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# Incentives and Service Quality in the Restaurant Industry: The Tipping – Service Puzzle

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Tipping is a significant economic activity (tips in the US food industry alone amount to about \$42 billion annually) that was claimed to improve service quality and increase economic efficiency, because it gives incentives to provide excellent service, and therefore allows to avoid costly monitoring of workers. The article suggests that this common wisdom might be wrong. A simple model shows formally that tips can improve service only if they are sensitive enough to service quality. Empirical evidence suggests that tips are hardly affected by service quality. Nevertheless, rankings of service quality by customers are very high; the co-existence of these two findings is denoted "the tipping – service puzzle," and several possible explanations for it are offered.

Keywords: tipping, service quality, social norms, waiters, restaurants, the hospitality industry.

JEL codes: L80, Z13, M50, J30, D10, A12

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## 1. Introduction

Tipping is an interesting consumer behavior that has received increased attention recently, for several reasons. One reason is the large economic magnitude of tips and the prevalence of tipping. Since tips are often unreported for tax purposes (according to Hemenway (1993), the only income with a lower compliance rate is illegal income), there are no formal figures about the extent of tipping. However, it is not hard to estimate it. Sales in the U.S. in 2005 of food and alcoholic beverages to consumers in full-service restaurants, snack and nonalcoholic beverage bars, bars and taverns, and lodging places, were \$164.8, \$16.9, \$15.3, and \$25.2 billion, respectively (U.S. Census Bureau, 2006, Table 1269; the numbers are a projection). Summing the four numbers gives sales of \$222.2 billion. A recent study of tipping in various restaurants (Parrett, 2003, Table 14) found that the average tip percentage (a simple average) was 23.22%. However, average tip amount was \$6.52 and average bill size was \$34.67, indicating that the weighted average (weighted by the bill size) was a tip of 18.8%. Being conservative, let us multiply the latter percentage by \$222.2 billion to get estimated annual tips of \$41.8 billion. Obviously, adding tips in other establishments and countries results in a much higher figure. In addition, millions of workers in the US derive most of their income from tips (Wessels, 1997), and tipping is prevalent in numerous countries and occupations (Star, 1988).

Another reason for the increased interest in tipping is that firms in industries in which tipping exists can benefit from better understanding of various issues related to tipping. For example, managers can decide to replace tipping in their firm with compulsory service charges. Many US restaurants, for example, do so for large parties (often 6 or more diners), calling this fixed service charge a “gratuity.” Whether or not it is beneficial to replace tipping with service charges depends crucially on the question whether tipping encourages better service quality, a question that is addressed below. As another example

for the implications of tipping for firms, managers have to decide to what extent to monitor their service workers when tipping exists. Once again, the answer depends on whether tipping suffices as a mechanism to ensure good service, which in turn depends on the sensitivity of tips to service quality (for formal models analyzing the effect of incentives such as tips on firm strategy regarding incentives provision and monitoring, see Azar, 2004a; 2006a).

A third reason for the interest in tipping is that it is a social norm and a form of consumer behavior that poses challenges to traditional economic theory. The usual assumption in economics, that consumers maximize utility (which is derived from consumption of goods and services), implies that people should not tip, because to tip is to sacrifice money without receiving anything in return. Because the service has already been provided by the time the tip is given, the service provider can no longer change the service in response to the tip. Empirical studies, however, show that almost all people tip where this is a social norm (Azar, 2006b). Consequently, tipping is an example that illustrates the importance of social norms and psychological motivations in economic behavior (Azar, 2007a). Moreover, better understanding of the reasons for tipping might contribute to our knowledge also about other economic behaviors that result from social and psychological motivations, such as donations and gift giving.

A major issue in the research on the relationship between economics and social norms is the question whether social norms are created to improve social welfare. Some people believe that social norms exist for various reasons, but not because they improve efficiency or welfare (see for example Elster, 1989). The opposite view, that social norms increase efficiency, is articulated well by Arrow (1971, p. 22), who wrote, *“I want, however, to conclude by calling attention to a less visible form of social action: norms of social behavior, including ethical and moral codes. I suggest as one possible interpretation that they are reactions of society to compensate for market failures.”* Two

paragraphs below Arrow added, *“There is a whole set of customs and norms which might be similarly interpreted as agreements to improve the efficiency of the economic system (in the broad sense of satisfaction of individual values) by providing commodities to which the price system is inapplicable.”*

Several studies tried to examine whether tipping is a norm that increases social welfare. Conlin, Lynn, and O'Donoghue (2003), for example, study tipping behavior in restaurants, and conclude that it exhibits elements of efficiency, but is not fully efficient. Azar (2005a) addresses the question whether tipping was created to increase social welfare by examining the difference in the characteristics of various tipped and non-tipped occupations. Azar (2005b) addresses a similar question with a theoretical model that analyzes in what conditions tipping is likely to increase social welfare.

The reason that tipping can increase social welfare is that tipping encourages the waiter to improve the service he provides (in what follows I talk about waiters and restaurants, but most of the ideas are also relevant to other occupations in which tipping is common). Assuming that the value of improved service quality for the customer is higher than its cost to the waiter, it is socially desirable to improve service quality. Tipping can increase service quality, however, only if tips are sensitive enough to service quality.

The next section provides a concise literature review of several areas that are related to this article. The following section presents a simple model that suggests that service quality in equilibrium should be high if tips are very sensitive to service quality, and low if tips do not vary a lot as a function of service quality. Section 4 reviews empirical results on tipping behavior, and points out “the tipping - service puzzle”: while the effect of service quality on tips is very small, service quality is in fact high. Thus, the empirical evidence on tipping is inconsistent with the intuitive result that service quality should be

low if tips are hardly affected by service quality. The last section discusses this puzzle, suggests a few possible explanations for it, and provides several ideas for future research.

While the evidence that tips are hardly affected by service quality and that service quality is ranked as being high by customers existed before, this is the first article that points out the inconsistency between these two market characteristics. It is therefore the first article to point out and discuss what I denoted "the tipping – service puzzle." This puzzle is an important characteristic of the restaurant industry, which is an industry that has a large economic significance – as was mentioned before, sales in the restaurant industry (including bars and hotel restaurants) in the US alone amount to about \$222 billion annually. Pointing out the puzzle therefore advances our understanding of this industry; future research that will attempt to "solve" the puzzle can enhance our knowledge even further.

## **2. Literature review**

The article is related to a couple of research areas, a short discussion of which can be helpful. First, the literature on tipping is obviously of particular relevance. While a comprehensive review of this literature is beyond the scope of this article, I want to briefly discuss the types of research done so far. The most common types of studies can be categorized as follows: field experiments, empirical surveys, hypothetical surveys, theoretical models, cross-cultural comparisons, managerial implications studies, and review articles. Some studies include components of more than one type of study and a few others do not fall in any of the above categories, but most tipping studies belong to one of the above categories.

Field experiments often ask the service provider to behave in a certain manner, and record the effect of his behavior on tipping. For example, Lynn and Mynier (1993) found that squatting during the initial visit to the table increases the waiter's tip, and Lynn, Le

and Sherwyn (1998) found that customers tipped significantly more when touched than when not touched and that the duration of the touch (two seconds versus four seconds) had no effect on tipping.

Empirical surveys try to better understand tipping behavior by collecting data on actual tipping situations. Usually this is done by surveying customers as they leave a restaurant and asking them about the bill size, how much they tipped, service quality, and other questions that are of interest for the purpose of the research. Examples for this type of study include Lynn and Grassman (1990), Bodvarsson and Gibson (1994), Conlin, Lynn, and O'Donoghue (2003), and Bodvarsson, Luksetich and McDermott (2003).

Hypothetical surveys also ask people about their tipping behavior, but not about actual tipping in an actual previous situation, but more generally about tipping in a certain scenario. The advantage of hypothetical surveys over empirical surveys is that hypothetical surveys allow to ask the subject about his tipping behavior in many different circumstances, and thus to examine within subjects how factors such as service quality affect tipping (empirical surveys can examine such questions only between subjects). The disadvantage of hypothetical surveys compared to empirical surveys is that it is not entirely obvious that people indeed tip in the manner they respond when asked about it hypothetically. A couple of examples for hypothetical surveys are Bodvarsson and Gibson (1999) and Azar (2006b).

Theoretical models attempt to analyze various issues related to tipping by developing a theoretical model of tipping. For example, Schwartz (1997) uses a theoretical economic model to show that tipping can increase the firm's profits when consumer segments differ in their demand functions and their propensity to tip. Azar (2004b) presents a model of the evolution of social norms and shows that when a norm is costly to follow and people do not derive benefits from following it other than avoiding social disapproval, the norm erodes over time. Tip percentages, however, increased over the years, suggesting that

people derive benefits from tipping including impressing others and improving their self-image as being generous and kind. Azar and Tobol (2006) present an optimal-control model in which tipping behavior creates reputation that affects future service, and find that tipping and reputation can evolve in three path prototypes: increasing indefinitely, converging to the minimal tip and zero reputation, and converging to an interior stationary equilibrium.

Cross-cultural comparisons examine the differences in tipping practices between different countries. Lynn, Zinkhan and Harris (1993), for example, looked at tipping practices for 33 service professions in 30 countries and found that tipping was less prevalent in countries with low tolerance for interpersonal status and power differences and in countries with values that emphasize social over economic relationships. Tipping was more prevalent in countries with low tolerance for uncertainty and in communistic countries that valued close employee ties to work organizations. Lynn (2000) found relationships between the number of tipped professions and national characteristics (positive relationship with the level of extraversion and neuroticism and negative with the level of psychoticism) in a sample of 21 countries.

Managerial implications studies discuss how tipping can affect the management of businesses in which workers are tipped (mostly restaurants) and often attempt to provide advice to managers of such businesses. Casey (2001), for example, argues that tipping has important consequences for the relationships among managers, front-line service workers, and customers, and for relations among co-workers. She also suggests that tipping may influence employee commitment, teamwork, and motivation, and claims that while tipping allows low labor costs, it may undermine the relationship between managers and staff because the customer becomes the one who provides monetary compensation and feedback to the servers. Lynn (1996) suggests that increasing tips can help to reduce turnover of servers and to retain the most competent servers. Therefore it

is beneficial for the management to advise servers how they can increase their tips. Based on various studies of tipping behavior, Lynn suggests that in order to increase their tips servers should introduce themselves, squat near the table, smile, touch customers, use tip trays with credit-card insignia, and write "thank you" or draw a happy face on customers' checks.

Lynn (2001) quotes two restaurant owners and a restaurant internal document, suggesting that restaurant owners consider tipping as a system that gives incentives to waiters to put effort at providing good service (and is therefore preferred to fixed service charges), that tip averages are the most effective way to measure a server's capabilities, and that small tips can help to identify customers who believe they did not receive good service. Azar (2004a) examines the optimal choice of monitoring intensity when workers face external incentives (incentives that are not provided by the firm), such as tips. Increase in such external incentives reduces optimal monitoring intensity but nevertheless increases effort and profits unambiguously. The model explains why U.S. firms supported the establishment of tipping in the late 19th century but raises the possibility that adding service to prices instead of tipping in Europe hurts the interests of the restaurant owners.

Review articles contribute to the tipping literature by summarizing and synthesizing the research in dozens of articles that are spread over various disciplines, such as psychology, economics, and hospitality management. Sometimes these review articles focus on specific aspects of tipping, and they often add original ideas and analysis. A few examples of such review articles include Lynn and McCall (2000a), Lynn (2006), and Azar (2003; 2007a; 2007b).

While the above types of studies constitute most of the tipping literature, there are additional types that are less common. For example, Ruffle (1998) conducts lab experiments that create a situation similar to tipping, Lynn and McCall (2000b) conduct a

meta-analysis on the relationship between service quality and tips, Azar (2004c) reviews the history of tipping in order to study why people tip and whether tipping improves service quality, and Anderson and Bodvarsson (2005) examine whether tipped servers in U.S. states with high minimum wages earn more than servers in other states.

In addition to tipping, another relevant literature is the one on service quality. Parasuraman, Zeithaml and Berry (1985), for example, conducted interviews with executives and focus groups with consumers, trying to understand the perceptions of both managers and consumers about service quality, and to identify gaps between the two groups. They investigated four service categories: retail banking, credit card, securities brokerage, and product repair and maintenance. One interesting proposition they make is that "The quality that a consumer perceives in a service is a function of the magnitude and direction of the gap between expected service and perceived service" (Proposition 5, p. 46).

Parasuraman, Zeithaml and Berry (1988) build a 22-item instrument called SERVQUAL for measuring consumer perceptions of service quality. SERVQUAL addresses many elements of service quality divided into the dimensions of tangibles, reliability, responsiveness, assurance, and empathy. Zeithaml, Berry and Parasuraman (1996) offer a conceptual model of the impact of service quality on particular behaviors that signal whether customers remain with or defect from a company. Empirical results examining relationships from the model concerning customers' behavioral intentions show strong evidence of their being influenced by service quality.

Brady and Cronin (2001) find through qualitative and empirical research that the service quality construct conforms to the structure of a third-order factor model that ties service quality perceptions to distinct and actionable dimensions: outcome, interaction, and environmental quality. Each dimension has three sub-dimensions that define the basis of service quality perceptions. For each of these sub-dimensions to contribute to

improved service quality perceptions, the quality received by consumers must be perceived to be reliable, responsive, and empathetic.

Li, Tan and Xie (2003) suggest that a company's ability to achieve excellent service quality depends on the choice of service attributes, their desired levels, and the prioritization of service attributes. They investigate the asymmetric and nonlinear nature of the relationship between service quality gaps and overall service quality (quality that is worse than expected hurts more than quality that is better than expected helps), and develop a model that applies utility theory to the prioritization of service attributes.

### **3. A simple model of tipping**

In order to analyze the relationship between tipping behavior and service quality, it is helpful to consider a simple model. Because the purpose of the model is to provide predictions that will later be examined using empirical evidence on tipping behavior, the model offered is simple, and its results are not intended to be surprising; on the contrary: the results are intended to be intuitive – and this emphasizes the puzzle, when it turns out that the data contradicts these intuitive predictions.

The most natural way to model the service provision and the tipping act is as follows. In the first stage, the waiter chooses which service quality to provide. Let us denote this quality by  $q$ . After the service is provided, the customer observes service quality, and determines how much to tip.<sup>1</sup> The tip, denoted by  $t$ , has a monetary cost, which reduces

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<sup>1</sup> As mentioned in the previous section, some of the literature on service quality suggests that perceived quality by the customer depends on the gap between expected and actual service quality (e.g., Parasuraman, Zeithaml and Berry, 1985; Li, Tan and Xie, 2003). Here I use  $q$  for service quality, without incorporating in the model additional variables that relate to the question how exactly  $q$  is formed. Consequently, there are two possible interpretations of  $q$ , and the reader can choose the one he prefers. First,  $q$  can be interpreted as perceived service quality that is equal to the gap (actual service quality -

the amount of money the customer has towards the purchases of other goods. Denote the customer's wealth by  $w$  and the utility from the consumption of all other goods by the function  $v$ . The customer's utility function therefore includes a term of  $v(w - t)$  which captures the fact that tipping more leaves less resources for other consumption. The

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expected service quality). The waiter being able to choose  $q$  can then be the result of assuming either that different customers of the same restaurant have similar expectations about service quality, or that customers are heterogeneous in their expectations but the waiter is able to identify the service expectations of the customers. Both alternative assumptions lead to the result that the waiter knows the one-to-one correspondence between the actual service he provides and  $q$ , which implies that he can choose  $q$ .

A second interpretation of the model is that only actual service quality affects tipping (expected service quality does not) and  $q$  is interpreted as actual service quality. Notice that this still allows the customer to have expectations about service quality and to be disappointed or surprised with the service he receives. For example, a customer who expects excellent service might plan to tip 20% of the bill. Another customer expects only mediocre service and therefore plans to tip 15%. Eventually both receive good service. The first customer is disappointed, so he tips less than he planned, say 18%, and the second customer is positively surprised and therefore he tips more than he planned – also 18%. This shows that tipping may be a function of only actual service quality even if customers also have expectations about service quality and their utility is affected by these expectations (through disappointment or positive surprise).

There are several good reasons to adopt  $q$  as service quality without further complicating the model by introducing two variables, one for expected service and one for actual service. One reason is that it allows to keep the model simpler, the analysis more tractable, and the results more intuitive, simple, and convincing. A second reason is that the empirical evidence that is analyzed in the following section based on the model has only one measure of service quality – the score that the customer gave to service quality after the dining experience. The data in the various empirical studies that are analyzed (and in any other tipping study I know of) does not have a separate measure of expected service quality, so introducing into the model a variable that has no equivalent in the empirical data it aims to analyze seems pointless. Third, this modeling is in line with other theoretical models of tipping, where service quality is measured as a single variable and not as a gap between expected and actual service (see for example Azar, 2004a; 2007c).

derivative  $v'$  is the marginal utility that can be obtained from an additional dollar. The standard assumptions in the literature, that  $v' > 0$  and  $v'' \leq 0$ , are also adopted here.

While the cost of tipping is clear, its benefits are a bit more complex. The literature on tipping (see, for example, Azar, 2004b; 2006b; 2007a) suggests a few possible motivations for tipping. One potential reason for tipping is the desire to conform to the social norm. In certain situations, such as dining in restaurants, tipping is a social norm, and psychologists suggest that we conform to social norms “so that we will be liked and accepted by other people” (Aronson, Wilson and Akert, 1999, p. 294). The social norm, in turn, might depend on service quality. Etiquette books, for example, suggest that if service is bad, the tip can be reduced (Post, 1997).

Let us denote the social norm about how much should be tipped for a service quality of  $q$  as  $n(q)$ . For simplicity, I consider a constant bill size, so even though the tipping norm is about the percentage one should tip, this can be easily translated to the dollar amount and we can interpret  $n(q)$  as dictating the dollar amount one should tip for service quality  $q$  with this constant bill size. The existence of the social norm does not imply that everyone tips exactly what the norm suggests; some people might tip more and others less; indeed, empirical data on tipping show significant dispersion in percentage tips (Azar, 2004b). However, the existence of the social norm suggests that a possible component in the customer's utility function is the difference between his tip and the social norm for the service quality he received. Let us denote this component of utility by the function  $h(t - n(q))$ .

The customer's psychological utility from the social norm component is higher when his tip becomes higher compared to the norm. He obviously should feel better when he tips what the norm prescribes than when he tips less than that. But various reasons can lead him to want to tip more than the norm, for example in order to show others in the

table or the waiter his generosity or his kindness (or simply to feel generous).<sup>2</sup> It makes sense that what determines generosity is the difference between the tip and the norm and not just the tip in isolation of the norm. For example, in countries in which service is included in the restaurant's prices (as is common in Europe), a tip of \$10 on a \$100 bill will be perceived as generous, but in the US the opposite will be true. Consequently, let us assume that  $h' > 0$ , and also that there is a decreasing marginal utility from tipping due to the social norm component, i.e.,  $h'' < 0$ .

Another potential reason for tipping is psychological motivations that are not directly related to the social norm. For example, people know that waiters rely on tips as their major source of income, and therefore they may want to tip because they feel compassion for the waiter or because they feel obligated to support his income by tips. People also want to reciprocate and to show their gratitude for excellent service by rewarding the waiter for his efforts (Azar, 2004b; 2006b). These motivations suggest that another component of the utility function can be psychological utility that does not depend on the social norm, but might depend on service quality. Let us denote this utility component by  $g(t, q)$ , and assume that the marginal utility of this component is positive but decreasing,  $g_t > 0$  and  $g_{tt} < 0$ . The partial derivative  $g_t$  captures how much additional utility the customer obtains when tipping another dollar. It makes sense that the customer enjoys tipping more (so  $g_t$  is higher) when service quality is higher; for example, when service is bad, the customer has less reasons to reciprocate by tipping generously. This implies that  $g_{tq} > 0$ . One last component of utility that can be added for completeness although it does not affect the optimal tipping function is the utility from the dining,  $d(q)$ , where  $d' > 0$ .

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<sup>2</sup> The reason that people want to feel generous and kind is that it can improve their self-image, which might affect their utility, see for example Akerlof and Kranton (2000) and Loewenstein (1999).

Let us assume (both for simplicity and because there is no apparent reason to assume otherwise) that the utility function is separable in its various components (i.e., there are no interaction terms between them). The relative importance of each component is captured by a non-negative coefficient multiplying each component except  $v(w - t)$ . However, at least one of the coefficients for the reasons for tipping must be strictly positive, otherwise the customer has no incentive to tip.<sup>3</sup> The utility function can thus be written as:

$$u(w, t, q) = v(w - t) + \beta g(t, q) + \gamma h(t - n(q)) + \delta d(q).$$

Let us also assume that the utility function is twice continuously differentiable. Assumption 1 summarizes the assumptions discussed above about the various components of the utility function:

**Assumption 1:** The customer's utility function is twice continuously differentiable and it satisfies the following properties:

$$\beta \geq 0, \gamma \geq 0, \beta + \gamma > 0, \delta \geq 0, v' > 0, v'' \leq 0, g_t > 0, g_{tt} < 0, g_{tq} > 0, h' > 0, h'' < 0, n' > 0, d' > 0.$$

It is now possible to prove the following proposition:

**Proposition 1:** The customer's tipping function is increasing in service quality.

**Proof:** The customer maximizes his utility by choosing the tip, given the service quality chosen by the waiter in the first stage. The first-order condition is therefore given by:  $u_t(w, t, q) = -v'(w - t) + \beta g_t(t, q) + \gamma h'(t - n(q)) = 0$ . Differentiating this with respect to  $t$  once again yields  $u_{tt}(w, t, q) = v''(w - t) + \beta g_{tt}(t, q) + \gamma h''(t - n(q)) < 0$ , where the inequality follows from Assumption 1. Therefore, the second-order sufficient condition

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<sup>3</sup> In that case the customer should not tip, but empirical evidence shows that almost everyone tips when this is the norm (Azar, 2006a), and therefore it is reasonable to assume that the representative customer has at least one reason to tip.

for maximum is satisfied. Next, differentiate the first-order condition with respect to  $q$ , which gives (omitting the arguments of the functions for the sake of simplicity):

$u_{iq} = v''t' + \beta (g_{iq} + g_{tt'}) + \gamma (h''t' - h''n') = 0$ , where  $t'$  is the derivative of the optimal tipping function with respect to  $q$ . Rearranging this yields:

$t' = (\gamma h'' n' - \beta g_{iq}) / (v'' + \beta g_{tt} + \gamma h'') > 0$ , where the inequality follows from Assumption 1 (because both the numerator and the denominator are unambiguously negative).

Q.E.D.

Thus, we see that the optimal tipping function implies that the tip should be an increasing function of service quality. Since this is a sequential game in which the waiter chooses quality first and then the customer chooses the tip, the game is solved by backward induction. Once we analyzed the customer's optimal tipping behavior, the next step is to find the optimal strategy of the waiter given the customer's tipping behavior.

Denote the effort function of the waiter by  $e(q)$ , i.e., this is the monetary equivalent (in terms of the waiter's utility) of the effort required by the waiter in order to provide service quality of  $q$ . The higher service quality is, the more effort the waiter has to exert. Following most of the literature, let us assume that the effort function is convex: as you increase quality, it becomes more and more difficult to increase it further. Assume for simplicity that the waiter's utility is quasi-linear in his income, and can therefore be represented by the following function:

$$t(q) - e(q).$$

The optimal choice of service quality is then given by the value  $q^*$  that solves the first-order condition:<sup>4</sup>

$$t'(q^*) - e'(q^*) = 0.$$

This equation suggests the intuitive relationship we would expect between service quality and the sensitivity of tips to service quality. When tips are more sensitive to service quality (i.e.,  $t'$  is higher), the value of  $e'$  in equilibrium is also higher. Since  $e$  is convex, this implies a higher service quality. That is, if customers' tips are very sensitive to service quality we should expect a high service quality to be provided, and if tips are almost identical regardless of service quality, we should expect bad service quality in equilibrium. This is also illustrated in Figure 1. This result is so intuitive that it will be surprising if we find out that it does not hold empirically; but this is exactly what the next section shows.

#### **4. Empirical evidence on tipping behavior and service quality**

To examine service quality and tipping behavior in restaurants, the results of previous empirical studies with particularly large number of observations are reported below. Bodvarsson and Gibson (1994) collected data from approximately 700 patrons of seven Minnesota restaurants in 1991. Patrons that finished dining were approached and given a questionnaire about their dining experience. Two restaurants were high-priced atmosphere / specialty restaurants with alcoholic beverages, two were moderately priced with alcoholic beverages and specialty menus (one was Mexican and the other specialized in seafood), two were low-priced family restaurants with standard American

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<sup>4</sup> The second-order condition is given by  $t''(q^*) - e''(q^*) < 0$ . In what follows I assume that this condition is satisfied. It is easy to see that this is the case if we assume that  $t$  is concave or linear. The second-order condition may be satisfied, however, even if  $t$  is convex, as long as  $e$  is "more convex."

menus and no alcoholic beverages, and one was a coffee shop. Service quality was ranked by the customers on a 0-5 scale, and was on average 4.60 (standard deviation 0.63), which means that in general customers were very satisfied with the service. Bodvarsson and Gibson ran a regression of dollar tips on the bill, service quantity (how many dishes and drinks were brought to the table), service quality, and whether the customer is regular (dines at the restaurant at least once a month). The regression results indicate that each additional point on the service quality scale increased tips on average by 12.6 cents (the t-statistic is 1.05)<sup>5</sup>, suggesting that the waiter has very little incentives to make an effort to increase service quality.

Bodvarsson and Gibson (1997) further examine this dataset, adding to the regression a dummy variable for St. Paul restaurants (the other restaurants are from St. Cloud), a dummy for lone diners, and a dummy for whether the restaurant serves alcohol. They find out in various specifications (reported in Table 4 of their article) that another point in the service quality scale increases tips by 6-9 cents, the coefficients being again not statistically significant (t-statistics range between 1.31-1.59). They also add a regression in which tip percentage rather than dollar tip is the dependent variable. A one-point increase in service quality raises tips on average by 0.44-0.54 percent of the bill (in the various specifications reported in their Table 5). In this regression the coefficients become statistically significant (t-statistics range between 2.10-2.75), but notice that the effect of service quality on tips is still negligible. With the sample average of a \$28 bill, the approximate 0.5% increase in percentage tip obtained by improving service quality by one point is only about 14 cents. The negligible effect of service quality on tips is even more striking given the low variability in service quality rankings – the number of

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<sup>5</sup> Taken from the full sample results with service quantity included in the regression, Table 3 in their article.

observations with service quality of 1, 2, and 3 is 1, 3, and 38, respectively.<sup>6</sup> This implies that the waiter's ability to increase tips by improving service is very low.

Conlin, Lynn and O'Donoghue (2003) (henceforth CLO) collected data during 112 surveys sessions conducted outside 39 restaurants in Houston, Texas. A wide variety of restaurants are included in the sample, including restaurants serving Mexican, Italian, Thai, and American food. In total, 1393 usable responses were collected.<sup>7</sup> The survey was answered by the customers who paid the bill and left the tip. Respondents were asked various questions, including the following one: "Given a 5 point scale with 1 being poor and 5 being excellent, how would you rate the server on:". In the next five lines the respondents had to circle a number between 1 and 5 for each of the following characteristics: appearance, knowledge of menu, friendliness, speed of service, and attentiveness. Servers were ranked high on all these attributes, with average rankings being 4.40 in appearance (standard deviation = 0.77), 4.46 in knowledge of menu (s.d. = 0.81), 4.61 in friendliness (s.d. = 0.71), 4.36 in speed of service (s.d. = 0.91), and 4.33 in attentiveness of server (s.d. = 0.94).

CLO report the results of various specifications. Let us consider first the results reported in the first column of their Table 3. In a regression where the dependent variable is the percent tip (in percents, i.e. 15% is 15, not 0.15), the coefficients and coefficient standard deviations of the various server attributes (ranked by the customer on a 1-5 scale) were as follows: Appearance: 0.064 (s.d. = 0.469); Knowledge of menu: -0.781 (s.d. = 0.462); Friendliness: 1.336 (s.d. = 0.716); Speed of service: 1.196 (s.d. = 0.462); Attentiveness: -0.475 (0.687). The coefficients of Knowledge and Friendliness are

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<sup>6</sup> This information is based on the dataset itself and not the articles. I thank Orn Bodvarsson and William Gibson for their data and Mike Lynn for help obtaining the data.

<sup>7</sup> The authors discard certain observations such as tables with more than 5 patrons (because in this case the tip is often included in the bill already) or tables with multiple checks.

statistically significant at 10-percent level, and Speed of service at 5-percent level. The authors suggest that the negative coefficient of Knowledge of menu may be a result of knowledgeable servers bothering the customer with unimportant information or being perceived as "snob." The effect of the various measures of service quality on tips is positive for only three of the five, and is statistically significant at the 5-percent level for only one, despite the large sample. This shows again that the relationship between service quality and tips is rather weak.

CLO then create an aggregate measure of service quality by taking the average of the various server's measures, except for knowledge of menu. A regression that includes this aggregate service quality measure instead of the five different variables (Table 3, second column) reveals that an increase of 1 point in this variable raises percent tip by 1.464 (s.d. = 0.551).<sup>8</sup> While this coefficient is statistically significant at the 5-percent level and much larger than the approximate 0.5% reported in Bodvarsson and Gibson (1997), it is still rather small. It means that if the waiter makes an effort and increases each of the four measures (appearance, friendliness, speed of service and attentiveness) by one point (which is a large increase, given that the variables are on a 1-5 scale and their standard deviation is between 0.71 and 0.94), he is tipped 1.464% (of the bill) more. With average bill being \$26.42 and average percentage tip being 17.56%, this means that all this effort increases the waiter's income from tips by less than 39 cents, or about 8% of his tip income (the increase in his total income is even smaller, assuming the waiter also receives a salary, as required by minimum wage laws<sup>9</sup>).

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<sup>8</sup> Notice that the negative coefficient of Knowledge of menu suggests that if the aggregate measure of service quality included also Knowledge of menu in the average computed, the coefficient of the aggregate measure would have been smaller.

<sup>9</sup> The federal law requires employers to pay \$5.15 per hour in general. Tipped workers should also have total income (from wages and tips) of at least \$5.15 per hour, but their wages can be reduced up to \$2.13 an

The theoretical model suggested that low sensitivity of tips to service quality should result in low service quality in equilibrium, but the empirical evidence shows that while tips are hardly affected by service quality, customers rank service quality as being very high on average. The co-existence of low sensitivity of tips to service quality and high service quality in equilibrium is what I denote "the tipping – service puzzle." It raises the question why the theoretical predictions, which seem quite intuitive, do not hold empirically.

The result that tips are affected by service quality very little is also obtained in various other studies.<sup>10</sup> Lynn and McCall (2000b), for example, evaluates this relationship in a meta-analysis of 7 published and 6 unpublished studies involving 2547 dining parties at 20 different restaurants. Although the average relationship between tip size and service evaluations was statistically significant in their meta-analysis, it was also quite small – accounting for less than two percent of the variability in tip percentages. However, because their meta-analysis does not report the average service ratings in the studies included, it is hard to know whether this can be taken as additional support for the "tipping – service puzzle" – this depends on whether these studies also involved high service evaluations by the customers. The findings in many studies about the weak

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hour, using what is called "tip credit" towards the \$5.15 minimum wage. Some states adopted different laws, however.

<sup>10</sup> One exception is the study of Bodvarsson, Luksetich and McDermott (2003), who argue that using different econometric techniques (instead of OLS regression) in their sample of 247 diners in a Central Minnesota restaurant reveals a stronger relationship between service quality and tips than in other studies. Lynn (2004), however, re-analyzes their data and suggests that the effect of service quality is small (top-rated service increases tips by not more than 1.5% of the bill amount) and not statistically significant, in line with previous research (see also Bodvarsson, 2005 for a reply to Lynn's criticism).

relationship between service quality and tips are also summarized well in Lynn (2001; 2003).

## 5. Conclusion

The tipping – service puzzle pointed out above is a puzzle that did not receive attention in the literature on tipping before. However, it is an important puzzle, because how tipping behavior affects service quality is a fundamental question in understanding tipping and its implications. Whether the social norm of tipping increases social welfare depends crucially on the question whether tipping increases service quality. Although service quality is generally high, which could lead us to think that tipping is the incentive that causes waiters to provide excellent service, the analysis above shows that the sensitivity of tips to service quality is so small that tipping is not likely to be the reason for the high service quality. Consequently, tipping, at least in restaurants, does not seem to improve social welfare and economic efficiency by improving service quality.

So what can explain the puzzling co-existence of high service quality and low sensitivity of tips to service quality? One possible explanation is that waiters derive satisfaction from doing a good job. The good feeling they obtain when providing good service is then another reward they receive for high service quality, which can encourage them to provide good service even though doing so hardly increases tips.<sup>11</sup>

A second possible explanation is that customers who are unhappy with the service may complain to the restaurant manager. The better the service, the lower is the probability that the customer will complain. Because complaints are costly for the waiters

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<sup>11</sup> On psychological motivations that play a role in job satisfaction see Hackman and Oldham (1976) and the other literature about Job Characteristics Theory; on job satisfaction in the low wage service sector, including the restaurant industry, see Brown and McIntosh (2003).

– they may get punished by the restaurant manager (for example, they may receive less attractive tables or shifts, or even get fired) – this creates an incentive to provide good service despite the small effect of service on tips.

A third possible explanation is that the restaurants themselves may be using various mechanisms to assure good service quality, and these mechanisms rather than tipping yield the good service. Since higher service quality improves the dining experience in the restaurant and allows it to attract more customers and to charge higher prices, the restaurant might find it beneficial to invest in monitoring workers in order to assure high service quality, especially if the managers believe that tips do not provide enough incentives for the waiters to give excellent service. Further examination of these explanations as well as other potential explanations for the tipping – service puzzle is an interesting project that is left for future research.

The managerial implications of this study are not clear because of the tipping – service puzzle. On one hand, tips are not sensitive to service quality, and this implies that managers cannot count on tipping as a sufficient motivation for providing good service, and should employ additional measures to ensure good service quality. On the other hand, reported service quality is high, suggesting that there is no need in additional monitoring of waiters. Future research that addresses the possible explanations for the puzzle will probably also shed more light on the managerial implications of the findings reported here.

Additional worthwhile idea for future research is to address the question what is the reason that people leave similar tips for good and bad service. There are several reasons why tips might depend on service quality, as pointed out in Section 3. So why despite all these reasons tips are hardly affected by service quality? This is an intriguing question that calls for additional research.

A final idea for future research is to examine whether the tipping – service puzzle exists in additional occupations. For example, are tips in taxicabs also not affected by service quality, and if so, is service quality in taxicabs generally ranked as being high? I hope that this article will encourage others to add to the growing literature on the interesting social norm of tipping.

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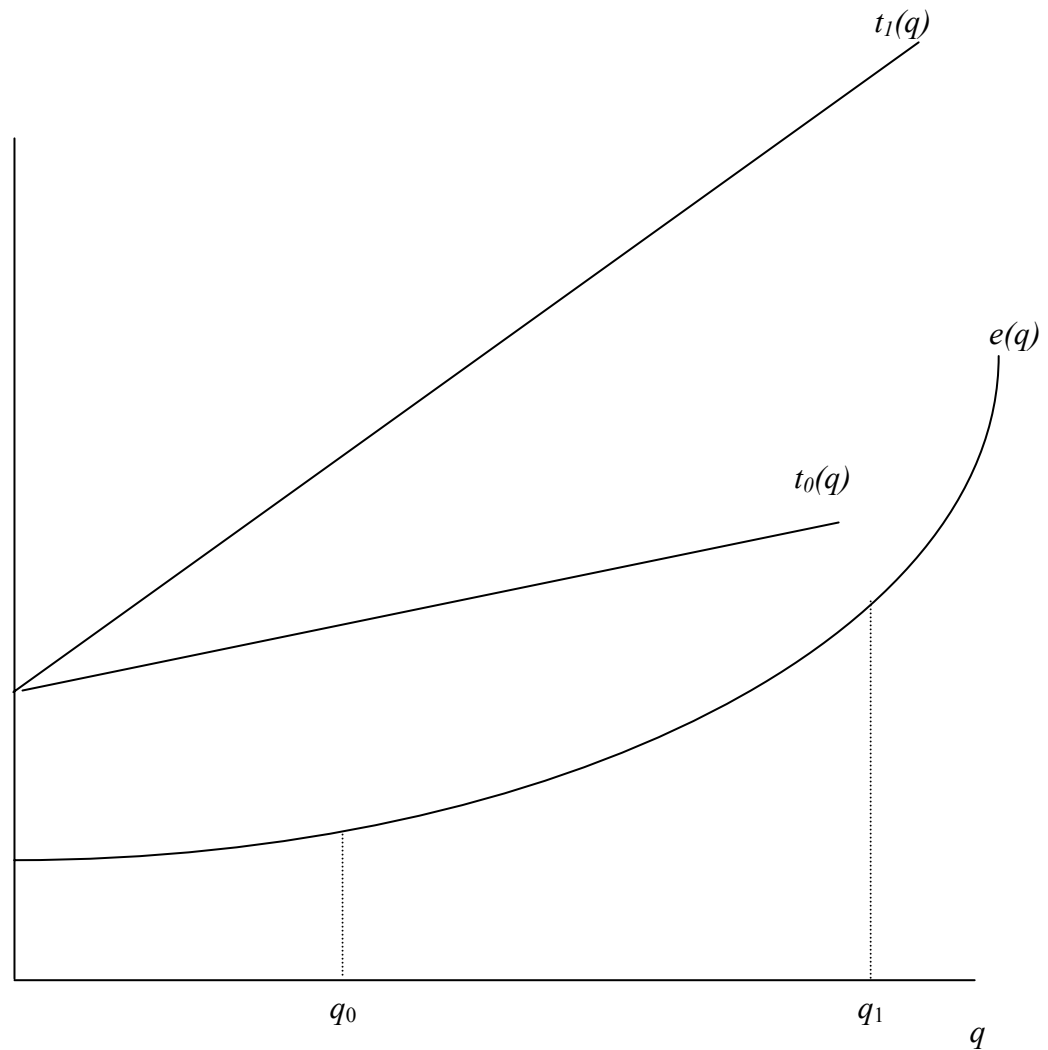
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**Figure 1: The choice of service quality by the waiter**



The curve  $e(q)$  is the waiter's convex effort function, while  $t_0(q)$  and  $t_1(q)$  are two alternative tipping functions. The values of  $q_0$  and  $q_1$  are the optimal choices of service quality by the waiter for  $t_0(q)$  and  $t_1(q)$ , respectively, derived from the first-order condition  $t'(q^*) - e'(q^*) = 0$ . Notice that the first-order condition gives the service quality for which the difference  $t(q) - e(q)$  is maximal, and this difference is the waiter's utility. The figure illustrates that a higher sensitivity of tips to service quality (a higher  $t'$  – the tipping function  $t_1(q)$  in the figure) leads to a higher service quality in equilibrium.