Volume 19, Issue 5, October 2012 ISSN 0927-5371

ELSEVIER

LABOUR ECONOMICS

Official Journal of the European Association of Labour Economists

CONTENTS

Available online at www.sciencedirect.com

SciVerse ScienceDirect

Labour Economics 19 (2012) 748–755

Contents lists available at SciVerse ScienceDirect

Labour Economics

journal homepage: www.elsevier.com/locate/labeco

The effect of the minimum wage for tipped workers on firm strategy, employees and social welfare ☆

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HIGHLIGHTS

- ► Millions of tipped workers are subject to the "tipped minimum wage."
- ► A model that examines the implications of the tipped minimum wage is developed.
- ► Increasing it may lead restaurants to use a service charge instead of tipping.
- ► Because servers are better off with tipping, they will be hurt from such a change.
- ► Increasing the tipped minimum wage may reduce social welfare.

ARTICLE INFO

Article history:
Received 21 July 2010
Received in revised form 7 July 2012
Accepted 9 July 2012
Available online 20 July 2012

JEL classification:
J30
J38
K31
M52
D21
L20

Keywords:
Minimum wage
Tipping
The restaurant industry
Business strategy
Tipped workers

ABSTRACT

Millions of workers derive much of their income from tips and are subject to the "tipped minimum wage" that differs from the regular minimum wage. This article examines the implications of the tipped minimum wage and shows that increasing it may lead restaurants to adopt a compulsory service charge in lieu of tipping to extract the economic rent enjoyed by waiters under tipping. Because servers are better off with tipping, this implies that increasing the tipped minimum wage in an attempt to increase servers' income may achieve the opposite result. Moreover, increasing the tipped minimum wage may reduce social welfare.

1. Introduction

Tipping is an important economic activity that in recent years has started to receive increased attention from economists. Tipping involves large amounts of money: in the US food industry alone, for example, the annual amount paid in tips is estimated to be about $42 billion (Azar, 2008), and tips are common in over thirty service occupations (Lynn et al., 1993) and in many countries (Star, 1988). The number of workers affected by tipping is also very large. The Bureau of Labor Statistics of the US Department of Labor (2007a) reports that over 11 million workers were employed in food preparation and serving-related occupations in the US in 2007; of these, 498,090 were bartenders and 2,357,040 were waiters and waitresses.[1] For these bartenders and servers, as well as some others in the food industry and certain workers in other industries (e.g., taxi drivers), tips are a major (and often the main) source of income. Wessels (1997), for example, suggests that servers in full-course restaurants earn 58% of their income from tips and those in counters earn 61% of their earnings in tips, and

☆ I thank Dale Mortensen and two anonymous referees for helpful comments.

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[1] Wessels (1997) suggests that because the US Department of Labor only lists people by their primary occupation, the total number of servers including those who are servers as a secondary occupation may be 60% larger.

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doi:10.1016/j.labeco.2012.07.002

these figures are underestimations because tip income is often underreported. Tipped workers are also of great importance in the context of minimum wage laws, because at least 20% of minimum wage workers are servers (Wessels, 1997). The Bureau of Labor Statistics of the US Department of Labor (2007b) suggests that workers in food preparation and serving related occupations constitute 58.6% of the employees who are paid hourly rates with earnings at or below the federal minimum wage in 2007.

Maybe the most important policy question about tipped employees is what should be the minimum wage policy in their case. One extreme option is to require their employers to pay them the full minimum wage, regardless of the amount they earn from tips. In certain US states this is the policy according to state law. The other extreme alternative is not to require the payment of a minimum wage to tipped employees. This alternative can come with an even more extreme view that allows the employer to charge workers for the privilege to work and earn tips.[2] Another option is not to require the payment of a minimum wage to tipped employees but to require that the worker's total income exceeds the regular minimum wage (i.e., the employer has to complement the income by paying a wage if tips are below the minimum wage). The idea that the employer can consider tip income as fulfilling (at least partially) the minimum wage requirement is referred to in the US as "tip credit" (because the employer receives credit for some of the minimum wage based on the employee's tip income).

In the US, the federal minimum wage is $6.55 per hour as of November 2008, but due to the tip credit that employers can take toward this amount, the minimum wage for tipped employees (sometimes referred to as the "tipped minimum wage") is $2.13, as long as the total employee's income exceeds the required $6.55. In many US states, however, the state laws are different from the federal law.[3] For example, several states, including California, Minnesota and Washington, do not allow a tip credit at all (i.e., employers have to pay the usual minimum wage regardless of tip income), while others allow a tip credit but smaller than the federal one (so the state's tipped minimum wage is higher than the federal). The different policies adopted by different states emphasize that the issue of the tipped minimum wage is an important one and there is no one policy that is obviously superior to others. Tip credit legislation sometimes creates heated debates, with businesses putting pressure to increase it and workers trying to reduce it.[4] This issue is not limited to the US, however, because as was pointed out earlier, tipping is common in many countries and each country that has both tipping and minimum wage laws has to choose a policy about the minimum wage for tipped employees. This suggests that analyzing the implications of the tipped minimum wage is an important endeavor which may assist policymakers to design better policies.

Despite the topic's importance, the literature on the tipped minimum wage is very limited.[5] Wessels (1993) estimates that allowing restaurants to use servers' tipped income to satisfy minimum wage requirements would create at least 360,000 new high-paying jobs and increase total income of tipped workers by at least 8%. Total elimination of the tip credit, on the other hand, would decrease servers' employment by at least 10%. Wessels (1997) suggests that when a restaurant hires more servers, each serves fewer meals, earns less in tips, and therefore has to be paid a higher wage. Consequently, restaurants have monopsony power over wages, and over some range a higher minimum wage should increase servers' employment. He reports that empirical evidence shows that as the minimum wage is increased, restaurant employment first goes up and then down.

Anderson and Bodvarsson (2005) examine empirically how the tipped minimum wage affects the total income of servers and bartenders. They divide US states to five categories according to the state policy on minimum wage and on tip credit compared to the federal policy. Compared to states with no minimum wage, only one category (states that have minimum wage that exceeds the federal and have no tip credit) has higher total income for tipped employees. The results suggest that minimum wage and tip credit policies designed to boost the income of servers are generally ineffective.

One important aspect of the tipped minimum wage that has not received attention in the literature is its impact on the restaurant's choice between tipping and a compulsory service charge.[6] Restaurants have the option to add to the bill a compulsory service charge (e.g., 18% of the bill); assuming they inform the customers about this practice in advance, doing so is legal, and the service charges obtained are the employer's property and can be used to pay servers the minimum wage (or more) without the limitation that is imposed on tip credits.[7] Many US restaurants, for example, replace tipping with service charges for large parties (e.g., six or more diners), and in some cases restaurants also replaced tipping with service charges regardless of the party size.[8] When a restaurant imposes such a service charge, customers understand that it replaces tipping and do not tip in addition to the service charge, except in rare cases (and even then, they tip much less than they would in the absence of a service charge).

The firm's choice between tipping and a compulsory service charge (or service-inclusive prices, which are generally equivalent to a compulsory service charge because under both systems the additional payment for service is not voluntary) received little attention in the literature. Ayres et al. (2005) discuss the idea to move from voluntary tipping to service-inclusive prices in the taxicab industry. They point out that doing so can solve two forms of racial discrimination: the tendency of passengers to tip minority drivers less than other drivers, and the discrimination of some drivers against minority passengers (because the latter are known as poor tippers). Kwortnik et al. (2009) examine how the firm's choice between service charges and tipping affects service quality in the leisure cruises and restaurant industries and conclude that a policy of voluntary tipping affects positively the motivation and behavior of service workers and customers' perceptions of service quality.

This article develops a model that relates the firm's choice between tipping and service charges to the tipped minimum wage. The model suggests that attempts to benefit servers by raising the tipped minimum wage (e.g., by lowering the allowable tip credit)[9] might in fact achieve the opposite result and hurt servers. The reason is that increasing the tipped minimum wage may result in restaurants moving from tipping to service charges. With tipping servers often enjoy relatively high income (e.g., compared with the restaurant's non-tipped employees), above their reservation wages, and thus enjoy economic rents.[10] Changing from tipping to a service charge allows the restaurant to take away these

[2] While this might sound extreme and unrealistic, there were in fact periods and countries in which this was a common practice (Segrave, 1998; Azar, 2004a).

[3] See http://www.dol.gov/esa/whd/state/tipped.htm.

[4] For example, a disagreement over the tip credit delayed the approval of a bill to increase the minimum wage in Hawaii (see http://pacific.bizjournals.com/pacific/stories/2001/04/23/daily29.html).

[5] There is a large literature on the regular minimum wage, ranging from early contributions that explore the effect of minimum wages on unemployment (e.g., Mincer, 1976; Brown et al., 1982) to recent studies that explore more specific issues. For example, Danziger (2010) studies the effect of the minimum wage in small firms; Strobl and Walsh (2011) explore the impact of minimum wages on hours worked per worker; and Sen et al. (2011) discuss the relationship between the minimum wage, teen employment, and poverty. However, the focus in this article is on the tipped minimum wage and its relationship to the firm's choice between tipping and a service charge, and therefore reviewing the literature on the regular minimum wage in more detail is beyond the scope of this article.

[6] I often refer to restaurants and servers for the sake of concreteness, but the ideas discussed here generally apply to other tipped occupations as well.

[7] See http://www.dol.gov/dol/allcfr/ESA/Title_29/Part_531/29CFR531.55.htm.

[8] Kwortnik et al. (2009), for example, report that approximately 40% of the restaurants in Miami Beach replaced voluntary tipping with automatic service charges.

[9] See, for example, the website http://www.keepyourtips.com/, which is dedicated to an attempt to abolish the tip-credit law in the 43 US states in which it exists.

[10] For example, a restaurant owner in California who decided to change from tipping to a compulsory service charge wrote to me that "Before starting this service charge, our servers were making, on average, over TWICE the wage of the cooks, and while servers require only a few months of training, our cooks require 2–5 years!"

economic rents and hurts the servers. This is the reason servers generally prefer a tipping regime to a compulsory service charge (see, for example, McGeehan, 2005).

One of the main reasons why restaurants do not always prefer a service charge is that tipping creates incentives for the worker to provide good service (because better service is rewarded with a higher tip, see Kwortnik et al., 2009; Azar, 2010), and replacing it with a service charge requires the firm to invest more in monitoring and supervising workers. The model incorporates this observation and shows that as the tipped minimum wage and consequently also the servers' economic rents are increased, the trade-off between the benefit of extracting these economic rents and the cost of additional supervision changes and more restaurants will adopt service charges in lieu of tipping. Therefore, their servers will be hurt. Because the change to service charges creates additional supervision costs, social welfare is also reduced. Finally, the model also shows that the socially optimal tipped minimum wage is negative; that is, allowing firms to charge their tipped workers for the privilege to work and earn tips can improve social welfare.

2. A model of the firm's choice between tipping and a service charge

To understand what affects the firm's choice between tipping and service charges, this section presents a simple model that considers only one firm. To make the discussion more concise, let us consider the case of the restaurant industry, although the analysis could also apply to firms in other industries where tipping is a major source of workers' income. The restaurant employs waiters as well as other staff. The unit of analysis is the serving of one meal. The waiter who serves the meal has to decide how much effort to exert, denoted by e. It is assumed that $e \geq 0$. The cost of effort to the waiter is denoted by $C(e)$. Let us normalize $C(0)=0$, and in addition assume that exerting more effort is more costly, with an increasing marginal cost of effort, $C'(e)>0$ and $C''(e)>0$. The waiter is paid by the restaurant a wage of w for each meal served. This wage must equal at least the minimum wage for tipped employees, computed on a per-meal basis, and denoted by $m \geq 0$ (henceforth simply "the minimum wage"). m is obtained by taking the minimum wage per hour and dividing it by the number of meals served on average in an hour.[11]

If the restaurant uses tipping, the waiter receives additional income from customer tips. There are models that analyze why people tip and how different reasons, such as future service, social norms, and psychological motivations, affect tipping (e.g., Azar, 2004b, 2007), as well as empirical studies of tipping behavior that address similar questions (e.g., Lynn and Grassman, 1990). Analyzing the reasons for tipping, however, is beyond the scope of the current article. Because where tipping is the social norm (e.g., in US restaurants) almost everyone tips (Azar, 2010), let us assume that the customer tips an amount of $T(e)$. That is, the tip is a function of the waiter's effort; in particular, let us assume that the customer tips more when the waiter makes more effort, $T'(e)>0$. There are various reasons why customers may tip more for higher effort (or for better service, which is naturally an increasing function of the waiter's effort): because it is more fair to do so, because this is the norm, to encourage good service in the future, or to show their gratitude in proportion to how grateful they actually are (Azar, 2010). Let us also assume that the tipping function is weakly concave in effort, $T'(e) \leq 0$. That is, higher effort results in higher tips, but the marginal returns to effort are non-increasing.

The customer's total willingness to pay for the meal depends on service quality and therefore on the waiter's effort, and is denoted by $V(e)$, where I assume that $V'(e)>0$ and $V''(e) \leq 0$. The customer, however, takes into account the amount he plans to tip (if the restaurant uses tipping), so his willingness to pay to the restaurant, denoted by $P(e)$, is equal to his total willingness to pay minus the amount he leaves as a tip, $P(e)=V(e)-T(e)$. I assume that $P'(e)>0$: higher waiter's effort (and consequently also higher service quality) increases the price paid to the restaurant; it follows that $V'(e)>T'(e)$. The customer buys one meal if its price is not higher than his willingness to pay, and zero meals otherwise. Consequently, to maximize profits, the restaurant chooses a price that equals the customer's willingness to pay, $P(e)$. The customer in the model therefore has a zero consumer surplus.

The restaurant might decide to cancel tipping, and implement one of two things instead. One possibility is to use a compulsory service charge—a charge that is added to the bill and is usually equal to a certain percentage of the bill. Another possibility is to use service-inclusive prices, i.e., to increase prices so that they include service, and to explicitly mention (for example in the menu, on the bill, or elsewhere in the restaurant) that prices include service and tips are not expected. For our purposes a service charge and service-inclusive prices are equivalent, because both are mandatory, as opposed to tipping.[12] I therefore discuss the case of a service charge but this could also be interpreted to include the case of service-inclusive prices. The restaurant's decision whether to use tipping or service charges naturally precedes the waiter's choice of effort.

Using a service charge instead of tipping makes several important differences. First, it is a compulsory amount that does not depend on the waiter's effort. Second, it goes to the restaurant and not to the waiter. Third, once tipping is canceled, the restaurant has to change the wage it pays its waiters, who no longer receive tip income. Finally, because the waiters no longer have the incentives provided by tipping to exert high effort, the restaurant has to find other ways to ensure that they give good service. I assume that the restaurant does so by supervising the waiters. Such supervision reveals the level of effort waiters exert, and the restaurant can implement whatever effort level it wants (e.g., by firing any employee who exerts lower effort).[13] This supervision, however, has a strictly positive cost, denoted by s (for example, it may require additional staff whose job is to supervise the waiters).

Serving one meal entails costs in addition to the waiters' compensation, such as the costs of food ingredients and wages of kitchen workers. These costs, however, do not affect the firm's choice between tipping and service charges, because they are the same in both regimes. Consequently, the model ignores these costs in order to simplify the analysis; this does not affect the results (other than shifting the restaurant's profits and social welfare by the fixed amount of these costs).

Let us denote variables that pertain to a tipping regime with a subscript t and those related to a service-charge regime with a subscript s. It follows from the above that the restaurant's profits are

$$\Pi_t = P(e) - w_t = V(e) - T(e) - w_t, \text{ and}$$
$$\Pi_s = P(e) - w_s - s = V(e) - w_s - s.$$

The waiter's utility is assumed to be quasi-linear in money, and therefore it equals under the two regimes:

$$U_t = T(e) + w_t - C(e), \text{ and}$$
$$U_s = w_s - C(e).$$

[11] I assume that if a tip credit is allowed, it is fully used. This is consistent with the empirical magnitude of tip income. Consequently, the tipped minimum wage is equal to the regular minimum wage minus the tip credit.

[12] In rare cases where the legislator requires that service charges will be paid entirely to employees (e.g., under Massachusetts state law), the service-inclusive prices will be the relevant option to consider because a service charge will not allow the firm to take away the waiter's economic rent.

[13] The model here assumes perfect monitoring, that is, monitoring reveals the effort level accurately. In reality monitoring might be imperfect and only reveal a noisy signal about the waiter's effort. As a result, the firm might be limited in its ability to implement a very precise level of effort, and waiters may occasionally lose their job despite exerting enough effort, etc. However, imperfect monitoring will complicate the model considerably without adding to the issues this paper focuses on and therefore the simplifying assumption of perfect monitoring is adopted here.

The waiter has a reservation utility denoted by U_0. This is a minimal level of utility that must be provided to him, otherwise he prefers to quit his job and take another job. I assume that at the effort level that maximizes $T(e)-C(e)$, denoted by e_w (w for "waiter", because this is the effort chosen by the waiter under a tipping regime), we have $T(e_w)-C(e_w)\geq U_0$. This assumption simplifies the analysis and does not change the main qualitative results. It suggests that if waiters receive no wage at all, but receive all of their tips, at the effort level they choose to provide in equilibrium the representative waiter will be interested in keeping his job. This seems to be consistent with the empirical magnitude of tipping, at least in restaurants in countries in which significant tips (e.g., 15% of the bill) are the norm.[14] To ensure that the waiter chooses a positive effort level in the tipping regime let us also assume that at zero effort the waiter has an incentive to increase effort: $T'(0)>C'(0)$.

Another assumption that simplifies the analysis without changing the main results is that if the firm decides to replace tipping with a service charge, it is better off supervising workers (and implementing the effort level that maximizes its profits) than avoiding the cost of supervision and having zero waiters' effort. As we will see in more detail later, with service charges the firm chooses a wage of $U_0+C(e)$. Denoting the effort level chosen by the firm as e_f, the assumption above implies that $V(e_f)-C(e_f)-s\geq V(0)$. I also assume for simplicity that this chosen wage meets the minimum wage law, i.e., $U_0+C(e_f)\geq m$. This assumption can be justified as follows: U_0 represents the utility the waiter can obtain in his best alternative job. Suppose that in terms equivalent to the restaurant (i.e., for the amount of time required to serve one meal), this alternative job pays w and requires an effort with a cost c. This means that $U_0=w-c$. Because such a job has to pay at least the regular minimum wage, which in turn is weakly higher than the tipped minimum wage, we have $w\geq m$. In addition, working in a restaurant is relatively a hard job, especially when having to exert the high effort level that the restaurant wishes to implement, e_f. Consequently, it seems plausible that working in the restaurant requires at least the same effort that is required in the alternative job, $C(e_f)\geq c$. It then follows that the assumption above holds, because $U_0=w-c\geq m-C(e_f)$.[15]

Finally, let us also assume (to avoid ambiguity in the analysis in knife-edge cases) that when the firm is indifferent between tipping and a service charge, it implements a service charge. For the reader's convenience, Assumption 1 summarizes the main assumptions discussed above.

Assumption 1. Effort is denoted by $e\geq 0$; the cost of effort satisfies $C'(e)>0$, $C''(e)>0$, and $C(0)=0$; the tipping function satisfies $T'(e)>0$, $T''(e)\leq 0$ and $T'(0)>C'(0)$; the willingness to pay for the meal (including service) satisfies $V'(e)>0$, $V''(e)\leq 0$, and $V'(e)>T'(e)$; the waiter's effort choice under tipping, e_w, satisfies $T(e_w)-C(e_w)\geq U_0$; the firm's effort choice (when it implements a service charge), e_f, satisfies $V(e_f)-C(e_f)-s\geq V(0)$; the waiter's reservation utility, effort function, and the tipped minimum wage satisfy $U_0+C(e_f)\geq m\geq 0$; and supervision cost is strictly positive, $s>0$.

[14] For example, suppose that it takes a waiter 30 minutes throughout the meal to serve a table of four diners, including all the relevant tasks he has to perform. In an hour he then serves eight people. If the average diner eats and drinks for $15 and leaves a 15% tip, the waiter makes $18 an hour from tips, far above what he is likely to receive in alternative jobs that require similar skills and effort. Recent evidence on tipping suggests even higher tips; Parrett (2006), for example, reports average tips of 19.63%.

[15] It is possible that alternative jobs are not readily available to waiters but rather require to incur costs such as search costs. If total search costs are x, and during the employment period the waiter serves y meals, then we have (ignoring time discounting for simplicity) $U_0=w-c-x/y$. Given that y is very large (the number of meals served over an employment period that may be several years), that $C(e_f)\geq c$, and that w is at least the regular minimum wage, which is weakly higher than the tipped minimum wage, the simplifying assumption that $U_0+C(e_f)\geq m$ holds is still plausible.

3. Analysis and results

The restaurant's main decision is whether to implement tipping or a service charge; additional decisions are about the wage it wants to pay and the effort level it wants to implement. The waiter decides how much effort to exert and whether to quit his job. Proposition 1 characterizes the equilibrium choices of the restaurant and the waiter.

Proposition 1. *Let e_f be the value of e that satisfies the equation $V'(e_f)-C'(e_f)=0$, let e_w be the value of e that satisfies the equation $T'(e_w)-C'(e_w)=0$, and define $s_c=V(e_f)-[V(e_w)-T(e_w)]-[U_0+C(e_f)-m]$. We then obtain the following:*

- **(a)** *The firm implements tipping if and only if $s>s_c$, and in this case the firm does not supervise the waiter, it pays him a wage of m, and the waiter chooses to exert effort of e_w. The firm's profit is given by $\Pi_t=V(e_w)-T(e_w)-m$, and the waiter's utility is $U_t=T(e_w)+m-C(e_w)$.*
- **(b)** *The firm chooses to implement a service charge if and only if $s\leq s_o$ and in this case the firm supervises the waiter, requires him to exert an effort level of e_f, and pays him a wage of $U_0+C(e_f)$. The firm's profit is then $\Pi_s=V(e_f)-U_0-C(e_f)-s$, and the waiter's utility is $U_s=U_0$.*
- **(c)** *The effort level chosen by the firm in a service-charge regime is higher than the level chosen by the waiter in a tipping regime, $e_f>e_w$.*

Proof. (a–b) Consider first a tipping regime with no supervision. Because the firm does not supervise the worker it does not know which effort level he chooses, and therefore the waiter is free to choose his effort. He chooses the effort that maximizes $T(e)+w_t-C(e)$. The first-order condition implies that his effort choice, denoted by e_w, must satisfy $T'(e_w)-C'(e_w)=0$. The assumption $T'(0)>C'(0)$ guarantees that $e_w>0$. The second-order sufficient condition is satisfied because $T''\leq 0$ and $C''>0$. The assumption $T(e_w)-C(e_w)\geq U_0$ guarantees that regardless of the minimum wage, the waiter's utility is high enough that he wants to keep his job. Because of that, the firm pays him as little as possible, which is the minimum wage, m. It follows that the firm's profit is $\Pi_t=V(e_w)-T(e_w)-m$, and the waiter's utility is $T(e_w)+m-C(e_w)$.

Under a service charge regime with supervision, the firm observes the waiter's effort level and can therefore implement whatever effort it wants (e.g., by firing the waiter if he does not provide at least this effort; the waiter has no reason to exert more than this required effort because he is not rewarded for higher effort). The firm, however, has to pay the waiter a wage that will give him at least a utility of U_0, otherwise he will quit his job. Because the firm has no reason to pay the waiter above the minimal amount necessary to retain him, the firm pays a wage of $U_0+C(e_f)$, which gives the waiter his reservation utility U_0 but not more, where e_f is the effort the firm wants to implement. The assumption $U_0+C(e_f)\geq m$ guarantees that this wage does not violate the minimum wage law. The firm's profit is then given by $\Pi_s=V(e_f)-U_0-C(e_f)-s$. The first-order condition for profit maximization implies that e_f must satisfy $V'(e_f)-C'(e_f)=0$. Because $V'(0)>T'(0)>C'(0)$ we know that $e_f>0$. The second-order sufficient condition is satisfied because $V''\leq 0$ and $C''>0$.

Because the firm can choose whether to implement tipping or a service charge, it prefers a service charge over tipping whenever $\Pi_s=V(e_f)-U_0-C(e_f)-s\geq\Pi_t=V(e_w)-T(e_w)-m$, which is equivalent to $s\leq V(e_f)-[V(e_w)-T(e_w)]-[U_0+C(e_f)-m]$.

Notice that the firm has two decisions: whether to adopt tipping or a service charge, and whether to supervise the waiter. Therefore, it has four different policy combinations. So far we considered two, tipping without supervision, and a service charge with supervision. To complete the proof, we need to consider the two other options – tipping with supervision, and a service charge without supervision – and show that these options are never optimal.

Implementing tipping and simultaneously supervising the waiter cannot be optimal. If the firm does not enforce an effort level, then it is a waste of money to pay the cost of supervision. If the firm enforces an effort level, on the other hand, the best it can do is to choose e_f. But if the firm implements e_f and pays the supervision cost anyway, it is better off with a service charge than with tipping. To see this, notice that the customer pays a total of $V(e_f)$, which is then divided between the firm and the waiter. A service charge allows the restaurant to give the waiter the necessary minimum ($U_0+C(e_f)$ in this case), whereas tipping leaves him an economic rent. Therefore the restaurant should choose a service charge if it plans to supervise the waiter.

Implementing a service charge without supervision means that the waiter's effort is not observed and yet he does not have the incentives provided by tipping to exert effort. In this case the waiter maximizes his utility by choosing $e=0$. The firm pays him as little as possible to retain him, which is U_0 (recall that $C(0)=0$). The firm's profit is then $V(0)-U_0$. Because we assumed (see Assumption 1) that $V(e_f)-C(e_f)-s\geq V(0)$, it is more profitable to supervise the waiter and obtain a profit of $\Pi_s=V(e_f)-U_0-C(e_f)-s$.

(c) By definition of e_f and e_w we know that $V'(e_f)=C'(e_f)$, and $T'(e_w)=C'(e_w)$. Because $C''>0$, $T''\leq 0$, and $V'(e)>T'(e)$, it must be that $e_f>e_w$. To see this, notice that if $e_f\leq e_w$, we get $V'(e_f)=C'(e_f)\leq C'(e_w)=T'(e_w)\leq T'(e_f)$, which contradicts the assumption that $V'(e)>T'(e)$. Q.E.D.

The intuition for the condition that determines when the firm should choose a service charge, $s\leq V(e_f)-[V(e_w)-T(e_w)]-[U_0+C(e_f)-m]$, is simple. The increase in revenues when switching from tipping to a service charge is $V(e_f)-[V(e_w)-T(e_w)]$. The increase in the waiter's wage is $[U_0+C(e_f)-m]$. When the difference between the two is higher than the cost of supervision, the firm is better off implementing a service charge.

Proposition 1 emphasizes the critical value of the supervision cost (the level of s that separates between the tipping and the service charge regimes); this represents the perspective of the restaurant's manager, who takes the minimum wage as given and examines his optimal choice according to the supervision cost in his restaurant. It is also interesting to examine the perspective of a policymaker, who takes the supervision cost as given, and wants to know how implementing different minimum wage laws will affect the restaurant's decisions; this is analyzed in Corollary 1:

Corollary 1. *Define* $m_c\equiv s-V(e_f)+V(e_w)-T(e_w)+U_0+C(e_f)$. *The value of* m_c *may be negative or positive. If* $m_c\leq 0$, *the firm chooses to implement a service charge for any non-negative minimum wage. If* $m_c>0$, *the firm chooses the tipping regime if and only if the minimum wage is strictly below* m_c, *otherwise it chooses to implement a service charge.*

Proof. Re-arranging the condition in Proposition 1 shows that the firm chooses tipping if and only if $m<m_c\equiv s-V(e_f)+V(e_w)-T(e_w)+U_0+C(e_f)$. Obviously, taking a sufficiently large value of s results in $m_c>0$. To see that values of s sufficiently close to zero result in $m_c<0$, notice that $m_c=s-[V(e_f)-C(e_f)]+V(e_w)-C(e_w)-[T(e_w)-U_0-C(e_w)]$. Because $V'(e_f)-C'(e_f)=0$, $(V-C)''<0$, and $e_f>e_w$, it follows that $V(e_f)-C(e_f)>V(e_w)-C(e_w)$, and by Assumption 1, $T(e_w)-C(e_w)\geq U_0$. Consequently, for values of s sufficiently close to zero we have $m_c<0$. The rest of the corollary follows immediately. Q.E.D.

Corollary 1 shows that when the parameter values are such that minimum wage has an effect on the firm's choice ($m_c>0$), when the minimum wage increases beyond a certain threshold, the firm switches from tipping to service charges. The intuition is that in the tipping regime the waiter enjoys an economic rent (his utility exceeds his reservation utility). Higher minimum wage increases this rent, and at some point the firm is better off extracting the rent to itself (by switching to a service charge and paying the waiter a wage that gives him only his reservation utility), despite the cost of supervision that becomes necessary.

We can now turn to analyze how the minimum wage affects the firm's profit, the waiter's utility, and social welfare. Because the customer always obtains zero consumer surplus, social welfare, denoted by SW (with a subscript t for tipping and s for a service charge), is the sum of the firm's profit and the waiter's utility. When $m<m_c$ we get a tipping regime that yields $SW_t=V(e_w)-C(e_w)$, and when $m\geq m_c$ we get a service-charge regime that yields $SW_s=V(e_f)-C(e_f)-s$. Notice that social welfare under each regime is unaffected by the minimum wage, because even if the minimum wage is binding (which is the case in the tipping regime), it is a transfer from the restaurant to the waiter that does not affect social welfare. However, the minimum wage does affect social welfare because it affects the restaurant's choice between tipping and a service charge. Proposition 2 states the main results about the effect of changes in the minimum wage.

Proposition 2. *Increasing the minimum wage can increase, decrease or leave without change the waiter's utility, and it weakly decreases the firm's profits and social welfare.*

Proof. First, consider the case of $m_c\leq 0$. In that case the firm chooses a service-charge regime for any minimum wage (recall that we assume $m\geq 0$), and Proposition 1b shows that with a service charge the minimum wage does not affect the firm's profit or the waiter's utility (and therefore it also does not affect social welfare).

Next, consider the case of $m_c>0$. For $m<m_c$ we have a tipping regime, in which we saw in Proposition 1a that $\Pi_t=V(e_w)-T(e_w)-m$, and $U_t=T(e_w)+m-C(e_w)$. That is, in the range of $m\in[0,\ m_c)$, the firm's profit is strictly decreasing in m and the waiter's utility is strictly increasing in m. Social welfare does not change because $SW_t=V(e_w)-C(e_w)$. When $m>m_c$, increasing the minimum wage further does not affect the firm's profit, the waiter's utility, or social welfare, because for any $m\geq m_c$ the firm chooses the service-charge regime, and in this regime the minimum wage has no effect.

However, increasing the minimum wage from any level $m_0<m_c$ to any level $m_1\geq m_c$ results in a regime change from tipping to a service charge. The firm's profit, the waiter's utility, and social welfare all decline in this case. The firm's profit declines because it is decreasing in m for $m<m_c$ (with tipping), is equal under tipping and a service charge for $m=m_c$, and does not change (with a service charge) for $m\geq m_c$. The waiter's utility declines from $T(e_w)+m_0-C(e_w)$ to U_0 (recall that $T(e_w)-C(e_w)\geq U_0$). Because both the firm's profit and the waiter's utility decline it is clear that social welfare is also reduced; this can be seen also directly by substituting $SW_t-SW_s=V(e_w)-C(e_w)-[V(e_f)-C(e_f)-s]=m_c+T(e_w)-U_0-C(e_w)>0$. Q.E.D.

Fig. 1 illustrates graphically the more complex case, of $m_c>0$. For relatively low minimum wages (below m_c), tipping is implemented and increasing the minimum wage increases the waiter's compensation at the expense of the restaurant. However, once the minimum wage exceeds m_c, the restaurant switches to a service charge, resulting in a drop in the waiter's utility and social welfare. Further increases in minimum wage have no effect because the restaurant remains with the service charge and then the minimum wage is not binding.[16]

How does the firm's choice between tipping and a service charge compare with that of a social planner who wants to maximize social welfare? Proposition 3 provides the answer.

Proposition 3. *Social welfare is higher with tipping if and only if* $s>z\equiv V(e_f)-C(e_f)-[V(e_w)-C(e_w)]$. *The firm implements tipping if and only if* $s>z-C(e_w)+T(e_w)-U_0+m$. *Consequently, when a service charge maximizes welfare it is always chosen by the restaurant, but*

[16] Recall that we are considering the tipped minimum wage, which is never higher than the regular minimum wage. If the regular minimum wage is increased this also increases the wage in alternative jobs and raises U_0, so the inequality $U_0+C(e_f)\geq m$ that ensures that providing the waiter his reservation utility (under a service charge) also satisfies the tipped minimum wage still holds.

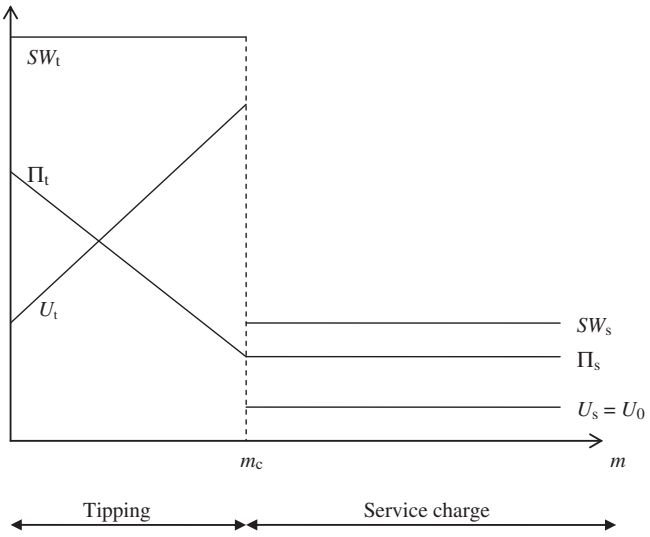

Fig. 1. The effect of the minimum wage on the equilibrium.

when tipping maximizes welfare, the restaurant might choose either tipping or a service charge, depending on the specific functions and parameters.

Proof. While $m_c > 0$ implies that social welfare is higher with tipping, for low supervision costs we have $m_c < 0$, and in that case social welfare may be higher with a service charge. In particular, because $SW_t = V(e_w) - C(e_w)$ and $SW_s = V(e_f) - C(e_f) - s$, social welfare is higher with tipping if and only if $s > z \equiv V(e_f) - C(e_f) - [V(e_w) - C(e_w)]$. Using Proposition 1, the firm chooses tipping if and only if $s > V(e_f) - [V(e_w) - T(e_w)] - [U_0 + C(e_f) - m] = z - C(e_w) + T(e_w) - U_0 + m$. Because $T(e_w) - C(e_w) \geq U_0$ and $m \geq 0$, the right-hand side is weakly higher than z. This implies that when social welfare is maximized with a service charge ($s < z$), it must be that $s < z - C(e_w) + T(e_w) - U_0 + m$ and the firm chooses a service charge. However, when social welfare is maximized with tipping, the firm might choose a service charge (this happens when $z < s < z - C(e_w) + T(e_w) - U_0 + m$), and it might choose tipping (when $s > z - C(e_w) + T(e_w) - U_0 + m$). Q.E.D.

The regime that maximizes social welfare is determined by the comparison between the cost of supervision and its benefit, which is the increased welfare due to a higher level of effort, e_f instead of e_w (notice that z is exactly equal to this welfare increase). The intuition for the difference between what the restaurant chooses to implement and what a social planner prefers is that while both care about the cost of effort, the customer's utility (which determines his willingness to pay), and the supervision cost, the firm sees an additional benefit in moving to a service charge because it allows it to extract the economic rent that the waiter enjoys in the tipping regime. This rent is the difference between the waiter's utility with tipping and his reservation utility, and is equal to $T(e_w) + m - C(e_w) - U_0$. Consequently, this expression is the difference between the restaurant and the social planner in the threshold of changing from tipping to a service charge, with the restaurant choosing a service charge also for some supervision-cost levels in which it is not socially optimal. Because $T(e_w) - C(e_w) - U_0 \geq 0$, the smaller is the value of m, the closer is the restaurant's threshold to that of a social planner. This means that a lower minimum wage increases the range of supervision cost levels for which the socially optimal regime will be chosen by the restaurant.

The comparison between the socially optimal regime and the one chosen by the restaurant is illustrated graphically in Fig. 2, which depicts how the firm's profit, the waiter's utility and social welfare depend on the supervision cost and the regime. The possible values of the supervision cost can be divided to three ranges; for low levels service charge is socially optimal and is also chosen by the restaurant, and for high levels tipping is socially optimal and is also chosen. However, for intermediate levels of the supervision cost, tipping is socially optimal but the restaurant chooses to implement a service charge. A lower minimum wage reduces the range of supervision-cost values in which this latter inefficient case occurs. Proposition 4 suggests an interesting observation about the extreme case, in which no minimum wage exists and the restaurant is allowed to charge its workers for the right to work and earn tips.

Proposition 4. *If no minimum wage exists and the restaurant can charge its waiters for the privilege to work and earn tips, this results in the socially-optimal regime always being chosen by the restaurant.*

Proof. The restaurant can extract the waiter's economic rent by charging him $T(e_w) - C(e_w) - U_0$ for the right to work and earn tips, i.e., the wage is non-positive, $w_t = U_0 - T(e_w) + C(e_w) \leq 0$. The waiter's utility is then equal to $T(e_w) + w_t - C(e_w) = U_0$. Because the waiter obtains his reservation utility even with the non-positive wage, he is indeed willing to pay for the privilege to work and earn tips. The firm's profit with tipping is $\Pi_t = V(e_w) - T(e_w) - w_t = V(e_w) - C(e_w) - U_0$, and therefore the firm chooses to implement tipping whenever $V(e_w) - C(e_w) - U_0 > \Pi_s = V(e_f) - U_0 - C(e_f) - s$, which is equivalent to $s > V(e_f) - C(e_f) - V(e_w) + C(e_w) = z$. That is, the firm implements tipping if and only if $s > z$, which is exactly the condition for tipping being socially optimal. Q.E.D.

Proposition 4 suggests that a policy that ensures that social welfare is always maximized by the restaurant's choice is to allow the restaurant to charge its workers for the right to work and earn tips (i.e., to allow negative wages). The intuition is that this policy eliminates the waiter's economic rent under tipping, and this rent was the only reason for potential differences between the restaurant's and the social planner's choices. In equilibrium the restaurant of course cannot

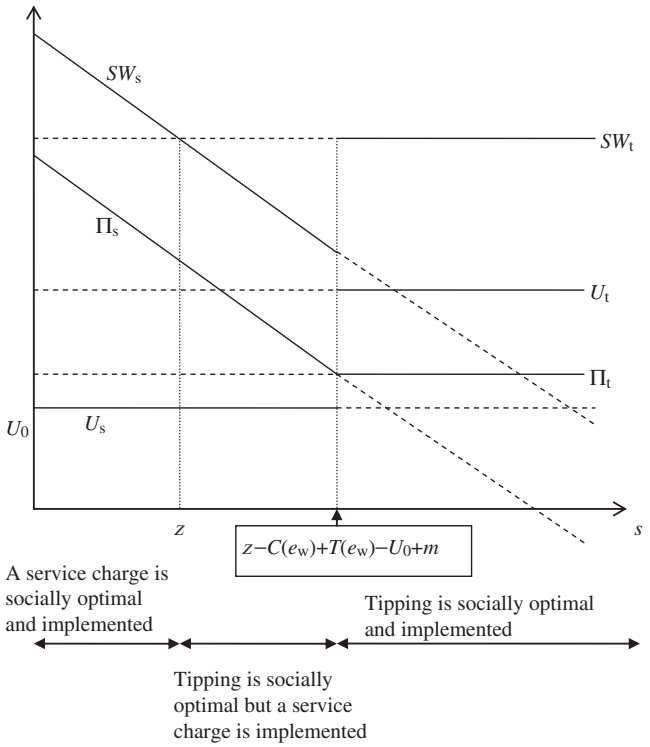

Fig. 2. The effect of the supervision cost. Solid lines are used for values in the equilibrium regime, i.e., for Π_s, U_s and SW_s when $s \leq z - C(e_w) + T(e_w) - U_0 + m$ and for Π_t, U_t and SW_t when $s > z - C(e_w) + T(e_w) - U_0 + m$. Dashed lines are used for values in the non-equilibrium regime.

charge the waiters as much as it wants, because it must provide its waiters their reservation utility, otherwise they will not work for the restaurant. The idea to charge a worker instead of paying him is not common today, at least partially because it violates minimum wage laws, but was in fact common in the past in various countries (Segrave, 1998; Azar, 2004a).

4. Discussion

4.1. The industry level

The previous section analyzes the decisions of a single restaurant. Consequently, several changes in the variables have a discontinuous effect; they do not affect the equilibrium in a certain range, and when they exceed a certain threshold, they create a big change, because the restaurant shifts from tipping to a service charge or vice versa. At the industry level, however, changes in the variables are likely to have a more gradual effect, because even if the situation in a single restaurant is discontinuous, when aggregating over many restaurants that are heterogeneous, the effects of changes in variables such as the minimum wage become smoother. For example, restaurants may differ in their supervision costs (e.g., because of differences in the restaurant arrangement, which determine how much effort is required to supervise the waiters). With heterogeneity in supervision costs, increasing the minimum wage will result in more restaurants shifting to a service charge, but the change will occur at a different level of the minimum wage for each restaurant. With a large number of restaurants and sufficient heterogeneity, the number of restaurants that adopt a service charge will be a relatively smooth increasing function of the tipped minimum wage. The same qualitative results obtained above for a single restaurant will still exist at the industry level, but without the discontinuity at a threshold level of the minimum wage. In particular, an increase in the minimum wage will lead to a decrease in restaurants' profits and in social welfare, and can either increase or decrease the waiters' utility. To maximize social welfare the social planner should adopt a policy that ensures that all restaurants choose the regime that maximizes social welfare given their supervision cost, and this can be achieved by allowing restaurants to charge waiters for the right to work and earn tips (i.e., a negative tipped minimum wage).

4.2. Management quality

The cost of supervising waiters, s, is affected by various factors, such as the salary that has to be paid to the supervising workers and the structure and size of the restaurant (which affect how hard it is to supervise waiters). One of the factors affecting the supervision cost which is worth some further discussion is the quality of the restaurant's management (using "management" to refer to anyone involved in the supervision of the waiters). The better the management is, the more efficiently it can accomplish the tasks related to supervising the waiters, leading to a lower supervision cost and a higher likelihood of the restaurant choosing a service charge regime.

4.3. Other ways to extract the waiters' economic rents

The model illustrates the idea that by shifting from tipping to a service charge the restaurant can extract the economic rent that the waiter enjoys under a tipping regime. An interesting question is whether the restaurant has additional ways to extract this rent. In the early history of tipping, restaurants sometimes extracted the waiters' rent by charging them for the right to work and earn tips (Segrave, 1998; Azar, 2004a). Today such a policy will violate minimum wage laws in many countries.

The restaurant can reduce the waiters' rent by hiring more waiters, thus giving each waiter fewer meals to serve and reducing his tip income. While this reduces the rent enjoyed by a specific waiter, however, it might not reduce the total rent enjoyed by the waiters (in total they still receive the entire tip income). Such a policy may be profitable in situations where there is no minimum wage for tipped employees and when currently there is a shortage of waiters in the restaurant, leading to low service quality. In this case increasing the number of waiters can improve service quality, and because the additional waiters derive their income from tips and the restaurant need not pay them wages, the restaurant enjoys from this step. In situations where a significant tipped minimum wage exists and the number of waiters allows good service quality, however, hiring more waiters requires the restaurant to pay the minimum wage to additional workers and increases its expenses, while service quality cannot be improved significantly and therefore hiring more waiters can reduce the restaurant's profits.

Another policy the restaurant can use to extract some of the economic rents from the waiters is to give some of their tips to non-tipped employees (e.g., dishwashers or cooks). This can be profitable if the restaurant can then reduce the wages it pays these other employees because they get additional income from the waiters' tips. Such arrangements are called tip-out arrangements. In the United States, however, the Fair Labor Standards Act states that tipped employees cannot be forced by employers to share tips with employees who do not ordinarily participate in tip pooling arrangements (such as dishwashers and janitors). In addition, if a pooling agreement involves more than 15% of the tips, the Department of Labor will investigate to assure that the pooling agreement is "customary and reasonable." Moreover, several states accepted laws that prohibit tip pooling (Wessels, 1997).

4.4. Empirical evidence

It is interesting to know whether service charges are indeed a concept that is used in practice and whether there is evidence for a relationship between the tipped minimum wage and the firm's choice between tipping and a service charge. The answer to the first question is clearly positive. First, as mentioned earlier, a regime of a service charge is essentially equivalent to a regime of prices that include service. So any service occupation that is not tipped is equivalent to a service charge regime. Some industries are divided between firms adopting tipping and firms adopting service charges, for example the restaurant and leisure cruises industries (Kwortnik et al., 2009). Many European restaurants use service charges (even though in the past tipping was common in restaurants in the same countries). In the US, many restaurants replace tipping with a service charge (often called "gratuity") of 15–20% of the bill for parties above a certain size (e.g., tables with six or more diners). Kwortnik et al. (2009) report that approximately 40% of the restaurants in Miami Beach replaced voluntary tipping with automatic service charges. These examples illustrate that service charges are used in many cases.

Finding evidence for the influence of the tipped minimum wage on the restaurant's choice between tipping and a service charge is more difficult. The tipped minimum wage hardly changes, and I am not aware of any systematic data on the percentage of restaurants adopting a service charge and how this is related to changes in the tipped minimum wage. However, some anecdotal evidence for such a relationship exists. In Israel, for example, a court decision that ruled that workers should receive minimum wages in addition to their tips resulted in some restaurants replacing tips with service charges (Sinay, 2001).

Additional interesting anecdotal evidence comes from a correspondence I had with a restaurant owner in California. He explained that with tipping an absurd and unfair situation was created, because the servers were making twice the wage of cooks, even though the cooks require much more training. Because the California state law does not allow mandatory tip-sharing of servers with cooks, and also no tip credit against the minimum wage, the solution he found was to replace tipping with a service charge. This allowed him to use the service charges to increase the cooks' wages and balance more fairly between the wages of servers and cooks.

5. Conclusion

The article examines the implications of the tipped minimum wage and points out that we have to consider the possibility that increasing it might lead restaurants to change from tipping to service charges. This result follows from the desire of restaurants to extract the economic rent enjoyed by waiters under tipping. An increase in the tipped minimum wage raises this rent and enhances the restaurant's willingness to pay the cost of monitoring servers (which is not required with tipping but becomes necessary in a service-charge regime) in order to extract this rent. Because servers are better off in the tipping regime, the possibility that the restaurant will change from tipping to a service charge implies that increasing the tipped minimum wage in an attempt to increase servers' income may achieve the opposite result. Moreover, increasing the tipped minimum wage reduces social welfare. Comparing the restaurant's choices to the welfare-maximizing regimes, the model suggests that with a positive minimum wage, when a service charge maximizes welfare it is always chosen by the restaurant, but when tipping maximizes welfare it may either be chosen or not. This creates a range of parameters where inefficiency exists because the restaurant implements a service charge whereas the socially optimal regime is tipping. This inefficiency can be cured by allowing restaurants to charge servers for the right to work and earn tips; this policy ensures that the restaurant will choose the regime (tipping or a service charge) that maximizes social welfare.

References

Anderson, J., Bodvarsson, O., 2005. Do higher tipped minimum wages boost server pay? Applied Economics Letters 12, 391–393.

Ayres, I., Vars, F.E., Zakariya, N., 2005. To insure prejudice: racial disparities in taxicab tipping. Yale Law Journal 114, 1613–1674.

Azar, O.H., 2004a. The history of tipping—from sixteenth-century England to United States in the 1910s. Journal of Socio-Economics 33, 745–764.

Azar, O.H., 2004b. What sustains social norms and how they evolve? The case of tipping. Journal of Economic Behavior and Organization 54, 49–64.

Azar, O.H., 2007. Do people tip strategically, to improve future service? Theory and evidence. Canadian Journal of Economics 40, 515–527.

Azar, O.H., 2008. Strategic behavior and social norms in tipped service industries. The B.E. Journal of Economic Analysis & Policy (Topics) 8 (Article 7).

Azar, O.H., 2010. Tipping motivations and behavior in the US and Israel. Journal of Applied Social Psychology 40, 421–457.

Brown, C., Gilroy, C., Kohen, A., 1982. The effect of the minimum-wage on employment and unemployment. Journal of Economic Literature 20, 487–528.

Bureau of Labor Statistics of the US Department of Labor, 2007a. Occupational Employment and Wages, 2007. Available at http://www.bls.gov/news.release/archives/ocwage_05092008.pdf2007accessed October 10, 2009.

Bureau of Labor Statistics of the US Department of Labor, 2007b. Characteristics of Minimum Wage Workers: 2007Available at http://www.bls.gov/cps/minwage2007.pdf2007accessed October 10, 2009.

Danziger, L., 2010. Endogenous monopsony and the perverse effect of the minimum wage in small firms. Labour Economics 17, 224–229.

Kwortnik Jr., R.J., Lynn, W.M., Ross Jr., W.T., 2009. Buyer monitoring: a means to insure personalized service. Journal of Marketing Research 46, 573–583.

Lynn, M., Grassman, A., 1990. Restaurant tipping: an examination of three 'rational explanations'. Journal of Economic Psychology 11, 169–181.

Lynn, M., Zinkhan, G.M., Harris, J., 1993. Consumer tipping: a cross-country study. Journal of Consumer Research 20, 478–488.

McGeehan, P., 2005. What, no tip? Service charge faces struggle at restaurants. New York Times, August 15. Available at http://www.nytimes.com/2005/08/15/nyregion/15tips.html, accessed October 11, 2009.

Mincer, J., 1976. Unemployment effects of minimum-wages. Journal of Political Economy 84, S87–S104.

Parrett, M., 2006. An analysis of the determinants of tipping behavior: a laboratory experiment and evidence from restaurant tipping. Southern Economic Journal 73, 489–514.

Segrave, K., 1998. Tipping: An American Social History of Gratuities. McFarland & Company, Jefferson, NC.

Sen, A., Rybczynski, K., Van De Waal, C., 2011. Teen employment, poverty, and the minimum wage: evidence from Canada. Labour Economics 18, 36–47.

Sinay, R., 2001. Trying to Protect Waiters Reduces Their Income. Ha'aretz. June 4 (in Hebrew).

Star, N., 1988. The International Guide to Tipping. The Berkeley Publishing Group, New York, NY.

Strobl, E., Walsh, F., 2011. The ambiguous effect of minimum wages on hours. Labour Economics 18, 218–228.

Wessels, W.J., 1993. The minimum wage and tipped employees. Journal of Labor Research 14, 213–226.

Wessels, W.J., 1997. Minimum wages and tipped servers. Economic Inquiry 35, 334–349.