

Tipping and the McQuatters Formula

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ABSTRACT: The Internal Revenue Service has been attempting to reduce tax evasion on tips paid in cash by imputing this income on the basis of credit card tip income. This note points out that the effective marginal tax rate on a credit card tip can as a result be very high, possibly in excess of 100%. This rate may affect behavior and could detract from the social acceptability of the imputation formula.

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INTRODUCTION

Cash transactions have long been a source of difficulty for tax enforcement authorities in many countries. The problem is especially troublesome for cash tips received by servers in restaurants and the broader hospitality industry as such tips are essentially unobservable by any means short of videotaping servers or assigning auditors to question departing customers. Tax enforcement authorities are left with four approaches: tolerate underreported income in this sector and employ only light audit effort, as in the case of the federal tax authority in Canadaⁱ; require that reported tips be a minimum percentage of sales (e.g., 8%, as used for all but the smallest establishments in the United States since 1982 and for provincial income tax in Quebec since 1998); encourage or mandate a compulsory “service charge” rate (Commission on Taxation and the Financing of Public Services, 1996), so that both actual and reported tips would in fact be a given percentage of sales; or estimate the cash tips of particular servers based on a formula involving their credit card tips, as the United States has done through audits based on this formula and voluntary agreements with restaurants.

This last option, known as the McQuatters formulaⁱⁱ, appears to have found increasing favor with the Internal Revenue Service (IRS). Its principal advantage is that it allows for some variation in tipping rate by establishment, providing an imputation in cases where the tipping rate is in excess of the 8% minimum cited above.ⁱⁱⁱ No doubt application of the McQuatters formula has contributed to the increase in the estimated fraction of tip income that is reported from 16% in the early 1980s to 50% today (Internal Revenue Service, 1990; Kilgore, 1999).^{iv} The commonly-cited disadvantage is that the McQuatters formula will inevitably overestimate the unreported income in some cases and overestimation clearly alienates servers

(Newman, 1988). The purpose of this note is to point out that the McQuatters formula has an additional disadvantage. If servers are forced to use this method to report cash tip income, each dollar of credit card tips increases the estimate of cash tips. Hence, the effective marginal tax rate on credit card tips becomes very high and can even exceed 100%. This rate may affect behavior and may also detract from the social acceptability of the McQuatters formula.

THE MODEL

We provide a simple model to illustrate the effect. G_s^M , the IRS McQuatters estimate of cash tips, is the credit card tip rate, less an adjustment m to allow for a presumed lower cash tip rate, multiplied by cash sales (sometimes adjusted by a factor $s \leq 1$, described as an allowance for factors such as additional “stiffing” by cash customers). Hence

$$(1) G_s^M = [(G_{CC}/S_{CC}) - m]sS_s$$

where G_{CC} is credit card tips, S_{CC} is credit card sales and S_s is cash sales, all of which are assumed observable^v by the IRS and the server. Given actual (unobserved) cash tips G_s and a constant marginal tax rate t , we model the server’s after-tax return from tips G_{net} as:

$$(2) G_{net} = (1 - t)G_{CC} + G_s - tG_s^M$$

More complex approaches are possible, involving for example random audits and expected tax payments, although as long as expected tax payments are increasing in the McQuatters estimate

G_s^M , the basic points of the analysis will be sustained. Note for (2) it does not matter what actual cash tips are, provided that taxes are paid on G_s^M --which may be an underestimate or an overestimate.

Given (2), the marginal after-tax return to the server from a one dollar cash tip is one dollar (as the cash tip is never observed by the IRS):

$$(3) \partial G_{net} / \partial G_s = 1.$$

The return from a one dollar credit card tip is:

$$(4) \partial G_{net} / \partial G_{CC} = 1 - t - ts(S_s / S_{CC})$$

where the $1 - t$ is the ordinary after-tax return but the third term reflects the increase in taxes due to the increase in the McQuatters estimate from the increase in credit card tips. For an establishment with a large fraction of cash sales, this return can be negative, that is the effective marginal rate on credit card tips can exceed 100%.

The choice of whether to pay the bill itself by credit card or by cash also has implications for the McQuatters formula. For every one dollar of restaurant bill paid by cash, the McQuatters estimate of cash tips increases (regardless of the actual tip), taxes increase and after-tax tips fall:

$$(5) \partial G_{net} / \partial S_s = -ts[(G_{CC} / S_{CC}) - m].$$

For every one dollar of restaurant bill paid by credit card, the McQuatters estimate of cash tips decreases, taxes decrease (again regardless of the actual tip) and after-tax tips rise:

$$(6) \quad \partial G_{net} / \partial S_{CC} = ts(G_{CC} / S_{CC})(S_{\$} / S_{CC}).$$

Table 1 gives the after-tax returns for the case of a \$100 restaurant bill with various payment and tip options. The total after-tax return to the server is a weighted sum of one of (3) or (4) and one of (5) or (6): for example the effect of paying the bill by cash and leaving a \$5 cash tip is $\$100(\partial G_{net} / \partial S_{\$}) + \$5(\partial G_{net} / \partial G_{\$})$. The marginal tax rate t is set at .3 and, using values that approximate those in both the *McQuatters* and *Bubble Room* cases, for (3) to (6) we set the credit card tipping ratio (G_{CC} / S_{CC}) as .15 and the McQuatters formula parameters $s = .9$ and $m = .04$. We choose two values for the cash-to-credit card sales ratio ($S_{\$} / S_{CC}$), .25 and 4.^{vi} (The latter ratio happens to be the ratio in the Seattle Space Needle restaurant in 1974 in which the McQuatters formula was first applied.)

As can be seen from the first row of Table 1 where payment and any tip is by cash, the server will actually lose after-tax income if a zero tip is left, because taxes paid will be a function of the McQuatters estimate which will automatically increase with a cash sale. However because cash tips do not affect taxes paid, the marginal after-tax return to each \$5 increment in cash tips is \$5. In the last row where a credit card is used for both check and any tip, the server benefits even with a zero tip because a credit card payment will lower the McQuatters estimate of cash tips. However because each \$5 increment in credit card tip is both taxed directly and increases the McQuatters estimate of cash tips, the marginal return to the server is much less than \$5. With

$S_c/S_{CC} = .25$, the marginal return on each \$5 of tip is about \$3.16 implying an effective marginal tax rate of 37%. But if $S_c/S_{CC} = 4$, the effective marginal tax rate is about 140% yielding a negative marginal return to the server for each \$5 tip increment. (For an intermediate case where cash sales equal credit card sales, the effective marginal tax rate would be about 57% or almost double the nominal tax rate.) In the middle row case where the check is paid by credit card but the tip is by cash, the server gets the best of both worlds and the after-tax return is greater than the tip in all cases.

We conclude this section by noting some qualifications. First, if tips are pooled, the analysis above will not apply to an individual server but may still apply to the servers as a collective (provided the servers co-ordinate their tax reporting so that the IRS cannot gain information about one server's cash tip income from a co-pooler's more accurate report). Second, as noted, the IRS has effectively set a minimum estimate (subject to an appeal mechanism) of total tips as 8 percent of total sales. Hence the approach might not apply to establishments with this relatively low tip rate. However, in *Bubble Room* and related cases the reported tip rate exceeded 8 percent but IRS attention was still drawn because of the discrepancy between reported cash and credit card tip rates. Third, we have assumed cash sales, credit card sales and credit card tips are perfectly observable: as they are not they must be estimated by sampling. The IRS (1995) publishes in advance the dates in a year which should be sampled by a co-operating employer, although an audit would unlikely be constrained by these dates. Hence there might be different after-tax returns to tips on different days, a complication we have ignored. Fourth, it is sometimes thought that the taxpayer's own records, even if unverifiable, may be accepted as accurate. The *Bubble Room* judgment did not accept this premise; the

records in question were the employer's and were based on employee reports. Finally the pay-by-credit-card/tip-by-cash method would be less advantageous if credit card sales in the McQuatters formula excluded those sales with zero tips as directed by the IRS manual (1995, p. 5-27); however the manual continues that if the corrected figure is not available, total credit card sales should be used. In any case, the after-tax returns in the middle row of Table 1 can be essentially accomplished by leaving an arbitrarily small credit card tip and the remaining tip in cash.

CONCLUSIONS

We have demonstrated that if credit card tips are used to impute cash tips, there can be a very large differential in the after-tax return to cash tips as compared to credit card tips (including the somewhat extreme possibility that in a restaurant or bar where cash is the norm, the after-tax return to the server of a credit card tip may be negative.) While some might be surprised by the potential difference, we believe that most customers understand that a cash tip may well effect a larger after-tax transfer than a credit card tip, yet some will still use credit card tipping. Moreover we would be surprised if our analysis changed the behavior of many readers of this note. Most tippers are not attracted by the strategy of leaving an equal, after-tax reward by substituting a credit card tip with a smaller cash tip. This may support the view (see e.g. Lynn, Zinkhan and Harris, 1993; Seligman, 1998) that individuals tip for psychological/social reasons not primarily related to the desire to reward the server's performance. It is also possible that some customers intrinsically value law abidance and are motivated to tip by credit card precisely because that method may increase the likelihood that the server will pay tax on the received tip.

More generally, customers tip by credit card for the same reasons they would make other expenditures by credit card, even if discounts for cash were available, because they value the ease as well as the verifiability and automatic record keeping aspect of credit card tips in their own tax and expense accounting.^{vii}

Whether or not high effective marginal tax rates on credit card tips affect behavior, they may be important in the public's assessment of the "social capital" (Slemrod, 1998), or goodwill, of the tax system.^{viii} As Slemrod points out, tax rule obedience may be based on notions of fairness and civic duty as well as on the fear of audits. Many servers are perceived as low-income earners, and a method of calculating their taxable income which not only produces an overestimate of cash tips for some but also produces high marginal tax rates on credit card tips may not necessarily be viewed as an improvement over the more traditional system which implicitly allows servers to underreport their income. An alternative perspective may be that problems with taxing cash tips constitute a strong argument for promoting or mandating European-style "service charges" that are automatically included in every bill and hence easily recorded and taxed (as recommended by Quebec's Commission on Taxation and the Financing of Public Services, 1996).

REFERENCES

- Auditor General of Canada, 1999. *1999 Report of the Auditor General of Canada*. Ottawa: Government of Canada.
- Commission on Taxation and the Financing of Public Services, 1996. *Working together for a responsible Québec*. Quebec City: Government of Quebec.
- Frey, Bruno S., 1992. *Economics as a Science of Human Behaviour*. Dordrecht: Kluwer.
- Internal Revenue Service, 1990. *A Study of Tipping Practices in the Food Service Industry for 1984*. Washington DC: Department of the Treasury, August, Publication 1530.
- Internal Revenue Service, 1995. *Market segment specialization program: bars and restaurants, Training Manual 3149-118 (2/95) TPDS 83849L*. Washington DC: Department of the Treasury, February.
- Internal Revenue Service, 2000a. *IRS simplifies, expands TRDAs and TRAC agreements*. Washington DC: Department of the Treasury, April, Publication IR-2000-26.
- Internal Revenue Service, 2000b. *Annual report for 1999*. Washington DC: Department of the Treasury, August, Publication 3385.
- Kilgore, Peter, 1999. Brief for the Amicus Curiae National Restaurant Association in support of the district court's decision in favour of Quietwater Entertainment, Inc., plaintiff-appellee. Washington, D.C.: National Restaurant Association.
- Lynn, M., G. M. Zinkhan, and J. Harris. 1993. Consumer tipping: A cross-country study. *Journal of Consumer Research* 20: 478-88.
- Newman, J. S. 1988. Waiter, there's an IRS agent in my soup. *Tax Notes* August 22: 861-69.

Quebec Minister of Finance. 1997. *Budget speech 1997*. Quebec City: Government of Quebec, March 25.

Raby, B. J. W. and W. L. Raby. 1998. The war on unreported cash tips. *Tax Notes*, November 2: 605-11.

Slemrod, J. 1998. On voluntary compliance, voluntary taxes, and social capital. *National Tax Journal* 51: 485-91.

Spencer, Jody L. 1997. Recent development: *Bubble Room, Inc. v. United States*: The Court of Federal Claims says no to aggregate income estimates for employer-only FICA taxes. *Georgia Law Review* 31: 1259-88.

Seligman, Dan. 1998. Why do you leave tips? *Forbes* December 14: 138-140.

Endnotes

i. The current Canadian federal approach to this problem is similar to that of the Quebec government before its minimum-percentage-reporting rules were introduced, and Quebec estimates that only 5% of tips were reported in that period (Quebec Minister of Finance, 1997). There is now some indication of change, as the hospitality industry is one of four sectors targeted by the Canadian federal government's underground economy initiative (Auditor General of Canada, 1999).

ii. Audits have been based on this formula since the 1973 *McQuatters* decision established the right of the IRS to use it to impute cash tip income (Newman, 1988), although the degree of audit effort has varied over time. Beginning in 1993, employers have been urged to enter "Tip Rate Determination Agreements" (TRDAs) which require withholding on the basis of the formula. The alternative is clear: "If the establishment will not enter [such an agreement], it will be necessary to conduct an employment examination of the establishment and all of its tipped employees. The foundation for any tip examination is the McQuatters Formula." (IRS, 1995). Beginning in 1995, similar encouragement was extended to employers joining the Tip Rate Alternative Commitment (TRAC) program, in which employers agree to provide the IRS with most of the information required for the McQuatters formula but without McQuatters-based withholding. A total of 33,533 establishments now participate in the TRAC and TRDA programs (Internal Revenue Service, 2000b). Although this is still only a small proportion of the nation's 375,000 restaurants (Spencer, 1997), the IRS has announced that a new round of enforcement actions is to begin now that three appeal courts have upheld the right of the IRS to conduct highly cost-effective employer-only social security tax audits on unreported tip income, applying the McQuatters formula (Internal Revenue Service, 2000a). (However, note that the IRS Restructuring and Reform Act of 1998 requires the IRS to instruct its employees that they may not threaten an audit to coerce a taxpayer into a TRAC agreement (Raby and Raby, 1998)).

iii. Some facts from the *Bubble Room* case may give the reader some feeling for the issue. The Bubble Room reported gross receipts from its two restaurants of just over \$7.3 million, of which almost exactly half were charged by credit card. Charged tips amounted to about \$0.6 million but total reported employee tip income was only about \$0.65 million. This corresponded to an overall reported tip rate of about 8.8% (over the IRS effective minimum rate of 8%) with reported tip rates of about 16.4% on charged receipts and 1.4% on cash receipts (Spencer, 1997).

iv. The number of people directly receiving tips, as estimated from the number of waitstaff and bartenders, is approximately two million (Kilgore, 1999).

v. The qualitative results will not change if set proportions of G_{CC} , S_{CC} or S_s are unobserved by the IRS, although if there were for example a large fraction of unobserved cash sales, the effective marginal tax rates on credit card tips will be smaller than our calculations suggest. Kilgore (1999) argues that credit card tips are partially unobservable because for reporting purposes the amount of tips should be reduced by the approximately 20% of tip income which is shared with other employees, on which the IRS has little information.

vi. The latter figure may be closer to the average--Internal Revenue Service (1990) reports that charge tips were left on only 20% of the average establishment's gross receipts, versus 71% for cash tips.

vii. High effective tax rates on credit card tips may affect server behavior. For example, a server may reallocate effort away from known credit card tippers and towards known cash tippers. Over time, this may conceivably lead more repeat customers to tip by cash.

viii. Frey (1992, pp. 203-204) makes a related argument that increased penalties for tax evasion may be taken by citizens "as an indication that the government distrusts them, which leads them to do likewise".

Table 1								
After-tax Return to Server: Payment of a Bill of \$100, Various Tips								
Payment of Bill	Payment of Tip	Cash-to-credit -card sales ratio (S_c/S_{cc})	Size of Tip					Marginal after-tax return to server per \$5 increase in tip
			\$0	\$5	\$10	\$15	\$20	
Cash	Cash	0.25	-\$2.97	\$2.03	\$7.03	\$12.03	\$17.03	\$5.00
		4	-\$2.97	\$2.03	\$7.03	\$12.03	\$17.03	\$5.00
Card	Cash	0.25	\$1.01	\$6.01	\$11.01	\$16.01	\$21.01	\$5.00
		4	\$16.20	\$21.20	\$26.20	\$31.20	\$36.20	\$5.00
Card	Card	0.25	\$1.01	\$4.18	\$7.34	\$10.50	\$13.66	\$3.16
		4	\$16.20	\$14.30	\$12.40	\$10.50	\$8.60	-\$1.90

These calculations are based on text expressions (3) - (6) with the credit card tip ratio (G_{cc}/S_{cc}) set at .15. A marginal tax rate $t = .3$, a stiff factor $s = .9$ and a cash tip adjustment factor $m = .04$ are assumed. Marginal increments within rows are constant except for rounding.