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WHY DO WE TIP TAXICAB DRIVERS?

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abstract

The leading economic explanation for tipping –that is, explanation why the practice is socially beneficial, not why individuals leave tips even though it is not narrowly advantageous to them– is that it confers an incentive to provide personal services. This fits many instances in which tipping is common but does not fit the taxicab business very well. I propose a novel explanation for tipping that does fit the taxi case. It is that tipping amounts to Lindahl pricing of the services of vacant cabs (essentially, reduced waiting time), a local public good for taxi customers.

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1. Introduction

The recent boom in behavioral economics has induced a boomlet on tipping. Recent literature such as Azar (2004) and Conlin, Lynn and O'Donoghue (2003), has focused on why individuals leave tips even though it is not narrowly advantageous for them to do so. Leaving a tip is an example of conformity to a social norm. The wish to avoid social ostracism, and not the pursuit of economic gain, is what induces customers to leave tips. And yet, it is natural to conjecture that social norms themselves evolve in a way that is economically efficient.

What then is the economic benefit of the social norm of tipping? A leading explanation, first proposed by Ben-Zion and Karni (1977) and further developed by Jacob and Page (1980), is that it confers an economic incentive to provide personal services. So, for instance, the prospect of receiving a tip induces a restaurant waiter to be attentive to each customer, even if the waiter's employer, the restaurant proprietor say, is unable to monitor the situation or has greater costs of doing so than does the customer. This explanation comports with the fact that most instances in which tipping is common do involve personal services, the quality of which is very much determined by the one who receives the tip. But the explanation does not fit the taxi business particularly well, for the "quality" of the taxi service seems little related to the driver's behavior. I propose a novel explanation for tipping that does fit the taxi business, that it amounts to Lindahl pricing of the services of vacant cabs, a local public good for taxi customers.

2. Tipping as Lindahl pricing of a local public good

Often, "quality" has the character of a public good. Where this is so, the market will in general not attain the socially optimal level of quality under ordinary pricing. Pourboire–tipping–in which customers voluntarily pay surcharges in amounts of their own individual choosing, is not ordinary pricing. Mightn't it be the case that the rules customers follow in deciding how much to tip in fact induce the socially optimal quality? In effect tipping might resemble Lindahl pricing of a local public good. This has particular relevance to the cruising taxi cab industry.

The quality of taxi service corresponds to the average waiting time for a vacant cab. Within a particular geographic domain served by cruising cabs or radio dispatched cabs, the average

waiting time depends upon the number of vacant cabs. As first noticed by Douglas (1972) and Mohring (1972) this imparts industry-wide economies of scale. Holding quality of service constant means holding the average number of vacant cabs constant. The cost of operating the set number of vacant cabs is a fixed cost independent of the quantity of cab services. But what is the economically efficient number of vacant cabs and will the market attain that? As suggested by Arnott (1996), the number of vacant cabs and implied average waiting time for a cab has the character of a local public good. The economically efficient allocation thus requires Lindahl pricing of the services of vacant cabs. That is, each cab customer must be dunned –in addition to a price equal to the marginal cost of the cab while he occupies it– an extra fee that equals his own marginal valuation of vacant cabs. The economically efficient number of vacant cabs is that such that the summed marginal valuations of all cab customers just equals the marginal cost of operating vacant cabs. If the tips of each cab customer correspond to the Lindahl prices of vacant cabs, regulators have then only to set the posted fare equal to the marginal cost of occupied cabs and allow free entry, to assure the economically efficient allocation.

In fact this is a possible basis for tipping generally, not restricted to the cruising taxi case, but in other instances where the argument might apply local monopoly is necessary. The cruising cab example is special in that the quality of cab service is an industry-wide public good even where the industry is itself atomistic. Where quality of a product is a local public good only for the customers of one firm, and there are many firms, then hedonic pricing can induce efficient choices of quality without Lindahl pricing. But where the firm is itself a monopoly there might be some basis for Lindahl pricing à la tipping to induce efficient quality choice by the one firm. Let us consider these arguments a bit more precisely, focusing on the taxicab case.[1]

Suppose that the cost of producing and customers' valuations depend upon the quality of a good as well as the quantity. The socially optimal quality maximizes social welfare:

$$\max_{q,s} W(q,s) = {}_0\int^q p(x,s)dx - c(q,s), \qquad (1)$$

where q is quantity, s is quality, p(x,s) is the inverse demand function and c(q,s) is the cost function. The necessary conditions for maximum social welfare are

$$p - \partial c/\partial q = 0 \qquad (2)$$

and

[1] Some of this follows the discussion and notation of Tirole (1988), pp. 100-102.

$$_0\int^q \partial p(x,s)/\partial s \, dx \; - \partial c/\partial s = 0. \qquad (3)$$

The first condition is the familiar "marginal cost equals price". The second condition means that the incremental social value of quality enhancement equals the incremental cost. This condition too is familiar; it is the condition for optimal allocation of a public good. Here quality s has the character of a local public good for all the consumers. The condition means that the summed marginal valuations of quality of all consumers just equal the marginal cost.

Now in the taxi case it is reasonable to let "s" stand for the average density of vacant cabs and "q" that of occupied cabs. It costs about as much to operate a vacant cab as it does an occupied one and each is subject to constant returns to scale. Thus

$$c(q,s) = \bar{c}q + \bar{c}s, \qquad (4)$$

where $\bar{c}$ is the constant unit cost. If the regulatory authority stipulates a fare p*, and there is no tipping, and there is free-entry, then the number of vacant cabs will on average be such that

$$p^*q = \bar{c}q + \bar{c}s. \qquad (5)$$

Thus the ratio of vacant to occupied cabs will become

$$s/q = (p^* - \bar{c})/\bar{c}\,, \qquad (6)$$

and the number of vacant cabs need not be socially efficient.

Now suppose that each customer, in addition to the payment of the base fare p, also pays the cab driver a tip that mimics Lindahl pricing of the corresponding vacant cabs. The Lindahl prices of vacant cabs are

$$\partial p(x,s)/\partial s, \qquad (7)$$

where x orders the taxi services q by marginal valuation (of occupied cabs) of the customers. At these "prices" the consumers all desire the same quality s*, and if the regulators have set the fare equal to the marginal cost of operating an occupied cab $p^*=\bar{c}$, then zero profit is just attained when the allocation of occupied and vacant cabs is efficient.[2] Notice that in this formulation, for given s (that is, given expected waiting time to hail a cab), the quantity demanded q depends on the fare p, and does not depend on the tip. The tip is a payment for the services of vacant cabs, distinct from the price p of a cab ride. The voluntariness of a tip comports well with this notion.

As just related, the social benefit of tipping is that it allows regulators to defray the cost of operating vacant cabs and still achieve an efficient allocation, without having to amass

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[2]Notice that the summed tips collected from all customers, under the tips as Lindahl prices regime equal: $s \; _0\int^q \partial p(x,s)/\partial s \, dx$.

information on the social value of vacant cabs. Once the regulators have set the price equal to marginal cost of an occupied cab, more tips make entry profitable which leads to more vacant cabs, which if the tips are Lindahl is also efficient. But what if, as in New York City, free-entry is not allowed by the regulatory authority?[3] If entry is barred, the goal should be to set the fare at a level that achieves a constrained optimum in the sense that the marginal social value of occupied and vacant cabs are just equal.[4] And here the tips would actually afford some useful information. If tips correspond to Lindahl prices of vacant cabs, the efficient fare would entail the total tips surpassing the costs of vacant cabs by the same percentage the fare lies above the unit cost of occupied cabs.[5] By monitoring tips, the regulators could determine whether they have set the fare at the correct level.

Does this explain why we tip cab drivers? Some readers of an earlier version of this manuscript suggested that the notion that taxicab tips are Lindahl prices of vacant cabs fails minimal standards of plausibility, on the grounds that tips do not vary across customers, or do not vary as much as one imagines that the Lindahl prices of vacant cabs would vary. Well. Taxicab tips vary more than one might have supposed, judging from the survey data collected by Ayres, Vars, and Zakaria (2005). Based on 1066 observations of 12 different New Haven, CT

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[3]Even if the number of licensed cabs is limited, the intensity with which the cabs are operated is still somewhat responsive to economic incentives. A higher price for cab services, whether vacant or occupied, would induce shorter work breaks and longer duty hours by licensed cabs. But this response is likely to be weak. For example Schaller (1999) found that in New York City the elasticity of cabs with respect to official fares was a mere 6 percent. That is, the 20(=100÷5) percent increase in posted fare introduced in 1996 seemed to increase vacant cab miles by 28÷5 percent but reduced occupied cab miles by only 22÷5 percent, and so increased total cab miles by 6÷5 percent.

[4]The quality that maximizes social welfare subject to the constraint $q+s \leq n$, where n is the number of licensed cabs, in other words that solves:

$$\max_{q,s} W(q,s) = {}_0\int^q p(x,s)dx - c(q,s) + \lambda(n-q-s),$$

necessarily fulfills the conditions

$$p - \partial c/\partial q - \lambda = 0$$

and

$${}_0\int^q \partial p(x,s)/\partial s \, dx - \partial c/\partial s - \lambda = 0.$$

So at the constrained social welfare maximum, the price p of occupied cabs just equals the marginal social value of vacant cabs:

$$p = {}_0\int^q \partial p(x,s)/\partial s \, dx.$$

[5]This assumes the simple cost function of (4) above.

taxicab drivers in 2001, they found an average tip rate of 15.8 percent of the fare (an average tip of $1.22), but with a standard deviation of 27 percent of the fare. In fact 23.8 percent of the passengers left no tip at all. It is clearly not the case that every customer pays the same "standard" tip. There is variation in tipping. But what about the pattern of variation?

A principal finding of Ayres et al was the existence of racial disparities in tipping rates. Specifically they found lower tips by minority passengers and lower tips for minority drivers. They speculate on the reasons but reach no definite conclusion. But if, as Ayres et al (2005, at f.n. 103) suggest, some drivers have discriminated against African-American passengers by refusing to pick them up, then the lower tip rates of African-American passengers comport well with the tips as Lindahl prices story, for two reasons. First, because African-Americans expect to wait longer for a cab than others, only those with a relatively low value of time remain in the market. Those who do remain have a revealed willingness to wait, and so tend to have low marginal valuations of the services of vacant cabs and tip little. Second, because the cabs that stop for African-Americans also stop for others, while the cabs that discriminate stop only for Whites, the African-Americans' marginal valuations of vacant cabs should be less than Whites', all else the same. That is, any expansion of the number of vacant cabs induced by White tips may include some discriminators who stop only for Whites, and to just that extent the expansion of vacant cabs has a greater effect on the reduction in expected waiting time of Whites. In other words Whites' marginal valuations of vacant cabs are greater than African-Americans' and so they tip more.[6] There is however a third consideration that has the opposite effect. Because on average African- Americans wait longer for a cab, to the extent marginal value of vacant cabs is diminishing, their marginal values should be greater. But this third effect will be small relative to the other two if, as I suppose, the variation in marginal disvalue of waiting varies more across individuals than it does across average waiting times.

The conjecture here that tipping might be a form of Lindahl pricing where quality is a local public good can be extended beyond the taxicab example. But in other instances where it might apply, quality is likely to be set by a monopoly supplier. Then if customers' tips are tied in some

[6]If Whites could differentiate between cabs that do not stop for African-Americans and those that do, the Whites' marginal valuation of the former would be greater, and so they would tip them more, in effect rewarding the cab drivers more likely to discriminate in their favor. This may comport with the Ayres et al finding that Whites tip African-American cab drivers less than they do others on average.

way to their marginal valuations of quality –a kind of Lindahl pricing– , the monopolist is induced to supply the efficient quality.

3. Tipping and Regulation

The taxi industry has been subject to government regulation throughout the world almost since its inception. The economic reasons are not entirely clear. One common thread in the recent literature on taxicab economics is that the fares of cruising cabs are subject to bargaining and negotiation between the cabs and individual customers. The point of regulating fares might then be to avert that process and thus avoid the costs associated with haggling or bargaining (Cairnes and Liston-Heyes (1996)). Another point might be that the outcome of such bargaining inefficiently compensates suppliers for the services of vacant cabs, or reflects local monopoly and its attendant waste, and so there is a possibility that regulation can improve resource allocation (Flath (2006)). Actually, regulation of fares by itself cannot attain a first-best allocation of vacant cabs because, as sketched previously, this would require Lindahl pricing which can only be based on the private information of each demander. In principle, regulation of fares and control of entry could attain a first-best allocation but would require that regulators determine the optimal density of vacant cabs and subsidize firms for the costs of operating vacant cabs, as detailed by Arnott (1996). As sketched in the previous section, with tips as Lindahl prices of the vacant cabs, the regulators need only set the cab fare equal to the marginal cost of supplying occupied cabs to attain a first-best allocation.

4. Conclusion

That tipping is an example of conformity to a social norm is obvious. In other words it is not narrowly rational to tip at all. But one presumes that when all conform to the social norm, the society is better off than if none did. In other words, when all tip according to the customary rule, resource allocation is improved. But why? The leading answer to this question so far has been that the prospect of receiving a tip induces diligence by the providers of personal services; it is an efficient way of monitoring personal servers. This doesn't fit the taxi business very well. So maybe the premise is wrong. Maybe society would be better off without the custom of tipping cab drivers. A recent analysis by Ayres, Vars, and Zakaria (2005) of the tipping patterns in the

New Haven, Connecticut taxi business, found disturbing racial disparities. The authors propose regulations to disallow tips altogether, so that inequities in payment due to the race of the drivers or customers would be eliminated.

I have proposed a novel explanation as to why the social norm of tipping taxi drivers might be socially efficient. To the extent that tips correspond to Lindahl prices of vacant cabs, the custom of tipping improves the allocation of cab services and prohibiting the tipping of taxi drivers would damage resource allocation.

Suppose that tipping indeed amounts to Lindahl pricing of the services of vacant cabs. This has several further implications that warrant investigation. (1) The propensity to tip or the size of tips in this case would have no direct bearing on the quantity demanded of cab services. (2) Those with a greater disvalue of waiting, all else the same, should tip more. (3) The average tip rate should be approximately equal to the ratio of vacant to occupied cabs. (4) Where the regulatory authority restricts the number of cabs, the average tip rate should be greater the larger the demand in relation to the number of cabs.

Finally, let me address a point raised by some readers of a previous version of this essay. In Japan there is virtually no tipping of taxi cab drivers. How can this fact be squared with the explanation for tipping offered here? Well, in Japan there is very little tipping anywhere. For instance customers generally do not tip servers in restaurants. This should draw our attention to the fact that tipping is a cultural as well as an economic phenomenon. For tipping to serve any economic purpose, the culture has to first accommodate it and in Japan this has apparently not occurred.

References

Arnott, Richard (1996). "Taxi Travel Should Be Subsidized", Journal of Urban Economics, vol. 40, pp. 316-33.

Ayres, Ian; Vars, Frederick E., and Zakariya, Nasser (2005). "To Insure Prejudice: Racial Disparaties in Taxicab Tipping", The Yale Law Journal, vol. 114, no. 7 (May), pp. 1613-74.

Azar, Ofer H. (2004). "What Sustains Social Norms and How They Evolve? The Case of Tipping," Journal of Economic Behavior and Organization, vol. 54, no. 1, pp. 49-64.

Ben-Zion, Uri and Karni, Edi (1977). "Tip Payments and the Quality of Service,"in O.C. Ashenfelter and W.E. Oates, eds., Essays in Labor Market Analysis, New York: John Wiley & Sons, pp. 37-44.

Cairns, Robert D. and Liston-Heyes, Catherine (1996). "Competition and Regulation in the Taxi Industry", Journal of Public Economics, vol. 59, pp. 1-15.

Conlin, Michael; Lynn, Michael, and O'Donoghue, Ted (2003). "The Norm of Restaurant Tipping", Journal of Economic Behavior and Organization, vol. 52, pp. 297-321.

Douglas, George W. (1972). "Price Regulation and Optimal Service Standards: The Taxicab Industry", Journal of Transport Economics and Policy, vol. 4, no. 2 (May), pp. 116-127.

Flath, David (2006). "Taxicab Regulation in Japan," Journal of the Japanese and International Economies, vol. 20, no.2, pp. 288-304.

Jacob, Nancy L. and Page, Alfred N. (1980). American Economic Review, vol. 70, no. 3 (June), pp. 476-8.

Mohring, Herbert (1972). "Optimization and Scale Economies in Urban Bus Transportation", The American Economic Review, vol. 62, no. 4 (Sept.), pp. 591-604.

Schaller, Bruce (1999). "Elasticities of Taxicab Fares and Service Availability", Transportation, vol. 26, pp. 1-17.

Spence, A. Michael (1975). "Monopoly, Quality and Regulation", Bell Journal of Economics, vol. 6, p. 417.

Tirole, Jean (1988). The Theory of Industrial Organization, Cambridge, MA: M.I.T. Press.