DO LODGING TAXES MAXIMIZE TAX REVENUE? EVIDENCE FROM TEN U.S. CITIES

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Abstract
Because taxes on lodging are generally not designed to correct market failure, their presumptive purpose is to maximize public revenue; we investigate whether they do so. Using recent estimates of the price elasticity of demand for hotel rooms in ten major U.S. cities, we find that existing tax rates on lodging are generally below the revenue-maximizing tax rates for all but the most expensive luxury hotels. On average, tax rates are 9 to 10 percentage points below the revenue-maximizing level.

Key words: *lodging, tax revenue, monopolistic competition, state and local government, price elasticity.*

JEL Classification: *D43, H71, L13, L83, Z38*

I. INTRODUCTION

The lodging industry generates important economic benefits for many communities by providing jobs, incomes, and tax revenue. Teiusan (2023) discusses the significance of tourism taxation as a source of public revenue around the world, and notes that in the U.S., "Taxes on hotel rooms have become a popular tax instrument for many states and localities" because they can often be passed through to consumers who live—and thus, vote—elsewhere. Twenty-five states and numerous localities assess special taxes on lodging, thirty-four states assess sales taxes that apply to lodging, and eleven states assess both sales and excise taxes (Hazinski and Ferguson, 2023). Unlike Pigouvian taxes, which are designed to encourage the internalization of negative externalities from products such as gasoline, tobacco, and alcohol, or income taxes designed for redistributive purposes, lodging taxes are generally not intended to correct market failures (for an exception, see Alfano, *et al*., 2022); rather, they are meant only to generate revenue for the government. This begs the question of how effectively they do so; but this question has not been addressed in the literature. Over the previous three decades, Teiusan (2023) found only 55 published articles on tourism taxation, most of which studied topics other than revenue maximization and countries other than the U.S.

It is well known that, given sufficient price elasticity, tax revenue initially rises, peaks, and then declines with increases in the tax rate. The resulting Laffer curve has been most extensively studied in the case of income taxes, but the same principle applies to excise and sales taxes on goods and services (Miravete, *et al*., 2018). The present note employs recent estimates of the price elasticity of demand in a model of monopolistic competition, in order to derive the tax rates on urban American hotels that would maximize public revenue, and compares these to the existing tax rates.

After a brief background on market structure, we present the theoretical model and the empirical estimation, followed by a short conclusion.

II. MARKET STRUCTURE

The U.S. lodging industry is characterized by monopolistic competition (Butters and Hubbard, 2023; Shetty, 2008). Although there are several large, name-brand hotel chains such as Marriott, Hilton, Sheraton, and Wyndham, there are only limited barriers to market entry. As a consequence, there are also many smaller, independent hotels, motels, inns, hostels, and bed-and-breakfast establishments in each local or regional market, and in recent years, there has even been competition from individual homeowners renting their houses for short stays through online person-to-person rental sites such as Airbnb (Li and Srinivasan, 2019; Farronato and Fradkin, 2022). In total, there were about 107,902 hotels and motels in the U.S. in 2023, and they collectively earned more than $231 billion in revenue (IBIS World, 2024). While the four largest firms have a 20 percent market share (Benkard, *et al*., 2023), the Herfindahl-Hirschman Index (HHI) for accommodation is only 900/10,000 or 0.09 (Brauning, *et al*., 2023). Differentiation in the lodging industry occurs most obviously by way of location and the number and sizes of rooms, but also takes the form of in-house restaurants, swimming pools, workout rooms, and other amenities.

Firms in markets characterized by monopolistic competition operate like monopolies in the short run, when their products exhibit the greatest differentiation

from those of competitors. Each firm confronts a downward-sloping demand curve, the price elasticity of which is generally quite high, based on the availability of substitutes. The firm sets marginal cost equal to marginal revenue, and prices up to the demand curve to maximize short-run profit. The market power exercised by such firms allows them to pass taxes through to consumers to varying extents, depending upon the curvature of the demand function. For example, with isoelastic demand, taxes are over-shifted to consumers (Dutkowsky and Sullivan, 2014). The absence of significant barriers to entry, however, allows competitors to erode monopoly profits in the long run.

III. Model

Consider a monopolistically competitive firm with constant marginal cost of c, facing semi-logarithmic demand given by

$$lnQ = a + bP \quad (1)$$

where Q is the quantity of output, P is the price, $a > 0$, and $b < 0$. This can be written equivalently as the indirect demand function, $P = (lnQ - a)/b$. From (1), the price elasticity of demand is

$$\eta = bP < 0, \quad (2)$$

reflecting greater elasticity at higher prices than at lower prices. If an excise tax of T per unit of output is imposed, the firm chooses Q to maximize profit,

$$\pi = [Q(lnQ - a)/b] - (c + T)Q, \quad (3)$$

which yields the price

$$P_T = c + T - (1/b) \quad (4)$$

and the quantity

$$Q_T = \exp(a + bc + bT - 1). \quad (5)$$

The second-order condition holds for all $b < 0$. In the absence of a tax, (4) and (5) reduce to

$$P_0 = c - (1/b) \quad (6)$$

and

$$Q_0 = exp(a + bc - 1), \quad (7)$$

respectively. Notice that (6) is the retail price before taxes, and from (4), the tax pass-through rate is $\partial P_T/\partial T = 1$.

Now let the government's objective be maximization of the tax revenue. Then using (5), the policymaker chooses T to maximize

$$TQ_T = Texp(a + bc + bT - 1); \quad (8)$$

this results in

$$T^* = -1/b. \quad (9)$$

Here again, the second order condition holds for all $b < 0$. Using (2), T^* can be written as a percentage of the untaxed retail price:

$$T^*/P_0 = -1/\eta_0. \quad (10)$$

Equation (10) indicates that the revenue-maximizing tax rate is the inverse of the absolute price elasticity of demand. This is also consistent with the basic Ramsey rule, which holds that taxes are least disruptive when they are inversely proportional to the price elasticity of demand (Stiglitz, 2015). The empirical estimation is undertaken in the next section.

IV. Empirical Analysis

Farronato and Fradkin (2022) estimated the price elasticities of demand for hotels of varying quality in ten major U.S. cities, using data on daily average prices, rooms sold, and rooms available between 2013 and 2015. Not surprisingly, the elasticity generally increased (in absolute value) with the quality and price of the hotel, ranging from -1.66 to -5.45 for an economy hotel, and ranging from -5.67 to -11.03 for a luxury hotel. (These price elasticities are broadly consistent with those in other countries; for example, Durbarry (2008) found demand for hotels in the United Kingdom to be similarly elastic, with absolute price elasticities exceeding 2.)

Though Farronato and Fradkin (2022) did not distinguish among types of travelers or seasons, results obtained by Cho, *et al.*, (2020) suggest higher elasticities on weekends than weekdays, in seasons of higher demand than other seasons, and among group and leisure travelers than business travelers. The latter result is also confirmed by other studies, such as that of Li and Srinivasan (2019). Also consistent with monopolistic competition, Corgel, *et al.* (2012) reported more elastic demand for hotel rooms in the long run than the short run.

Applying (10), we take the inverse of the absolute elasticities reported by Farronato and Fradkin (2022) as the revenue-maximizing tax rates, and report these in Table 1. The revenue-maximizing rates range from 9 to nearly 18 percent for luxury hotels, and from 18 to more than 60 percent for economy hotels. Of course, tax policy is a rather blunt instrument, in that a single tax rate generally applies to all market segments. Thus, the final column gives an unweighted average of revenue-maximizing rates across hotel types in each city; these range from 14.84 to 32.68 percent. The final row shows averages across cities, ranging from 13 percent for luxury hotels to more than 40 percent for economy hotels; the overall mean exceeds 25 percent.

Table 1. Revenue-Maximizing Tax Rates (%)

Location	Luxury	Upper-Upscale	Upscale	Upper-Midscale	Midscale	Economy	Mean
Austin	11.98	19.96	24.94	29.94	33.78	60.24	30.14
Boston	10.94	20.53	23.75	25.97	28.33	35.97	24.25
Los Angeles	10.68	22.62	23.36	26.81	30.86	44.64	26.50
Miami	12.50	18.52	22.17	24.45	24.57	29.59	21.97
New York	9.07	13.55	15.08	16.67	16.34	18.35	14.84
Oakland	16.61	23.64	27.32	28.90	33.78	49.26	29.92
Portland	17.64	22.03	29.15	35.34	38.76	53.19	32.68
San Francisco	11.59	19.05	19.84	19.84	20.37	26.95	19.61
San Jose	16.31	19.49	22.88	25.45	27.10	37.17	24.74
Seattle	14.95	20.24	24.94	29.24	32.47	46.95	40.23
Mean	13.23	19.96	23.35	26.26	28.64	40.23	25.28

Table 2 displays the actual state and local tax rates in each city, as reported by Hazinski and Ferguson (2023). Taxes are assessed at several levels, and the

final column reports the combined rate of all lodging taxes. The combined rates are remarkably consistent across cities, ranging narrowly from 14 to 17 percent, and averaging 15.72 percent; they are also similar in magnitude to those in Germany and the United Kingdom, but well below the hotel tax rates of about 25 percent in Denmark (Durbarry, 2008).

Table 2. Existing Tax Rates (%)

Location	State Tax	County Tax	City Tax	Special Districts	Excise Tax	Total Tax
Austin	6.00	0.00	11.00	0.00	0.00	17.00
Boston	5.70	0.00	9.25	2.00	0.00	16.95
Los Angeles	0.00	0.00	14.00	1.50	0.00	15.50
Miami	6.00	8.00	0.00	0.00	0.00	14.00
New York	4.00	0.00	10.38	0.38	0.52	15.27
Oakland	0.00	0.00	14.00	0.00	0.00	14.00
Portland	1.50	5.50	6.00	3.00	0.00	16.00
San Francisco	0.00	0.00	14.00	2.75	0.00	16.75
San Jose	0.00	0.00	10.00	4.00	1.22	15.22
Seattle	6.50	2.00	7.10	0.00	0.86	16.46
Mean	2.97	1.55	9.57	1.36	0.26	15.72

Comparing Table 2 with Table 1 reveals that the existing (total) tax rates are below the revenue-maximizing rates for all hotel types in Oakland, Portland, and San Jose. In Portland, for example, state, county, city, and special district taxes total 16 percent, while revenue-maximizing tax rates would range from 17.64 percent for luxury hotels to 53.19 percent for economy hotels, with an average 32.68 percent. In most other cities, the existing taxes are below the revenue-maximizing levels for all but luxury hotels. Only New York appears to have combined state and local tax rates that approximately maximize tax revenue for most hotel types.

Using the final columns of Tables 1 and 2, Table 3 computes the difference between the average revenue-maximizing rate and the actual tax rate by city; these differences range from approximately zero to nearly 17 percent, with a mean of about 9.5 percent.

Table 3. Mean Differences (%)

Location	Mean Rev Max Rate (%)	Actual Rate (%)	Difference (%)
Austin	30.14	17.00	13.14
Boston	24.25	16.95	7.30
Los Angeles	26.50	15.50	11.00
Miami	21.97	14.00	7.97
New York	14.84	15.27	-0.43
Oakland	29.92	14.00	15.92
Portland	32.68	16.00	16.69
San Francisco	19.61	16.75	2.86
San Jose	24.74	15.22	9.51
Seattle	40.23	16.46	11.67
Mean	25.28	15.72	9.56

These ten cities appear to be broadly representative of the U.S. Across the 150 largest cities, Hazinski and Ferguson (2023) reported combined state and local tax rates that average 14.21 percent, with a median and mode of 14 percent, consistent with the means found among the cities studied here. And across 50 cities, Farronato and Fradkin (2022) found the price elasticity of demand to be -4.27, which implies a revenue-maximizing tax rate of 23.42 percent, also strongly consistent with the ten-city sample.

V. CONCLUSION

Among nations, the United States is second only to France as a tourist destination (Duran-Roman, *et al.*, 2020), so the revenue potential from the taxation of lodging is substantial. Although the rates are not insignificant, state and local taxes on lodging in the U.S. apparently fail to maximize tax revenue; existing taxes are generally 9 to 10 percentage points below the revenue-maximizing level. There are several possible explanations for this finding. Our model looks only at tax revenue from the hotel stay itself, and not the ancillary tax revenue from sales taxes on complementary goods and services purchased by hotel guests (such as taxi rides or meals at restaurants), or the income tax revenue from employment in the lodging industry. Viewed holistically, it may be more revenue-enhancing to restrict tax rates on lodging so as to encourage tourism. Another potential explanation is political: lobbying by the lodging industry or complaints from constituents may make elected officials wary of imposing tax rates that appear excessive, regardless of their fiscal optimality. These possibilities certainly deserve further investigation.

At the same time, further research on tax revenue maximization in the lodging industry in other locations, both within the U.S. and in other countries, is needed to confirm the generalizability of these results. The relative simplicity of the model facilitates such replication, provided that the assumption of monopolistic competition holds.

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