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Determinants of Tipping Behavior: Evidence from US Restaurants

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DETERMINANTS OF TIPPING BEHAVIOR: EVIDENCE FROM US RESTAURANTS

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This thesis is approved as a creditable and independent investigation by a candidate for the Master of Science degree in Economics and is acceptable for meeting the thesis requirements for this degree. Acceptance of this does not imply that the conclusions reached by the candidate are necessarily the conclusions of the major department.

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ABSTRACT

DETERMINANTS OF TIPPING BEHAVIOR: EVIDENCE FROM US RESTAURANTS

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This study aims to analyze people's tipping behavior to assess the factors that determine both the likelihood of leaving a tip and tip size in US restaurants. A total 2,334 away from home eating events are considered in this study based on the nationally representative National Household Food Acquisition and Purchase Survey (FoodAPS) dataset. Two different tipping scenarios are considered for full-service restaurants to examine differences in customers' behavior under two different situations. Considering that households' tipping decisions and tip sizes are functions of the demand for personal interest ($D_{PI,}$) and the demand for social interest (D_{SI}), different socio-demographic, behavioral and economic factors are used as proxies for D_{PI} and D_{SI}. Results show that households' average tip size varies from 16% to 19% depending on the particular restaurant and tipping scenario. Hypothesis testing and regression analysis confirm that households' average monthly income has no influence on the tip size, rather demographic and cultural factors like gender, race and birthplace are significant determinants of tipping behavior. The overall analysis demonstrates that households' tipping decisions and tip sizes are functions of their social interest. Thus, it is evident that consumers view tipping more as a social norm rather than purely self-interested rational behavior.

Chapter One: Introduction

1.1 Background

Tipping is the norm in restaurants all over the world. According to Lynn et al. (1993), among the all types of service occupations, at least 33 occupations consider tipping as a custom. Depending on the nature and quality of service received, the tip amount varies. According to Azar (2007), the tip amount has increased from 15% to 20% of the total bill for excellent service. Researchers analyzed people's tipping behavior in different dimensions starting from rational cause to social cause. But still the reason for why people tip is not clear.

An economic transaction refers to exchanging money in return for goods and services that serve a consumer's self-interest. First, since people are not quite sure of consuming the same service several times, it rules out the plausibility of present personal interest behind tipping. Conlin et al. (2003) state that the tip percentage of those that frequented any full-service restaurant at least four times a month was higher than the percentage of tip for those that frequented the particular restaurant more than once a month. Kahneman et al. (1986) reported that people spent the same on tipping regardless of frequency of visits.

Second, it is uncertain that future generations will get the same service. So, we rule out the credibility of the future generation's interest as motivating tipping. Thus, we cannot claim strongly that people tip for getting better service in the next visit or for the next generation receiving the same service quality. Hence, it is more logical to view tipping as an instant reward to satisfactory service received or as a social norm rather than a rational behavior towards future expectation. The literatures also suggest that people

tip mostly for social interests, i.e. to reward lower income strata for their job effort or to increase self-esteem through generosity to surrounding people. Tipping also generates a third party-effect. It is possible to explain only if tipping improves the service quality for the next consumer, expecting that the person who spent on tipping will receive improved service somewhere else too. This explains how tipping serves consumers' personal interest without violating the assumption of uncertainty about receiving the same service again. But that is beyond the scope of this study.

The norms of tipping are viewed differently across the world. In countries where minimum income is lower, tipping is much appreciated and waiters and other restaurant staff can earn three to four times as much from tips than from wages. Russia, Romania, Slovenia and Lithuania expect 5%-10% tips while the same is acceptable in Argentina, Austria, Turkey and India but is not expected (Jacobs, 2017). In some countries like Cuba, Uruguay, Bulgaria, Columbia, Slovakia and Estonia, a 10% tip is a usual norm while it varies between 10%-15% for Canada, Mexico, Chile, Poland, Ukraine, Egypt, Armenia and Serbia (Jacobs, 2017). In other European countries like UK, Ireland, Germany, Sweden, France, Italy, Hungary and Greece, just rounding up the total bill is enough. In the United States, the expected restaurant tip ranges from 15%-20% (Jacobs, 2017).

On the other hand, countries with a higher minimum wages do not expect tips from visitors, as tipping is not common in these countries. In Australia, people do not tip well because the minimum wage is about $13 per hour which is standard. Some countries view tipping as very unusual practice (Wiles, 2015). In Japan, South Korea, Georgia, Spain, Peru, Thailand and Kazakhstan leaving a tip is an insult to the service

provider (Wiles, 2015). Observing the culture of tipping in different countries, it is important to know what factors influence peoples' tipping behavior and determine the tip size.

1.2 Objective

The main objective of this study is to assess the factors affecting tipping behavior. Specifically, this study examines the following research questions:

i) How does the tip amount vary with an individual's demographic characteristics?

ii) How does the tip amount vary with payment method, restaurant type, family size and number of guests in the household?

iii) How does the tip amount vary between low-income, medium-income and high-income households?

1.3 Motivation of the Study

Tipping is viewed as a reward to satisfactory service. Restaurant managers and waiters are the main beneficiaries of tip money. Tips provide extra income to service providers and serve as motivation to improve service quality. Tips work as an indirect monitoring tool to improve service quality for owners and managers. But tipping is a puzzle from consumers' perspective because they spend a portion of their income for other peoples' well-being even if the service is not repetitive. Thus, it is important to study what factors influence their decision to leave a tip, what factors determine their tip size and whether their tipping behavior is rational or a social or a cultural norm. Answers to these questions will help to understand the role of a tip in a consumer's utility function. On the other hand, information on consumers' tipping decision will also help managers to set wage levels for waiters and waiters also can get insight to improve their service.

Moreover, the findings from this study will be informative for future research on consumers' tipping behavior or hotel management.

1.4 Research Gap

A few research studies has been conducted on consumers' tipping behavior or on the tipping and service relationship. These studies for example Lin (2007), Conlin et al. (2003), Parrett (2006), Lee and Dewald (2016), Bodvarsson and Gibson (1999), Margalioth (2010) and Hoaas and Bigler (2005) closely examined restaurants in a particular state or city. Moreover, almost all of these papers are based on primary data and have both similarities and contradictions on the same issues. For example, some studies found males tip more than females while others found the opposite. There are a few studies that cover a broad geographical area and a large sample size. Hence, after reviewing the related literature, the author has been motivated to study households' tipping behavior using a nationally representative data set to provide evidence in the context of the United States.

1.5 Limitation of the Study

This research is based on the data from Household Food Acquisition and Purchase Survey (FoodAPS). The dataset considers household level features only. Thus responses on tipping related issues from restaurants owners and socio-demographic features of waiters are absent in this study. This study considers only the variables included in the dataset. So, another limitation is absence of variables like demographic characteristics of tip receiver, environment of particular service, wage of tip receiver, place of service received, particular day of service received (Weekend) that might have influence on consumers' tipping behavior.

Chapter Two: Literature Review

A tip is an extra amount of income given to service providers that customers typically leave before or after getting service. Initially it was related to restaurant service, but now it is widely in practice across many service areas. But the reason behind tipping is still vague. In this section, the literature on tipping is reviewed in order to understand peoples' tipping behavior and provide insight on the objective of this study.

2.1 Tipping as A Social Norm

According to many economists, tipping serves consumers' personal interest in the case of frequent visits only. But other economists argue that tipping gains importance as a social norm only. Azar (2007) stated six different categories of tipping. These are reward-tipping, price-tipping, tipping-in-advance, bribery-tipping, holiday-tipping, and gift-tipping. Based on the existing literature on tipping, Azar (2007) mentioned that tipping as a social norm, avoiding feelings of unfairness and embarrassment are the main reasons behind tipping.

Lin (2007) stated that diners tip because they view tipping as a social norm. A social norms creates a cost for diners in the form of guilt unless they tip. The results, based on 783 responses from the residents of Louisiana, show that 60% of people tip because it is a custom and 58% of people usually tip 15%-20% of the total bill size. On the other hand, Lin (2007) interviewed 162 restaurants and 427 servers. He concluded that owners believe that customers always tip servers and they pay their servers less for this reason. And according to the opinion of 58.5% of servers, between 60% and 80% of customers tip at least 15% of the total bill size.

Conlin et al. (2003) stated tipping has been mostly a norm (regardless of the frequency of taking service) rather than an efficient element to improve service quality. Based on primary data on 39 restaurants in Texas, they stated, "the percentage of tippers frequented any full-service restaurant at least four times a month is higher than the percentage who frequented the particular restaurant more than once a month." This implies that loyal customers (frequent visitors) in a particular restaurant tip less than that of usual customer (who are not frequent visitors) to any restaurant. In a Canadian study, Kahneman et al. (1986) also reported that the amount people spent on tipping does not depend on frequency of visiting a particular restaurant. They collected data through telephone surveys in Toronto and Vancouver and found that the average tip for a $10 meal is $1.28 in a restaurant that people visit frequently and $1.27 for a different restaurant in a different city. It implies that people tip from their guilt, urge of fairness or social norm and supports the idea of ruling out consumers' present personal interest. But it does not preclude the idea that tipping benefits related parties.

Nelson (2017) conducted a case study on the tipping behavior of consumers in a bar, after collecting data every Friday and Saturday night for one year. He asked why people tip more or less, and opined that benefits from tip are non-excludable and non-rival. It creates free-riding like for a public good, e.g. national defense, roads, parks etc., where only taxpayers pay for these services but non tax-payers also enjoy the benefits. Parrett (2006) conducted a laboratory experiment in Richmond, Virginia and also collected data from several restaurants in Richmond, Virginia to test for external validity of his results. His research supports free-riding in tipping and showed that tip size decreases with the table size. When one person spends on a tip, other people at the same table get

the benefit of free-riding. This study includes the variable number of individuals in the party to examine the issue of free riding.

2.2 Efficiency of Tipping as A Monitoring Tool

Conlin et al. (2003) suggested tipping fails to motivate servers as well as a paper contract. But even if tip is not a perfect monitoring tool, there exists some sort of influence on the service quality as mentioned in Conlin et al. (2003) by the term 'not fully efficient'. With this backdrop, it is possible to think about some optimal tip that might be fully efficient. We expect tipping as a tool for measuring service quality as it is usual to assume that improved service quality results in a higher tip and vice versa. Azar (2004) stated tip was a great incentive to induce workers' performance in his article, where he studied tipping history from the sixteenth to twentieth century in England and the United States. He also argued that service charges in Europe, and fixed gratuities in the United States, that have replaced tip recently are inefficient in monitoring service quality. The reason might be workers care less about service quality with the tip fixed in advance, but are more responsive to unexpected gains like tips. Thus the relation between tipping and service quality subject to before tip or after the tip is worth exploring, but is beyond the scope of this study.

2.3 Motivation Behind Tipping

Consumers behave rationally to maximize utility subject to constraints when they are involved in economic activities. But tipping is fully a voluntary action that goes against this assumption of rationality. Consumers spend more than $40 billion a year on food tips as mentioned by Azar (2005, 2009). But this situation is not restricted only to the

food industry. People of various occupations, from paper boys, watchmen, to tour guides often receive tip money as appreciation of their service.

Saunders and Lynn (2010) studied the intention behind tipping car guards in the context of South Africa based on the response of 530 individuals considering the same motivational factors from earlier research on food tip such as gaining good quality service in the future, rewarding good quality service, helping service workers, gaining social approval and conforming to internalized tipping norms. Their findings show that perceived service quality is positively related to both tip and tip size, but social norms are not related to tip size. Rather, social norms are positively related to tip size only when other people are around and there is a chance of gaining social approval and status. Social norm was measured by the extent to which the social connections of the respondent (i.e. family, friends, peers and leaders) believed that people should tip. A five-point scale starting from 'definitely not tip car guards' to 'definitely tip car guards' was used to capture this normative belief. The final social norm measure came from summing up the normative beliefs of four social connections.

Lee and Dewald (2016) approached 211 Chinese tourists in the U.S. and calculated the mean responses for social norm and service quality related questions. They found that Chinese tourists tip because of social norm though tipping is not considered as a social norm in China. This implies the importance of cultural differences across the world. They also found that quality of service or food is another reason behind tipping for these Chinese tourists and peer influence also affects tip size. But in many situations consumers do not tip only for social approval and still tipping is a widely accepted custom. Hence, service quality might be considered as a more unbiased factor for

leaving a tip, than social norms, because, an individual's satisfaction from service drives him to reward the service provider which is more rational behavior than leaving a tip to maintain social status.

2.4 Factors Influencing Tipping Behavior

Barkan and Israeli (2004) studied how servers' role as both expert and manager influenced tipping behavior based on 15 restaurants in Israel. They found a higher correlation between tip and bill size and a positive correlation between tip and group size. They detected moderate correlation between service quality and dollar tip. But they suggested that service quality is independent of servers' tip prediction. On the other hand, Bodvarsson and Gibson (1999) in their paper 'Economics of Tip and Service Quality' argue that tipping is not related to social norms but instead to service quality. They suspected that service quality is a cardinal ranking from customers and there exists low variation in this ranking if tipping really improves service quality. Hence, service quality becomes a poor factor to explain tipping behavior. Based on the responses from 286 students from two universities in the United States, they found service quality as a very strong predictor for tipping behavior and confirmed that students view tipping as a reward for good service or the amount of work done rather than an obligation or norm.

Bodvarsson and Gibson (1997) used a supply function of tips including both service quality and service quantity. They specified service quality as promptness, reliability, neatness and attentiveness. The number of items brought to the table and the number of trips to the table by the waiter were used as measurements of service quantity. They surveyed about 700 diners in 7 restaurants in Minnesota and reported that people view

tipping as a both a social norm and a reward for good service. They found that large table size does not result in small tips rather the mean tip rate is statistically the same for small and large tables, as people are driven by guilt aversion. Moreover, the results revealed that regular diners tip more than irregular diners. Michael Lynn (2001) conducted a meta-analysis based on eight published and six unpublished papers on tipping, and concluded that though service quality evaluation by customers and tip size are positively correlated, but the correlation is a weak predictor of consumer satisfaction. Lynn and Sturman (2010) analyzed 275 dinning events of 51 business students at a commuter college in a large southern city and found that when service rating on a five-point scale increases by an additional point, tip increases by two percent of total bill. Parrett (2006) based on restaurant data from Virginia concluded that tip size decreases with the table size and people tip due to reciprocity and guilt aversion. He used both survey data and experimental data collected in Virginia Tech's laboratory. The experimental data helped to understand human thought and action while the comparison of results from both data sets helped to test the external validity of the experiment. The result of experimental data showed that men tip more than women.

Kvasnicka and Szalaiova (2015) collected 804 observations of consumers' behavior from four restaurants in Brno in Czech Republic. They used attentiveness of the waiting staff as a proxy of service quality. The regression result showed that tip percent increases by about half a percent of the bill size each time the waiting staff visits the table willingly. They also reported that in the Czech Republic, the relation between payment method and tip size is insignificant. But, their results showed that tip size decreased with group size and increases with bill size. Table 1 includes variables from existing literatures that influence peoples' tipping behavior.

Table 1: Variables from Existing Literature

Variable	Definition	Reference
Service quality	Categorical variable High =1, Medium = 2, Low=3	Bodvarsson and Gibson (1999)
Bill size	USD	Barkan and Israeli (2004)
Group size	Number	Barkan and Israeli (2004)
Quality of food	Dummy	Hoaas and Bigler (2005)
Type of food ordered	Categorical variable	Hoaas and Bigler (2005)
Particular day	Dummy Weekend = 1, Weekday = 0	Hoaas and Bigler (2005)
Type of customer	Categorical variable	Hoaas and Bigler (2005)
Serving time	Minute	Hoaas and Bigler (2005)
Server's manner	Dummy	Hoaas and Bigler (2005)
Gender of tipper	Dummy Male = 1, Female = 0	Hoaas and Bigler (2005)
Server's look	Categorical variable	Gueguen and Jacob (2014)

Source: Author's Compilation, 2016

Margalioth (2010) analyzed the secondary data from 'National Purchase Diary Research Inc.' and '2009 Zagat America's Best Restaurants'. He reported that there is weak correlation between tip size and service quality but bill size is an important determinant of the tip size in USA based on these data set. Gueguen and Jacob (2014) observed the color effect of servers' dress on tipping size by gender in France where tipping is not a norm since price already includes the service charge. They observed 722 customers combining both male and female, and 11 waitresses for six continuous weeks except the weekends. They showed that red colored dress had a significant effect on male customers' tipping behavior, and tip size but it is unrelated with female customers' behavior. Since researchers only considered female waitresses, a study considering both male and female waitresses might reveal the exact situation regarding tipping behavior.

Hoaas and Bigler (2005) conducted 50 surveys in Louisiana to identify factors that influenced tip size. The authors found quality of food, group size, type of food ordered, gender of tipper, server's look, particular day (weekend), type of customer, serving time, server's manner and efficiency to be most influential to determine tip size. Based on 296 responses in Mauritius, Munhurrun (2012), hypothesized that service quality is linked to customer satisfaction and customer satisfaction influences the possibility of revisiting and recommending to others and the study supported his hypotheses. He measured service quality based on 25 service quality statements using a five-point scale. Customer satisfaction and revisiting intention and willingness to recommend both were measured based on two statements using a five-points scale.

Azar (2007) and Lin (2007) mentioned that tipping as a social norm, avoiding feelings of unfairness and embarrassment, are the main reasons behind tipping. Conlin et al. (2003) thinks tipping has been mostly a norm (regardless of the frequency of taking service) rather than an efficient element to improve service quality. On the other hand, Bodvarsson and Gibson argue that tipping is not related to social norm but instead to service quality. Michael Lynn (2001) concluded that correlation between service quality and tip size is a weak predicator of consumer satisfaction. Again, Saunders and Lynn (2010) show that perceived service quality is positively related to both tip and tip size, but social norm is not related to tip size. Barkan and Israeli (2004) found a higher correlation between dollar tip and bill size and suggested that service quality is independent of servers' tip prediction. Nelson (2017) opined that benefits from tip are non-excludable and non-rival. Parrett (2006) found free-riding in tipping and showed that tip size decreases with the table size. Conlin et al. (2003) suggest tipping fails to motivate servers as well as paper contract. Azar (2004) stated tip was a great incentive

to induce workers' performance. This discussion of similarities and contradictions in existing literatures regarding tipping creates a logical field to reexamine factors underlying their tipping behavior.

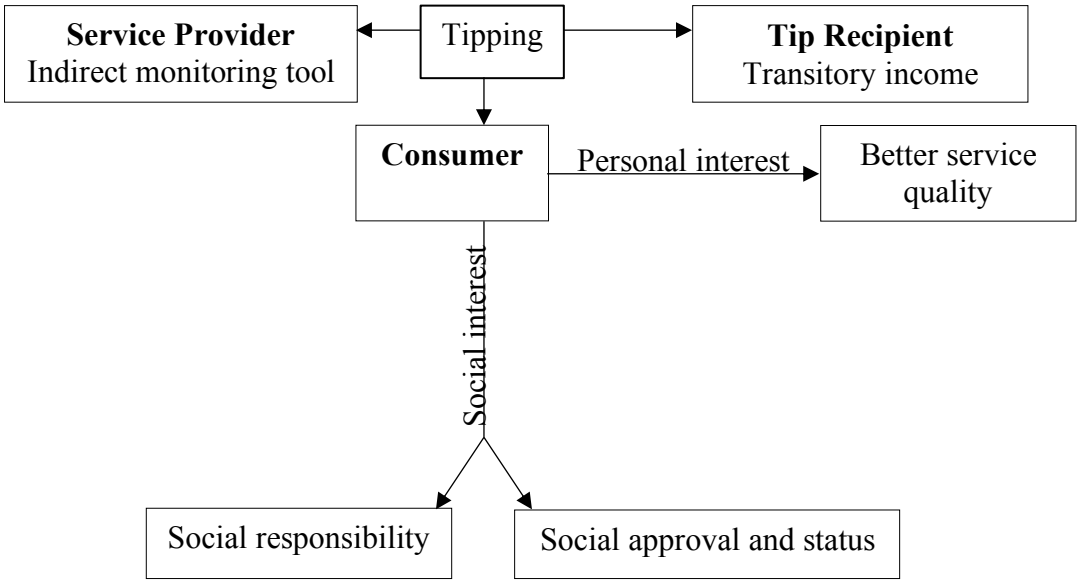
Chapter Three: Conceptual Framework

People are heterogeneous in tipping behavior and their reasons behind tipping also vary widely. Lynn (2015) built a theoretical framework to explain individual, national, occupational, situational and historical variations in tipping by integrating models in the tipping literature. His Tipping Motives Framework (TMF) includes five motives for tipping i.e. to help servers, to reward service, to gain or keep preferential future service, to gain or keep social esteem, to fulfill a sense of obligation or duty. It also includes two motives for not tipping, i.e., to save tip money for other usage and to avoid creating or strengthening status and power differences between customers and servers. However, it is expected that different factors influence the magnitude of tipping. This study aims to assess which factors affect the tipping decision and the size of the tip.

3.1 Conceptual Model

Even if the purpose of tipping is ambiguous, it has clear implications for related parties, i.e. consumers, tip recipients and service providers. Figure 1 shows the nexus between tipping and related parties. A tip is a short-term form of income like any other transitory income. Thus, the recipient is the most immediate beneficiary while the owner of the service, for example, a restaurant owner is the second beneficiary of tipping. Service providers usually deliver service under the supervision of an owner or manager. Sometimes owners include a service charge in the price that helps to monitor the service quality. When a service charge is absent, a tip works as an indirect monitoring and screening tool and reduces monitoring costs for the owner. From the consumers' perspective, tipping might satisfy both personal and social interests. Workers perceive tipping as an incentive to improve service quality that ultimately also serves consumer's personal interest of getting better service in the next visit.

Figure 1: Nexus between Tipping and Related Parties



Source: Author's observation

Besides service quality, consumers may tip to achieve social responsibility by supplementing of lower income groups. Or, sometimes they merely tip to get social approval and maintain social status. Thus, a tip has continuous influence on the utility functions of respective consumers, tip recipients and owners or managers. However, the tipping decision and tip size are functions of a consumers' demand for personal interest (D_{PI}) and social interest (D_{SI}).

$$\text{Tipping decision} = f(D_{PI}, D_{SI}) = f(\text{SDF, BF, EF}) \quad (1)$$

$$\text{Tip size} = f(D_{PI}, D_{SI}) = f(\text{SDF, BF, EF}) \quad (2)$$

This thesis considers socio-demographic factors (SDF), behavioral factors (BF) and economic factors (EF) as proxies for both personal and social interests following (Sayyman, 2014).

Chapter Four: Methods and Procedures

This chapter includes all the tools used to address the main objectives and hence all related research questions. After reconciling all datasets to create necessary variables, particular models have been specified based on the theoretical justification of these models.

4.1 Linear Probability Model

The dependent variable, households' tipping decision (D_j) is a binary response variable with 1= households leave a tip and 0 = households do not tip. So, following Wooldridge (2015), the true conditional probability of D_j=1 for j^{th} household given *n* number of explanatory variables is

$$P(D_j = 1| X_{jk}) = \beta_0 + \sum_{j,k=1}^{n} \beta_{jk} X_{jk} + u_{jk} \quad (3)$$

Where, X_{jk} is the *n* number of explanatory variables for j^{th} household and u_{jk} is the unobserved random variable capturing all variables other than X_{jk}.

Since the probabilities sums to one, the true conditional probability of D_j=0 for j^{th} household given *k* number of explanatory variables is

$$P(D_j = 0| X_{jk}) = 1 - P(D_j = 1| X_{jk}) \quad (4)$$

The linear probability model (LPM) assumes the conditional probabilities are linear in parameters. The variance of a binary response variable is conditional on explanatory variables that causes heteroscedasticity in the model but does not bias the ordinary least

square (OLS) estimators. Thus OLS is used for the linear probability model to estimate equation (3).

4.2 Multiple Linear Regression Model

The dependent variable tip percent is continuous in nature and depends on a number of explanatory variables. The multiple regression model can be written as

$$T_i = \alpha + \sum_{i,k=1}^{n} \beta_{ik} X_{ik} + \epsilon_{ik} \qquad (5)$$

Where, T_i is tip size as a percentage of the total bill for households *i*, X_{ik} is the *n* number of explanatory variables for i^{th} household and ϵ_{ik} is the unobserved random variable capturing all variables other than X_{ik}. OLS minimizes the sum of squared residuals $\sum_{i,k=1}^{n}(T_i - \hat{\alpha} - \hat{\beta}_{ik})^2$ and gives an unbiased estimate, i.e. for all β_{ik} , $E(\hat{\beta}_{ik}) = \beta_{ik}$. Thus, OLS has been used to estimate equation (5).

4.3 Tobit Model

According to Horowitz and Savin (2001), LPM implies that the probability of binary response changes with the change in X_{jk} that is reflected in β_{jk}. Thus, the conditional probability does not strictly remain between zero and one because probabilities become negative when X_{jk} are small and become greater than one when X_{jk} are large. So, we compared the marginal effects from Tobit model with LPM estimates. The dependent variable tip size has strictly positive and continuous value and an observed zero value means a zero tip. In other words, we want to determine factors that affects tip size (T_i) when $T_i \geq 0$ with $P(T_i = 0) > 0$. But T_i is continuous over strictly positive values

(Woolridge, 2010). So, tip size is a variable with corners at zero and the non-zero positive tip size can exceed 1% or 100%. The suitable model in this case is

$$T_i = \max(0,\ \beta_{ik}X_{ik}\ + \epsilon_{ik}) \qquad (6)$$

For probability of leaving a tip, partial effects on $P(T_i>0|X)$ is as follows, where, β implies coefficient and σ implies standard deviation.

$$\frac{\partial P(T_i > 0|X)}{\partial X_{ik}} = (\beta_{ik}/\sigma)\phi(X\beta/\sigma)$$

Considering the scenario when people leave non-zero positive tip, partial effects on $E(T_i|X, T_i > 0)$ is as follows, where, β implies coefficient and σ implies standard deviation.

$$\frac{E(T_i|X, T_i > 0)}{\partial X_{ik}} = \beta_{ik}\theta(X\beta/\sigma)$$

Considering the scenario when people leave a zero tip or a non-zero positive tip, the unconditional expectation is as follows, where, β implies coefficient and σ implies standard deviation.

$$\frac{\partial E(T_i|X)}{\partial X_{ik}} = \Phi(X\beta/\sigma)\beta_{ik} = P(T_i > 0|X)\beta_{ik}$$

Chapter Five: Data Section

5.1 Data Description

Lynn (2000) criticized the primary data accuracy used by Bodvarsson and Gibson (1999) saying that there exists a difference between consumers' statement and actual behavior. This study is based on secondary data from National Household Food Acquisition and Purchase Survey (FoodAPS). The survey was conducted under the supervision of the Economic Research Service (ERS) and the Food and Nutrition Service (FNS) of the U.S. Department of Agriculture (USDA). The datasets are nationally representative and contain information from households' perspectives on different attributes relating to expenditure on food away from home and also their demographic characteristics. This survey oversampled low-income households for one week. Data has been collected for nine and half months from April 2012 through Mid-January 2013. According to the codebook, the definition of 'Household' refers to persons who live together, share food and are expected to be present at the sampled address during at least the data collection week. A total of 4,826 households were surveyed using a multi-stage sample design. In the first stage, 948 primary sampling units (counties or group of contiguous counties) was selected using metropolitan statistical area boundaries. Then probability proportional to size (PPS) was used to select a stratified sampling of 50 primary sampling units (PSU). Each PSU was composed of four target groups, 1) Supplemental Nutrition Assistance Program (SNAP) households and 2) Non-SNAP households- i) below 100 percent poverty guideline ii) between 100 percent to 184 percent poverty guideline iii) equal to or above 185 percent poverty guideline. In the second stage, 395 secondary sampling units (SSU) were selected using PPS again. The final 4,826 households came from these SSUs. From the final sample size, this study considers 2,334 food away from home (FAFH)

events for full-service restaurants after dropping missing values, valid skips, negative tip percentages and events where tips are not customary such as schools.

5.2 Key Factors and Variables

This study considers socio-demographic, behavioral, and economic factors as proxies for consumers' demand for both personal and social interests. In accordance with the literature, this study identifies corresponding variables in FoodAPS that best define these key factors.

Table 2: Key Factors and Corresponding Variables

Key Factor	**Corresponding Variable**
Socio-demographic	Gender, Race, Education Level, Birth Place, Citizenship, Households' Location
Behavioral	Payment Type, Number of Household Member, Number of Guests
Economic	Household Income

Source: Authors compilation based on FoodAPS, 2016

Besides, other factors like demographic characteristics of tip receiver, environment of particular service, wage of tip receiver, place of service received might also influence tipping behavior and tip size which cannot be controlled in this study.

5.3 Variable Identification

Table 3 and 4 include all response variables and explanatory variables related to this study.

Table 3: Response Variables

Response Variable	Definition	Model Specification
Tipping Decision	Yes=1; No=0	Linear Probability Model
Tip size	Percentage of total bill	Multiple Linear Regression
		Tobit

Source: FoodAPS, 2016

The dataset contains the variable total paid, i.e., total payment including tip amount. For this study the tip size, i.e., tip as a percentage of total bill was considered. The codebook denotes missing tip and valid skip with -995 and -996 respectively. To create the dependent variable, at first these values were dropped from the data set. Then the tip amount was deducted from total paid to generate a new variable. This left the total amount of bill excluding the tip. Then the new dependent variable tip size has been generated dividing tip amount by total bill excluding tip. Finally, since we are interested in only positive tip percentage, 28 observations with tip percentage less than zero, were dropped from the data set.

$$Tip\ Size\ (\%) = \frac{Tip}{Total\ Paid - Tip}$$

Table 4: Explanatory Variables

Explanatory Variable	Definition
Gender	Dummy; Male=1, Female=0
Payment type	Dummy; (n-1) dummies for n categories
Household member	Number
Guest	Number
Household location	Dummy; Metropolitan=1, Non metropolitan=0
Hispanic status	Dummy; Hispanic=1, Non-Hispanic=0
Race	Dummy; (n-1) dummies for n categories
Education level	Dummy; (n-1) dummies for n categories
Birth place	Dummy; US-born=1, Non US-born=0
Citizenship	Dummy; US-citizen=1, Non US-citizen=0
Household income	Monthly average income in USD

Source: FoodAPS, 2016

5.4 Summary Statistics

Households' food acquisition places have been categorized as full-service and fast-food restaurants following Leschewski et al. (2018). Two situations have been considered to study peoples' tipping behavior in the USA. These situations are considered from the perspective of full-service restaurants only since tips are not customary at fast food restaurants. These are mentioned in table 5.

Table 5: Classification of Restaurants Type and Tipping Scenario

Tipping scenario	Restaurant type
Zero and non-zero positive tip	Full-service
Non-zero positive tip	Full-service

Source: Author's organization based on Leschewski et al., 2018

Table 6 shows that households left a tip in total 2,334 full-service restaurant events with an average tip size of 16.75 percent. In total 2,020 events, households paid non-zero positive tip with an average tip size of 18.56 percent with standard deviation 0.0039.

Table 6: Summary Statistics of Tip Size by Restaurant Type

Variable (Tip size)			
Full-service restaurants (zero and non-zero positive tip)		Full-service restaurants (non-zero positive tip)	
Mean	**SE**	**Mean**	**SE**
0.1675	0.0038	0.1856	0.0039
Observation	2,334		2,020

Source: FoodAPS, 2016

Table 7 presents average tip size for the primary respondents in households who are responsible for food shopping or meal planning. Under both situations, households with male primary respondents leave higher tip than that of households with female primary respondents, which are 18.35 percent and 19.30 percent respectively.

Table 7: Summary Statistics of Tip Size by Gender

Variable (Gender)	Full-service restaurants (zero and non-zero positive tip)		Full-service restaurants (non-zero positive tip)	
	Mean	SE	Mean	SE
Male	0.1835	0.0068	0.1930	0.0063
Female	0.1595	0.0042	0.1816	0.0047

Source: FoodAPS, 2016

Table 8 shows average tip size for households by type of payment under two different scenarios. Under both zero and non-zero scenario, households who pay with credit card have the highest average tip size 17.11 percent. But under non-zero positive tip scenario, households who pay with cash have the highest tip size of 19.31 percent. The tip size might increase as we considered only non-zero positive tip here.

Table 8: Summary Statistics of Tip Size by Payment Type

Variable (Payment type)	Full-service restaurants (zero and non-zero positive tip)		Full-service restaurants (non-zero positive tip)	
	Mean	SE	Mean	SE
Cash	0.1681	0.0050	0.1931	0.0052
Check	0.1423	0.0268	0.1545	0.0274
Debit card	0.1680	0.0060	0.1826	0.0062
Credit card	0.1711	0.0083	0.1800	0.0069
Gift card	0.1668	0.0300	0.1668	0.0300

Source: FoodAPS, 2016

The largest household in the data set consists of 10 members while the smallest one has single member. Under both restaurants scenario, households with single member have the highest tip size of 17.68 percent and 20.02 percent of the total bill respectively. This might be because single member households tend to have their meal in restaurants more often. As the number of household member increases, the mean tip size decreases (Table 9).

Table 9: Summary Statistics of Tip Size by Number of Household Member

Variable (Household member)	Full-service restaurants (zero and non-zero positive tip)		Full-service restaurants (non-zero positive tip)	
	Mean	SE	Mean	SE
1	0.1768	0.0054	0.2002	0.0058
2	0.1621	0.0034	0.1719	0.0027
3	0.1534	0.0167	0.1706	0.0162
4	0.1134	0.0099	0.1341	0.0066
5	0.1129	0.0183	0.1368	0.0100
Above 5	0.1027	0.0250	0.1254	0.0180

Source: FoodAPS, 2016

Table 10 shows that the highest average tip size happens under non-zero positive tip scenario without any guest which are 17.26 percent and 19.32 percent respectively. But households' average tip size decreases as the number of guest increases under both scenarios.

Table 10: Summary Statistics of Tip Size by Number of Guest

Variable (Number of guest)	Full-service restaurants (zero and non-zero positive tip)		Full-service restaurants (non-zero positive tip)	
	Mean	SE	Mean	SE
0	0.1726	0.0038	0.1932	0.0044
1	0.1599	0.0058	0.1696	0.0045
2	0.1549	0.0110	0.1637	0.0107
3	0.1064	0.0129	0.1293	0.0108

Source: FoodAPS, 2016

Table 11 depicts that metropolitan households pay higher tip than non-metropolitan households under both scenarios which are 16.89 percent and 18.73 percent respectively. The tip size is the highest under non-zero positive tip scenario but it might be because of excluding zero tip.

Table 11: Summary Statistics of Tip Size by Households' Location

Variable (Metropolitan Status)	Full-service restaurants (zero and non-zero positive tip)		Full-service restaurants (non-zero positive tip)	
	Mean	SE	Mean	SE
Metropolitan	0.1689	0.0040	0.1873	0.0041
Non-metropolitan	0.1531	0.0118	0.1695	0.0106

Source: FoodAPS, 2016

According to table 12, Hispanic households leave smaller tip compared to Non-Hispanic households. Hispanic households pay 18.81 percent tip under nonzero positive tip scenario that is 2.29 percentage point less than Non-Hispanic households.

Table 12: Summary Statistics of Tip Size by Hispanic Status

Variable (Hispanic Status)	Full-service restaurants (zero and non-zero positive tip)		Full-service restaurants (non-zero positive tip)	
	Mean	SE	Mean	SE
Non-Hispanic	0.1703	0.0037	0.1881	0.0041
Hispanic	0.1450	0.0114	0.1652	0.0093

Source: FoodAPS, 2016

White primary respondents have average tip size of 17.27 percent and 18.91 percent under both scenarios. Thus, white primary respondents leave higher tip than that of black primary respondents and primary respondents of other race (table 13).

Table 13: Summary Statistics of Tip Size by Race

Variable (Race)	Full-service restaurants (zero and non-zero positive tip)		Full-service restaurants (non-zero positive tip)	
	Mean	SE	Mean	SE
White	0.1727	0.0042	0.1891	0.0043
Black	0.1475	0.0162	0.1777	0.0130
Other race	0.1377	0.0087	0.1603	0.0078

Source: FoodAPS, 2016

Note: 'Other' indicates American Indian or Alaska Native, Asian or Native Hawaiian or Other Pacific Islander, Multiple race and Other race.

Table 14 explains how the average tip size increases with the increase in educational level of households' primary respondent. Households' having primary respondents with a College, Bachelor or Master degree leave higher average tip compared to households with primary respondent who attended school but did not have a High school diploma or with primary respondent with a High school diploma. This might be because more academics belong to higher education categories. Thus it indicates education may be an important determinant for social norms like restaurant tipping.

Table 14: Summary Statistics of Tip Size by Education Level

Variable (Education level)	**Full-service restaurants (zero and non-zero positive tip)**		**Full-service restaurants (non-zero positive tip)**	
	Mean	**SE**	**Mean**	**SE**
School	0.1595	0.0146	0.1763	0.0140
HS diploma	0.1583	0.0093	0.1760	0.0085
College	0.1677	0.0059	0.1826	0.0058
Bachelor	0.1718	0.0091	0.1950	0.0086
Masters and above	0.1704	0.0095	0.1869	0.0080

Source: FoodAPS, 2016

Table 15 shows non-US born respondents' average tip is less than that of US born respondents. Non-US born respondents leave 16.44 percent tip while US born respondents leave 18.86 percent tip under non-zero positive tip scenario. This difference might be the result of cultural differences.

Table 15: Summary Statistics of Tip Size by Birth Place

Variable (Birth place)	Full-service restaurants (zero and non-zero positive tip)		Full-service restaurants (non-zero positive tip)	
	Mean	SE	Mean	SE
Non-US born	0.1383	0.0083	0.1644	0.0085
US born	0.1720	0.0040	0.1886	0.0042

Source: FoodAPS, 2016

Similar to the birth place variable, citizenship status shows that US citizens leave a higher non-zero positive tip which is 18.69 percent. On the other hand, non-US citizens leave 16.65 percent tip under non-zero positive tip scenario (Table 16).

Table 16: Summary Statistics of Tip Size by Citizenship

Variable (Citizenship)	Full-service restaurants (zero and non-zero positive tip)		Full-service restaurants (non-zero positive tip)	
	Mean	SE	Mean	SE
Non-US citizen	0.1538	0.0100	0.1665	0.0102
US citizen	0.1684	0.0039	0.1869	0.0041

Source: FoodAPS, 2016

In table 17, tip size is presented for households of different income categories. Households with income ranging from $0-$9,999 per month have been categorized as low income households and households with income ranging from $10,000-$19,999 per month have been categorized as medium income households. Households with income $20,000 per month and above have been categorized as high income households. Tip size increases as income increases for full-time restaurants where tip is a norm. But for all restaurants, the average tip size for low and medium income households are more than that of high income households.

Table 17: Summary Statistics of Tip Size by Monthly Average Family Income

Variable (Income)	Full-service restaurants (zero and non-zero positive tip)		Full-service restaurants (non-zero positive tip)	
	Mean	SE	Mean	SE
Low income	0.1661	0.0044	0.1853	0.0046
Medium income	0.1724	0.0129	0.1872	0.0112
High income	0.1805	0.0080	0.1856	0.0066

Source: FoodAPS, 2016

5.5 Hypothesis Tests

Regression approach is used for hypothesis testing. Table no. 18 explains that tip size is statistically different for males and females. Coefficient for constant presents the average tip size for females since female is considered as the base category. Males tip 2.40 percentage points more than female which is statistically significant at the 1% level.

Table 18: Mean Difference Test for Tip Size by Gender

Gender	Coefficient	Std. Err.	t	P>|t|	[95% Conf. Interval]	
Male	0.0240	0.0078	3.09	0.004	0.0082	0.0399
Constant	0.1595	0.0042	37.61	0.000	0.1508	0.1681
Number of Observation		2,334				
F-statistic		9.53				
R squared		0.0099				

Source: FoodAPS, 2016

Table 19 depicts that primary respondents with higher education do not have different average tip size than primary respondents with lower educational background. Because none of the education categories are statistically significant. Coefficient for constant presents the average tip size for primary respondents who attended school but did not achieve a high school diploma since school is considered as the base category education level.

Table 19: Mean Difference Test for Tip Size by Level of Education

Education level	Coefficient	Std. Err.	t	P>|t|	[95% Conf. Interval]	
HS diploma	-0.0008	0.0164	-0.05	0.962	-0.0341	0.0325
College	0.0086	0.0151	0.57	0.571	-0.0221	0.0394
Bachelor	0.0126	0.0166	0.76	0.452	-0.0211	0.0464
Masters and above	0.0113	0.0178	0.63	0.531	-0.0250	0.0476
Constant	0.1591	0.0146	10.92	0.000	0.1294	0.1888
Number of Observation		2,334				
F-statistic		0.36				
R squared		0.0018				

Source: FoodAPS, 2016

Table 20 depicts that there is no statistically significant difference between metropolitan and non-metropolitan households for their average tip size. Coefficient for constant presents the average tip size for metropolitan households that is considered as the base category.

Table 20: Mean Difference Test for Tip Size by Households' Location

Household status	Coefficient	Std. Err.	t	P>|t|	[95% Conf. Interval]	
Metropolitan household	0.0159	0.0121	1.31	0.198	-0.0087	0.0405
Constant	0.1531	0.0118	12.98	0.000	0.1290	0.1771
Number of Observation		2,334				
F-statistic		1.73				
R squared		0.0016				

Source: FoodAPS, 2016

According to table 21, households with Hispanic primary respondent leave 2.53 percentage points less average tip compared to households with Non-Hispanic primary respondent and the result is statistically significant at the 5% level. Coefficient for constant presents the average tip size for the base category non-Hispanic primary respondent.

Table 21: Mean Difference Test for Tip Size by Hispanic Status

Hispanic status	Coefficient	Std. Err.	t	P>|t|	[95% Conf. Interval]	
Hispanic	-0.0253	0.01160	-2.18	0.037	-0.0489	-0.0016
Constant	0.1703	0.0037	45.81	0.000	0.1627	0.1778
Number of Observation		2,334				
F-statistic		4.74				
R squared		0.0048				

Source: FoodAPS, 2016

Table 22 shows that households with a white primary respondent leave 3.50 percentage point higher average tip compared to households with a primary respondent of other race which is statistically significant at the 1% level. But average tip size for households with a black primary respondent is not statistically different from households with a primary respondent of other race. Coefficient for constant presents the average tip size for the base category other race.

Table 22: Mean Difference Test for Tip Size by Race

Race	Coefficient	Std. Err.	t	P>|t|	[95% Conf. Interval]	
White	0.0350	0.0089	3.94	0.000	0.0169	0.0530
Black	0.0098	0.0189	0.52	0.607	-0.0287	0.0484
Constant	0.1377	0.0087	15.82	0.000	0.1210	0.1554
Number of Observation		2,334				
F-statistic		8.12				
R squared		0.0108				

Source: FoodAPS, 2016

Mean difference test for tip size by birth place shows that US-born primary respondent reported 3.37 percentage point higher average tip than that of non-US born primary respondent which is statistically significant at the 1% level (Table 23). Coefficient for constant presents the average tip size for the base category non-US born primary respondent.

Table 23: Mean Difference Test for Tip Size by Birth Place

Birth place	Coefficient	Std. Err.	t	P>|t|	[95% Conf. Interval]	
US-born	0.0337	0.0086	3.94	0.000	0.0163	0.0512
Constant	0.1383	0.0083	16.69	0.000	0.1214	0.1551
Number of Observation		2,334				
F-statistic		15.54				
R squared		0.0102				

Source: FoodAPS, 2016

Table 24 shows that average tip size for US citizen primary respondent and non-US citizen primary respondent are not statistically different since the p-value is not less than 0.10. Coefficient for constant presents the average tip size for the base category non-US citizen primary respondent.

Table 24: Mean Difference Test for Tip Size by Citizenship

Tip size	Coefficient	Std. Err.	t	P>|t|	[95% Conf. Interval]	
US citizen	0.0145	0.0101	1.43	0.162	-0.0061	0.0352
Constant	0.1538	0.0100	15.46	0.000	0.1336	0.1741
Number of Observation		2,334				
F-statistic		3.74				
R squared		0.0024				

Source: FoodAPS, 2016

According to table 25, mean difference for households' average tip size in terms of different payment methods are not statistically different than households' average tip size in terms of payment with cash. Coefficient for constant presents the average tip size for the base category payment with cash.

Table 25: Mean Difference Test for Tip Size by Payment Type

Tip size	Coefficient	Std. Err.	t	P>|t|	[95% Conf. Interval]	
Check	-0.0250	0.0283	-0.88	0.384	-0.0826	0.0326
Debit card	0.0072	0.0071	0.10	0.920	-0.0137	0.0152
Credit card	0.0038	0.0082	0.46	0.651	-0.0130	0.0205
Gift card	-0.0006	0.0308	-0.02	0.985	-0.0633	0.0622
Constant	0.1673	0.0049	34.35	0.000	0.1574	0.1773
Number of Observation		2,301				
F-statistic		0.39				
R squared		0.007				

Source: FoodAPS, 2016

None of the income categories are statistically significant in terms of average tip size. This implies that average tip size for lower, medium and higher income households are not statistically different (Table 26). Thus, these results suggest that consumers value social norm practice irrespective of their financial condition.

Table 26: Mean Difference Test for Tip Size by Monthly Family Income

Tip size	Coefficient	Std. Err.	t	P>|t|	[95% Conf. Interval]	
Low income	-0.0144	0.0090	-1.60	0.119	-0.0327	0.0039
Medium income	-0.0081	0.0197	-0.41	0.684	-0.0483	0.0320
Constant	0.1805	0.0080	22.67	0.000	0.1643	0.1968
Number of Observation		2,334				
F-statistic		1.21				
R squared		0.0010				

Source: FoodAPS, 2016

Chapter Six: Results and Discussion

6.1 Results of Linear Probability Model

Full Model

Table 27 shows the results of the linear probability model where the dependent variable is binary in nature, one (1) denotes that households leave a tip and zero (0) denotes that households do not leave a tip. In the full model, the variables low income, payment by gift card, gender of the primary respondent and citizenship of the primary respondent are statistically significant.

Low income households have a 3.11% lower probability to leave a tip compared to that of high income households, which is statistically significant at the 5% level. Households who pay the bill with a gift card have a 5.37% higher probability to leave a tip than that of households who pay the bill with cash or other type of payment, which is statistically significant at the 1% level. Households with male primary respondent have a 4.23% higher probability to leave a tip compared to households with a female primary respondent which is statistically significant at the 1% level. Households with US-citizen primary respondent have a 6.13% higher probability to leave a tip than that of households with a non-US citizen primary respondent which is statistically significant at 10% level. The variable level of education of the primary respondent and number of guest are not statistically significant but the coefficients indicate that the probability of leaving a tip increases as the number of guest increases. This supports the idea that people tip to gain social approval and to maintain social status which is similar to the findings by Saunders and Lynn (2010) for tip size.

Table 27: Linear Probability Model for Full-Service Restaurants

Linear Probability Model						
Dependent Variable: Tipping Decision (Yes=1, No=0)						
Explanatory Variable	**Full Model**			**Reduced Model**		
	Coefficient	**SE**	**P-value**	**Coefficient**	**SE**	**P-value**
Low income	-0.0311**	0.011	0.007	-0.0301***	0.008	0.001
Middle income	-0.0202	0.021	0.332	-0.0249	0.019	0.210
Check	0.0121	0.041	0.771	0.0219	0.041	0.599
Debit card	0.0109	0.008	0.192	0.0121	0.009	0.163
Credit card	0.0166	0.011	0.134	0.0199	0.012	0.103
Gift card	0.0537***	0.010	0.000	0.0624***	0.008	0.000
Member 1	0.0023	0.045	0.960	-	-	-
Member 2	0.0229	0.051	0.654	-	-	-
Member 3	0.0107	0.048	0.824	-	-	-
Member 4	-0.0179	0.048	0.710	-	-	-
Member 5	-0.0092	0.069	0.895	-	-	-
No guest	-0.0058	0.016	0.727	-	-	-
Guest 1	0.0073	0.019	0.702	-	-	-
Guest 2	0.0148	0.017	0.410	-	-	-
HS diploma	-0.0109	0.013	0.433	-	-	-
College	-0.0128	0.016	0.422	-	-	-
Bachelor	-0.0275	0.017	0.109	-	-	-
Masters	-0.0184	0.022	0.412	-	-	-
Male	0.0423***	0.008	0.000	0.0409***	0.008	0.000
Metro	-0.0003	0.011	0.977	-	-	-
White	0.0069	0.020	0.737	-	-	-
Black	-0.0050	0.031	0.873	-	-	-
Hispanic	0.0050	0.015	0.739	-	-	-
US born	0.0589	0.041	0.165	-	-	-
US citizen	-0.0613*	0.034	0.077	-0.0073	0.009	0.433
Constant	0.9739***	0.047	0.000	0.9657***	0.011	0.000
F-statistics			2.75			16.77
***p<0.01, **p<0.05, *p<0.1						

Source: Author's estimation from FoodAPS, 2016

Reduced Model

In the reduced model, all insignificant variables are dropped. In this model, the variable low income, payment by gift card and gender of primary respondent are statistically significant at the 1% level, but citizenship of the primary respondent is not significant. This model shows low income households have a 3.01% lower probability to leave a tip compared to that of high income households. Households who pay the bill with gift

card have a 6.24% higher probability to leave a tip than that of households who pay the bill with cash or other type of payment. Households with male primary respondent have a 4.09% higher probability to leave a tip compared to households with a female primary respondent. Thus the probability of leaving a tip for low income households and gift card payment in the reduced model increased slightly but it decreased slightly for gender of primary respondent. Thus the result implies that income, payment method of the household and gender of the primary respondent determine the probability of leaving tip. On the other hand, education, number of household members, level of education, race and birth place do not significantly influence the probability of leaving a tip.

6.2 Results of Multiple Linear Regression Model

Full Model

Table 28 depicts the result of multiple linear regression models where the dependent variable tip size is continuous in nature and measured as the percentage of total bill paid by households. In the full model, the variable number of household members, number of guests in the household, gender of the primary respondent, location of household, race of primary respondent and birth place of primary respondent are statistically significant.

Households consisting of single members leave a 6.81% higher tips than those of households with more than five members which is statistically significant at the 1% level. But households with two members leave 5.00% higher tips than those of households with more than five members, which is statistically significant at the 5% level. And households with three members leave 5.08% higher tips than those of

households with more than five members, which is statistically significant at the 5% level. Households having four and five members are not statistically significant but the overall result for the number of households shows that the tip size decreases as the number of household members increases.

Table 28: Multiple Linear Regression Model for Full-Service Restaurants

Multiple Linear Regression Model						
Dependent Variable: Tip Size (Percentage of total bill)						
Explanatory Variable	**Full Model**			**Reduced Model**		
	Coefficient	**SE**	**P-value**	**Coefficient**	**SE**	**P-value**
Low income	-0.0065	0.012	0.586	-	-	-
Middle income	0.0021	0.023	0.925	-	-	-
Check	-0.0093	0.035	0.791	-	-	-
Debit card	0.0017	0.006	0.786	-	-	-
Credit card	0.0013	0.006	0.840	-	-	-
Gift card	0.0028	0.032	0.931	-	-	-
Member 1	0.0681***	0.022	0.003	0.0659**	0.022	0.006
Member 2	0.0500**	0.024	0.042	0.0484*	0.024	0.053
Member 3	0.0508**	0.020	0.015	0.0498**	0.022	0.031
Member 4	0.0085	0.020	0.676	0.0096	0.022	0.669
Member 5	0.0168	0.029	0.571	0.0128	0.031	0.677
No guest	0.0398***	0.010	0.000	0.0382***	0.009	0.000
Guest 1	0.0202*	0.011	0.070	0.0215**	0.010	0.042
Guest 2	0.0191	0.014	0.167	0.0188	0.013	0.151
HS diploma	-0.0076	0.014	0.590	-	-	-
College	-0.0035	0.013	0.792	-	-	-
Bachelor	0.0005	0.013	0.972	-	-	-
Masters	-0.0039	0.015	0.790	-	-	-
Male	0.0218***	0.007	0.003	0.0236***	0.007	0.002
Metro	0.0253**	0.010	0.014	0.0247**	0.011	0.039
White	0.0231**	0.011	0.043	0.0199*	0.010	0.059
Black	-0.0049	0.018	0.786	-0.0085	0.018	0.634
Hispanic	-0.0061	0.010	0.557	-	-	-
US born	0.0354**	0.015	0.023	0.0252**	0.009	0.009
US citizen	-0.0286	0.018	0.121	-	-	-
Constant	0.0314	0.037	0.396	0.0102	0.032	0.755
F-statistics			12.34			8.33
***p<0.01, **p<0.05, *p<0.1						

Source: Author's estimation from FoodAPS, 2016

Households having no guest leave 3.98% higher tips compared to households having three guests, which is statistically significant at the 1% level. Households having one guest leave 2.02% higher tips compared to households having three guests which is statistically significant at the 10% level. The variable two guests in the household is not statistically significant but the coefficients of the guest variable show that the tip size decreases as the number of guests increases. This indicates the free-riding and non-excludability nature of restaurant tipping which is supported by Parrett (2006) where he stated that tipping has free-riding effect and benefit of tipping is non-excludable.

Households with a male primary respondent leave a 2.18% higher tip than that of households with female primary respondent, which is statistically significant at the 1% level. The variable location of household, race and birth place of primary respondent are statistically significant at the 5% level. Households located in metropolitan areas have a 2.53% higher average tip size than that of households located in non-metropolitan areas. Households having white primary respondent leave a 2.31% higher tip compared to households with primary respondent of other race. Households with US-born primary respondent leave a 3.54% higher tip compared to households having non-US born primary respondent.

Reduced Model

In the reduced model, the same variables are statistically significant as the full model and the coefficients have decreased slightly for almost all variables except the gender of primary respondent and households with one guest where tip size has increased slightly. Households consisting of single member leave a 6.59% higher tips than that of households with more than five members, which is statistically significant at the

5% level. Households with two members leave a 4.84% higher tip than that of households with more than five members which is statistically significant at the 10% level. And households with three members leave a 4.98% higher tips than that of households with more than five members, which is statistically significant at the 5% level. Households having no guest leave a 3.82% higher tips compared to households having three guests which is statistically significant at the 1% level. But households having one guest leave a 2.15% higher tips compared to households having three guests, which is statistically significant at the 5% level.

Households with a male primary respondents leave a 2.36% higher tip than that of households with a female primary respondent, which is statistically significant at the 1% level. The variable location of household and birth place of the primary respondents are statistically significant at the 5% level but race of the primary respondent is statistically significant at the 10% level. Households located in metropolitan areas have a 2.47% higher tips size than that of households located in non-metropolitan areas. Households having white primary respondent leave a 1.99% higher tips compared to households with primary respondent of other races. Households with US-born primary respondents leave a 2.52% higher tips compared to households having non-US born primary respondents. This implies that the number of household members, number of guests, race, birth place, households' location and gender are most influential to determine the tip size while income, education and payment method have no influence on the tip size.

6.3 Results of Tobit Model

Table 29 shows the results of the Tobit model where the dependent variable is tip size. Tip size is a continuous variable calculated as the percentage of the total bill paid by households that includes both zero tip and positive tip.

Table 29: Tobit Model for Full-Service Restaurants

Tobit Model						
Dependent Variable: Tip Size (Percentage of total bill)						
Explanatory Variable	**Full Model**			**Reduced Model**		
	Coefficient	**SE**	**P-value**	**Coefficient**	**SE**	**P-value**
Low income	-0.0095	0.011	0.415	-	-	-
Middle income	0.0003	0.023	0.991	-	-	-
Check	-0.0075	0.038	0.842	-	-	-
Debit card	0.0037	0.006	0.574	-	-	-
Credit card	0.0043	0.007	0.538	-	-	-
Gift card	0.0080	0.032	0.806	-	-	-
Member 1	0.0733**	0.030	0.020	0.0694**	0.031	0.034
Member 2	0.0585*	0.032	0.078	0.0556	0.033	0.104
Member 3	0.0570*	0.028	0.052	0.0551*	0.031	0.083
Member 4	0.0093	0.028	0.740	0.0105	0.030	0.730
Member 5	0.0192	0.041	0.647	0.0133	0.043	0.759
No guest	0.0419***	0.012	0.002	0.0393***	0.010	0.001
Guest 1	0.0248*	0.013	0.066	0.0260**	0.012	0.038
Guest 2	0.0246	0.015	0.116	0.0236	0.014	0.108
HS diploma	-0.0089	0.014	0.550	-	-	-
College	-0.0036	0.014	0.801	-	-	-
Bachelor	-0.0016	0.014	0.911	-	-	-
Masters	-0.0055	0.016	0.738	-	-	-
Male	0.0263***	0.007	0.001	0.0283***	0.008	0.001
Metro	0.0269**	0.011	0.019	0.0265**	0.013	0.043
White	0.0265*	0.013	0.045	0.0218*	0.012	0.079
Black	-0.0065	0.022	0.768	-0.0119	0.022	0.598
Hispanic	-0.0051	0.012	0.681	-	-	-
US born	0.0442**	0.019	0.027	0.0294**	0.011	0.011
US citizen	-0.0388*	0.021	0.071	-	-	-
Constant	0.0162	0.044	0.713	-0.0101	0.041	0.805
F-statistics			9.60			6.23
***p<0.01, **p<0.05, *p<0.1						

Source: Author's estimation from FoodAPS, 2016

In both the full model and the reduced model, number of family members, number of guests, gender of the primary respondent, race of the primary respondent, birth place of the primary respondent and household's location are statistically significant. Marginal effects from Tobit models are compared to both linear probability model and multiple linear regression model in table 30.

6.4 Comparison of Tobit Model with LPM and MLR Model

Table 30 presents a comparison of the linear probability model and multiple linear regression model with the marginal effects from the Tobit model. In LPM model, the variable low income, gift card, gender and citizenship are statistically significant. But the marginal effects from the Tobit model show that number of household members, number of guests, household location, gender, race, birthplace and citizenship of the primary respondent significantly influence households' tipping decision.

Comparison of the multiple linear regression model with the Tobit model shows that more or less the same variables are statistically significant. Marginal effects in the non-zero positive tip scenario is a little lower than the other two scenarios. Households consisting of single members leave a 6.64% higher tips in zero and non-zero positive tip scenario and a 5.38% higher tips in non-zero positive tip scenario than that of households with more than five members, which are statistically significant at the 5% level and lower compared to the coefficient in multiple linear regression model. Households with two members leave a 5.03% higher tips in MLR model and a 5.30% higher tips in zero and non-zero positive tip situation which are statistically significant at the 5% level than that of households with more than five members, but leave a 4.29% higher tips in non-zero positive tip situation that is statistically significant at the 10%

level. Households with three members leave 5.06% higher tips in MLR model and 5.12% higher tips in Tobit model under the zero and non-zero positive tip situation and 4.15% higher tips in non-zero positive tip scenario compared to households with more than five members, which is statistically significant at the 5% level. The marginal effect decreases for three members under positive tip situation.

Table 30: Comparison among Models for Full-Service Restaurants

Dependent Variable **LPM: Tipping Decision (Yes=1, No=0)** **MLR: Tip Size (Percentage of total bill)** **Tobit: Tip Size (Percentage of total bill)**					
Explanatory Variable	**LPM**	**Tobit**	**MLR**	**Tobit**	
	Coefficient	**ME**	**Coefficient**	**ME (Zero and non-zero positive tip)**	**ME (Non-zero positive tip)**
Low income	-0.0252**	-0.0136	-0.0077	-0.0092	-0.0075
Middle income	-0.0158	-0.0005	0.0011	-0.0003	-0.0003
Check	0.0117	-0.0117	-0.0100	-0.0079	-0.0064
Debit card	0.0095	0.0056	0.0023	-0.0038	0.0031
Credit card	0.0144	0.0063	0.0020	-0.0043	0.0034
Gift card	0.0556***	0.0129	0.0039	-0.0087	0.0071
Member 1	-0.008	0.0979***	0.0685***	0.0664**	0.0538**
Member 2	0.0204	0.0780**	0.0503**	0.0530**	0.0429*
Member 3	0.0090	0.0755**	0.0506**	0.0512**	0.0415**
Member 4	-0.0206	0.0111	0.0079	0.0076	0.0061
Member 5	-0.0104	0.0235	0.0154	0.0159	0.0129
No guest	-0.0068	0.0567***	0.0404***	0.0385***	0.0312***
Guest 1	0.0065	0.0338*	0.0208**	0.0229**	0.0186*
Guest 2	0.0128	0.0338*	0.0201	0.0230*	0.0186*
Male	0.0414***	0.0356***	0.0223***	0.0242***	0.0196***
Metro	-0.0027	0.0374***	0.0264***	0.0253**	0.0205**
White	0.0061	0.0357**	0.0236**	0.0242**	0.0196**
Black	-0.0047	-0.0079	-0.0042	-0.0054	-0.0043
US born	0.0571	0.0611**	0.0370**	0.0415**	0.0336**
US citizen	-0.0645*	-0.0509*	-0.0274	-0.0346*	-0.0280*
Constant	0.9644***	-	0.0238	-	-
F-statistics	4.10	5.41	5.98	5.41	5.41
***p<0.01, **p<0.05, *p<0.1					

Source: Author's estimation from FoodAPS, 2016

Households having no guest leave a 4.04% higher tip in MLR and a 3.85% higher tip under the zero and non-zero positive tip scenario but a 3.12% higher tips under the non-zero positive tip scenario compared to households having three guests which is statistically significant at the 1% level. But households having one guest leave a 2.08% higher tips in MLR and a 2.29% higher tips under the zero and non-zero positive tip scenario but a 1.86% higher tips under the non-zero positive tip scenario compared to households having three guests, which is statistically significant respectively at the 5%, 5% and 10% level. Households having two guests are not significant in the MLR model but significant at the 10% level in the Tobit model. Households with a male primary respondent leave a 2.23% higher tips in MLR and a 2.42% higher tips under the zero and non-zero positive tip scenario but a 1.96% higher tips under the non-zero positive tip scenario, than that of households with female primary respondent which is statistically significant at the 1% level. Location of household is statistically significant at the 1% level and the 5% level in MLR and Tobit respectively. The variable race and birth place of meal planner are statistically significant at the 5% level in both MLR and Tobit, citizenship is not significant in MLR but becomes statistically significant at the 10% level in the Tobit model.

Households located in metropolitan areas have 2.64% higher tips size in MLR and 2.53% higher tips under the zero and non-zero positive tip scenario, but 2.05% higher tips under the non-zero positive tip scenario than that of households located in non-metropolitan areas. Households having a white primary respondent leave 2.36% higher tips in MLR and 2.42% higher tips under the zero and non-zero positive tip scenario but 1.96% higher tips under the non-zero positive tip scenario compared to households with primary respondent of other race. Households with a US-born primary respondent

leave 3.70% higher tips in MLR and 4.15% higher tips under the zero and non-zero positive tip scenario but 3.36% higher tip under the non-zero positive tip scenario compared to households having non-US born primary respondent. Citizenship is not statistically significant in MLR but significant in the Tobit model. Thus, the value of significant variables decreases under the positive tip scenario situation in Tobit model compared to the MLR model.

Chapter Seven: Findings and Conclusion

7.1 Findings

Households' food acquisition places have been categorized as full-service and fast food restaurant following Leschewski et al. (2018). Most of the households left tip in full-service restaurants. The size of the average non-zero positive tip for households is 18.56 percent in full-service restaurants. This supports the average tip size of 15 percent to 20 percent as mentioned in Azar (2007). Hypothesis testing suggests that households with a male primary respondent leave higher tip than that of households with female primary respondents which is consistent with the findings of Parrett (2006). Regression analysis shows that males tip 2.36 percent higher compared to females. Single member households and households without any guest have the highest average tip size. Households' average tip size decreases as the number of household members and number of guests increases. This is an implication for the situation when income per household member decreases because of increasing number of household members. Lower tip size with increased number of guests implies free-riding effect and also benefit of tipping is non-excludable Parrett (2006).

There is no statistically significant difference between metropolitan and non-metropolitan households for their average tip size. But multiple regression analysis shows that metropolitan households have higher tip size than that of non-metropolitan households holding other variables constant. Households with a Hispanic primary respondent leave less average tip compared to households with non-Hispanic primary respondents. But households a with white primary respondent leave higher average tip compared to households with primary respondents of other race. Households with a US-born primary respondent reported higher average tip than that of households with

non-US born primary respondents. But average tip size for US citizen households and Non-US citizen households are not statistically different. Average tip size for lower, medium and higher income households are not statistically significant. This implies households determine their tip size irrespective of their financial condition and view tipping more as a social norm rather than a rational behavior.

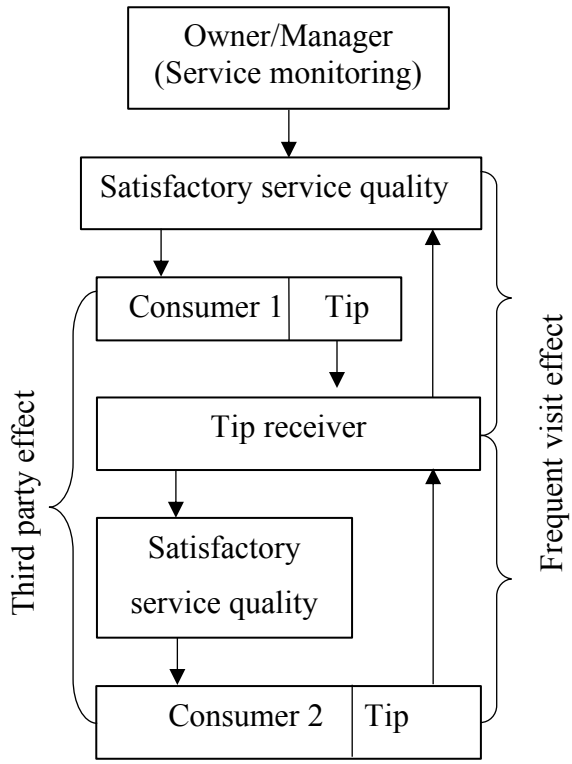
The LPM model implies that income, payment method of the household, and gender of the primary respondent determine the probability of leaving a tip. On the other hand, education, number of household member, level of education, race and birth place do not influence the probability of leaving a tip. Payment with a gift card increases the probability of leaving a tip compared to other payment methods. Comparison among LPM, MLR and Tobit shows that number of family members, number of guests, gender of the primary respondent, race of the primary respondent, birth place of the primary respondent and household's location are significant. This implies demographic and cultural factors are influential to determine households' tipping behavior.

7.2 Future Research

Tipping is a unique feature of the service sector and inevitably quality of service influences consumers' tipping behavior which is beyond the scope of this study. Figure 2 shows the nexus between tip and related parties based on service quality. Consumer 1 spends a tip, receiving satisfactory service that inspires the tip receiver to keep improving the service quality. As a result, consumer 1 again receives satisfactory service in his or her next visit. We can state it as a frequent visit effect of tipping on service quality. But the first consumer's tip has also a positive influence on the service quality provided to a second consumer. This is the third party effect of tipping on

service quality. Thus, a tip has continuous influence on both the utility functions of respective consumers and on the utility functions of other consumers.

Figure 2: Impact of Tip on Service Quality

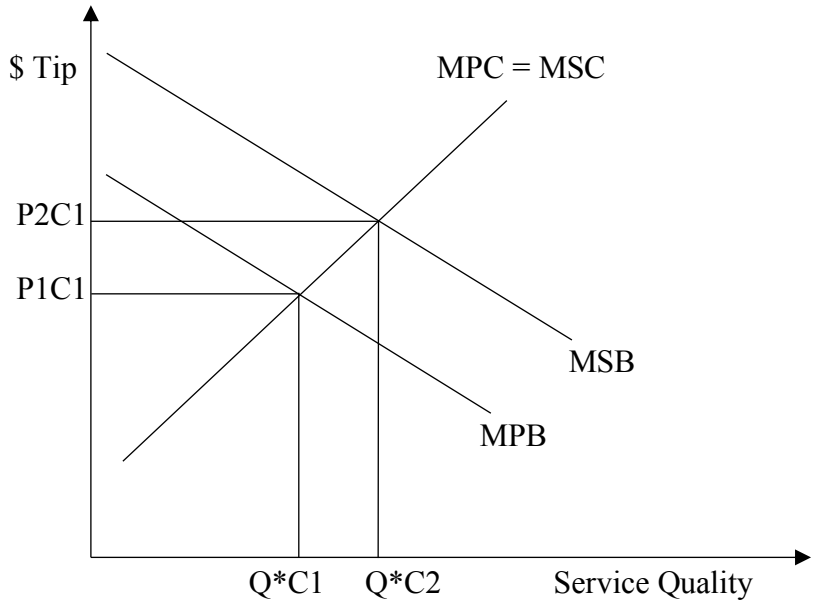


Source: Author's observation

Tip generates a positive externality as consumers consume service and leave a tip. The following graph illustrates the positive consumption externality of tip. When commodity price is P1C1, consumers get Q*C1 service quality that is where marginal private benefit and marginal private cost (MPC=MSC) equates. But when consumers add tip with commodity price, price rises to P2C1 and we can trace the marginal social benefit curve that leads to Q*C2 of service quality. Consumers who do not tip consumes (Q*C2-Q*C1) amount of service quality. Irrespective of the frequent visit effect, the third party effect or the social responsibility effect, tip influences service quality. Not

only that but service quality also might be influential for size of tip which works like a two-way cause and effect. So, all these aspects might be a fertile ground for further research.

Figure 3: Positive Consumption Externality from Tipping



Source: Author's observation

7.3 Conclusion

Existing studies differ widely in terms of study area and sample size to explain peoples' tipping behavior. All of these studies are based on primary data from particular cities of interest in different countries but do not represent a broad spectrum. Moreover, these studies do not include variables like income, birthplace and citizenship. This study aims at finding the determinants of peoples' tipping behavior based on a nationally representative dataset to represent more a consistent picture of consumers' tipping behavior in the USA. Based on this analysis, households' average tip size varies between 16% to 19% depending on particular restaurant scenario which is similar to

findings in existing literatures on tipping behavior study. One of the major findings is that male primary respondents have higher probability to leave a tip, and actually leave higher tips compared to female primary respondents. This results have important implication for the full-service restaurants in the USA. The average tip size may provide useful information for the restaurants' owner or the manager to determine minimum wage for waiters. On the other hand, the average tip size might give a signal to waiters to determine their level of service quality. It will be also helpful for restaurant waiters to get an idea about how much extra income they can earn from their job. Results from this study on influential factors of tipping behavior will contribute to future research related to peoples' tipping behavior or relation between tipping and service. This study finds that income does not influence households' tipping behavior but demographic and cultural differences are influential factors. Thus, it implies consumers view tipping more as a social norm rather than a rational behavior. This is evident by the results that shows US-born households, Hispanic and white households leave more tip than that of non-US born, non-Hispanic households and households with other race.

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