

Suggestions for Further Research

Subsequent studies might explore the influence of factors other than Mobil's star rating on restaurant prices, such as population density, restaurant ethnicity, proximity to tourist attractions, affiliation with hotels, and presence and level of alcoholic-beverage service (e.g., full bar versus beer-and-wine license). The examination of other regions or other restaurant-rating systems may also offer insight into restaurateurs' pricing strategies in the face of a change in ratings. A study using another type of restaurant guide may offer additional insight. *CQ*

Exhibit 6
Demoted restaurants' price changes by star ranking

PERCENTAGE CHANGE IN HIGH-PRICE MEALS					
Star rank*	Unchanged Restaurants	Demoted Restaurants	d.f.	t-value	p
★★	15.0	17.3	2,502	1.12	0.264
★★★	18.9	17.0	180	0.79	0.429
★★★★	25.0	21.1	204	0.47	0.638

PERCENTAGE CHANGE IN LOW-PRICE MEALS					
Star rank*	Unchanged Restaurants	Demoted Restaurants	d.f.	t-value	p
★★	15.5	18.9	107	0.90	0.369
★★★	18.9	26.1	149	1.73	0.085
★★★★	32.1	9.4	32	3.73	0.001

*Note: When a one-star restaurant is demoted, it is removed from the *Mobil Guide* and there is no way of ascertaining what subsequent price changes occurred. No five-star restaurants in our data set were demoted during the period 1972-94.

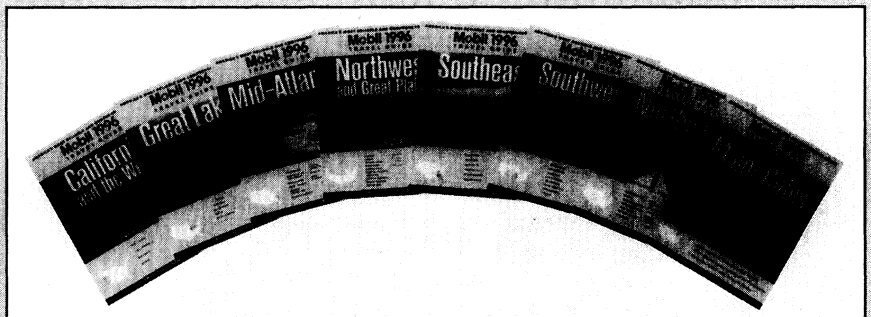
New Criteria Alter Mobil's Five-Star Restaurant List

An extensive revision of criteria applied to restaurants has shaken up the listings of four- and five-star restaurants in the 1996 *Mobil Travel Guide*. The guide is now published by Fodor's Travel Publications, which updated the restaurant criteria to reflect changes in the American restaurant market. Describing the criteria as "more contemporary," publisher Kristina Peterson commented: "The American restaurant scene has changed dramatically in the ten years since the restaurant criteria were last evaluated."

As a result of the changes, seven restaurants that held either three or four stars in 1995 were promoted to five stars in 1996, and two previously unlisted restaurants also gained five-star status. Four restaurants retained their five-star rating. A total of 129 restaurants were added to the four-star ranks.

The new criteria include a requirement that highly rated restaurants offer some vegetarian or "healthy" menu selections, along with a selection of premium, bottled water. Moreover, the four- and five-star restaurants must create a menu that makes it difficult for guests to order similar dishes for separate courses. That is, dishes may not be alike in height, color, or texture, and the temperature of the items on the plate may vary.

The following are sample criteria for a five-star restaurant, according to the 1996 rules:



- In the waiting area, hors d'oeuvres and drinks may be served to diners who must wait for their table; these may be complimentary.
- Table tops are extraordinary and in exquisite taste, revealing perfect balance of colors, materials, and heights.
- The noise level is ideal, neither too loud nor silent; a sense of privacy prevails.
- Menu descriptions are unflinchingly accurate. Any dietary fare is as exquisite as other offerings.
- The restaurant prides itself on its ability to accommodate special requests.
- The staff carries diners' unfinished drinks from the bar to the table, when necessary.

Although the Mobil *hotel* criteria did not change in 1996, Fodor's brought in new reviewers—resulting in some changes in its list of high-ranked hotels. Three properties won five stars for both their lodging and food service. They are the Inn at Little Washington (Washington, Virginia); the Mansion on Turtle Creek (Dallas); and the St. Regis Hotel and its restaurant Lespinasse (New York City).—G.W.